ORDINANCE NO. 2014 1120-1

AMENDING THE CHISAGO COUNTY ZONING ORDINANCE BY ADDING STANDARDS AND DEFINITIONS FOR SOLAR ENERGY SYSTEMS, SOLAR ENERGY FARMS AND FOR THEIR INSTALATION AND USE IN CHISAGO COUNTY

THE CHISAGO COUNTY BOARD OF COMMISSIONER ORDAINS:

The following language is hereby added to the Chisago County Zoning Ordinance:

7.31 SOLAR ENERGY SYSTEMS

A. GENERAL PROVISIONS,

1. Purpose and Intent
Chisago County finds that it is in the public interest to encourage the use and development of renewable energy systems that enhance energy conservation efforts, but result in limited adverse impact on nearby properties. As such, the County supports the use of solar energy collection systems and the development of solar energy farms. Chisago County also finds that the development of solar energy farms should be balanced with the protection of the public health, safety and welfare. The County resolves that the following standards shall be adopted to ensure that solar energy systems and solar energy farms can be constructed within Chisago County while also protecting public safety and the natural resources of the County. Consistent with the Chisago County Comprehensive Plan, it is the intent of the County with this Section to create standards for the reasonable capture and use, by households, businesses and property owners, of their solar energy resource, and to encourage the development and use of solar energy.

2. Severability
The provisions of this Section shall be severable and the invalidity of any paragraph, subparagraph or subdivision thereof shall not make void any other paragraph, subparagraph or subdivision of this section.

3. Applicability
These regulations shall apply to all solar energy systems and solar energy farms on properties and structures under the jurisdiction of the Chisago County Zoning. Those systems shall be defined as solar farms generating less than 50 megawatts of power. Chisago County shall refer any application for a large electric power generating plant (LEPGP)
to the Minnesota Public Utilities Commission (MN PUC) for approval. An LEPGP shall be defined as any solar energy system capable of producing more than 50 megawatts of power.

B. DEFINITIONS. The following words, terms and phrases, when used in this Section, shall have the meaning provided herein, except where the context clearly indicates otherwise:

**Building or Other Architecturally-Integrated Solar Energy System:** An active solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building. Building-integrated systems include, but are not limited to, photovoltaic or thermal solar systems that are contained within roofing materials, windows, skylights and awnings.

**CSES:** Community solar energy system.

**Community Solar Energy System (also called a “Solar Garden”):** A solar-electric (photovoltaic) array that provides retail electric power (or a financial proxy for retail power) to multiple community members or businesses residing or located off-site from the location of the solar energy system.

**Ground Mounted Panels:** Freestanding solar panels mounted to the ground by use of stabilizers or similar apparatus.

**Large Energy Power Generating Plant (LEPGP):** Any Solar Energy System capable of producing 50 megawatts or more of power.

**MN PUC:** The Minnesota Public Utilities Commission.

**Photovoltaic System:** An active solar energy system that converts solar energy directly into electricity.

**Roof or Building Mounted Solar Energy System:** A solar energy system that is mounted to the roof or building using brackets, stands or other apparatus.

**SES:** Solar Energy System

**Solar Access:** A view of the sun, from any point on the collector surface that is not obscured by any vegetation, building, or object located on parcels of land other than the parcel upon which the solar collector is located, between the hours of 9:00 AM and 3:00 PM Standard time on any day of the year.

**Solar Collector:** A device, structure or a part of a device or structure that the principal purpose is to transform solar radiant energy into thermal, mechanical, chemical or electrical energy.

**Solar Energy:** Radiant energy received from the sun that can be collected in the form of heat or light by a solar collector.

**Solar Energy System:** An active solar energy system that collects or stores solar energy and transforms solar energy into another form of energy or transfers heat from a collector to another medium using mechanical, electrical, thermal or chemical means.

**Solar Farm:** A commercial facility that converts sunlight into electricity, whether by photovoltaics (PV), concentrating solar thermal devices (CST), or other conversion technology, for the principal purpose of wholesale sales of generated electricity.

**Solar Garden:** A community solar energy system.

**Solar Hot Water System:** A system that includes a solar collector and a heat exchanger that heats or preheats water for building heating systems or other hot water needs.

**Solar Site Permit:** A land use permit required by the County for the installation of certain solar energy systems regulated by this Ordinance.
C. TYPES OF SOLAR ENERGY SYSTEMS: This Ordinance identifies and regulates the following four types of solar energy systems:

1. Rooftop or other Architecturally-Integrated Solar Energy Systems
2. Ground Mount Solar Energy Systems
4. Solar Farms

These systems shall be defined and regulated as follows:

1. **Rooftop or other Architecturally-Integrated Solar Energy Systems**: Systems which are accessory to the principal land use, designed to supply energy for the principal use. Rooftop or other architecturally-integrated systems shall be regulated as follows:

   a) Rooftop or other architecturally-integrated systems are permitted accessory uses in all districts in which buildings and structures are permitted.
   b) No Solar Site permit is required, but the owner or contractor shall obtain a building permit before installing a rooftop or other architecturally-integrated solar energy system.
   c) Commercial rooftop or other architecturally-integrated systems shall be placed on the roof to limit visibility from the public right-of-way or to blend into the roof design, provided that minimizing visibility but which still allows the property owner to reasonably capture solar energy.

2. **Ground-mount solar energy systems**: Systems which are accessory to the principal use and designed to supply energy for the principal use. Ground-mount systems shall be regulated as follows:

   a) Ground-mount systems are permitted accessory uses in all districts in which buildings and structures are permitted.
   b) Ground-mount systems require a Solar Site Permit and a Building Permit.
   c) Ground-mount systems shall be subject to the accessory use standards for the district in which they are located, including dimensional standards, such as yard setbacks.
   d) The height of ground-mounted components shall not exceed 10 feet.
   e) No ground-mounted solar energy system shall cover or encompass more than 10 percent of the total property area or lot size.

3. **Community Solar Energy Systems (Solar Gardens/CSES)**: Roof or ground-mount CSES's designed to supply energy for off-site users on the distribution grid (but not for export to the wholesale market or connection to the electric transmission grid) shall be allowed as a principal or accessory permitted use, in all districts unless otherwise regulated or prohibited in this section:

   a) Community Solar Energy Systems shall be located on parcels of land no less than five acres in size.
   b) Ground Mount CSES's which are sited upon a contiguous or aggregate site area footprint larger than 20 acres in size (whether commonly owned/controlled or not-so owned or operated) shall require a Conditional Use Permit, in accordance with Section E. Conditional Use Permit Requirements. The site area footprint size shall be computed by a determination of the Zoning Administrator.
   c) Prohibited Districts: The County prohibits CSES's within the following districts:

      1) Shoreland Districts as designated by the Department of Natural Resources (DNR) and the Chisago County Shoreland Management Ordinance;
      2) Within Six Hundred (600) feet of areas designated or formally protected from development by Federal, State or County agencies as wildlife habitat, wildlife management areas or designated as National Wild and Scenic land or corridor;
      3) Wetlands, to the extent prohibited by the Minnesota Wetland Conservation Act;
      4) The Floodplain District.
d) All CSES’s and CSES components must meet the setback, height and coverage limitations for the district in which the system is located.

e) CSES’s shall require a Solar Site Permit and a building permit, and are subject to the accessory use standards for the district in which they are located.

f) Power and communication lines. All on-site power and communication lines running between banks of solar panels and buildings shall be buried underground on premise. The Zoning Administrator may grant exemptions to this requirement in instances where shallow bedrock, water courses or other elements of the natural landscape interfere with the ability to bury lines.

g) Decommissioning Plan: The owner/operator shall submit a decommissioning plan for ground-mounted CSES’s to ensure that the owner or operator properly removes the equipment and facilities upon the end of project life or after their useful life. The owner or operator shall decommission the solar panels in the event they are not in use for twelve (12) consecutive months. The plan shall include provisions for the removal of all structures and foundations, the removal of all electrical transmission components, the restoration of soil and vegetation and a soundly-based plan ensuring financial resources will be available to fully decommission the site. The disposal of structures and/or foundations shall meet the requirements of the Chisago County Solid Waste Ordinance. The owner/operator shall provide a current-day decommissioning cost estimate, and shall post a bond, letter of credit or establish an escrow account, including an inflationary escalator, in an amount determined by the County Board, to ensure proper decommissioning.

4) Solar Farms: Ground-mount solar energy arrays which are the principal use on the property, that are designed for providing energy to off-site users or export to the wholesale market shall be a permitted use in the Agricultural district, except as otherwise regulated or prohibited in this section. Solar Farms shall be subject to the following:

   a) Solar Farms which have a generating capacity of 50 megawatts of power or more shall fall under the jurisdiction of the Minnesota Public Utilities Commission.

   b) Solar Farms shall be located on parcels of land no less than five acres in size.

   c) Solar Farms which are sited upon a contiguous or aggregate site area footprint larger than 20 acres in size (commonly owned/controlled or not so) shall require a Conditional Use Permit, in accordance with Section E. Conditional Use Permit Requirements. The site area footprint size shall be computed by a determination of the Zoning Administrator.

d) Prohibitions: The County prohibits community solar farms within:

   1) Shoreland Districts as designated by the Department of Natural Resources (DNR) and the Chisago County Shoreland Management Ordinance
   2) Six Hundred (600) feet of areas formally designated or protected from development by Federal, State or County agencies as wildlife habitat, wildlife management areas or designated as National Wild and Scenic land or corridor
   3) Wetlands to the extent prohibited by the Minnesota Wetland Conservation Act,
   4) The Floodplain District.

e) All Solar Farm components must meet the setback, height and coverage limitations for the district in which the system is located.

f) Power and communication lines. All on-site power and communication lines running between banks of solar panels and buildings shall be buried underground on premise. The Zoning
Administrator may grant exemptions to this requirement in instances where shallow bedrock, water courses or other elements of the natural landscape interfere with the ability to bury lines.

g) Decommissioning Plan: The owner/operator shall submit a decommissioning plan for ground-mounted CSES’s to ensure that the owner or operator properly removes the equipment and facilities upon the end of project life or after their useful life. The owner or operator shall decommission the solar panels in the event they are not in use for twelve (12) consecutive months. The plan shall include provisions for the removal of all structures and foundations, the removal of all electrical transmission components, the restoration of soil and vegetation and a soundly-based plan ensuring financial resources will be available to fully decommission the site. The disposal of structures and/or foundations shall meet the requirements of the Chisago County Solid Waste Ordinance. The owner/operator shall provide a current-day decommissioning cost estimate, and shall post a bond, letter of credit or establish an escrow account, including an inflationary escalator, in an amount determined by the County Board, to ensure proper decommissioning.

D. ADDITIONAL STANDARDS: In addition to the standards required above, the following standards shall apply to all Solar Energy Systems.

1. Compliance with Building Code. All SES's shall require a building permit, shall be subject to the approval of the County Building Official, and shall be consistent with the State of Minnesota Building Code.

2. Compliance with State Electric Code. All photovoltaic systems shall comply with the Minnesota State Electric Code.


5. Utility Notification. No grid-interried photovoltaic system shall be installed until the owner has submitted notification to the utility company of the customer’s intent to install an interconnected customer-owned generator. Off-grid systems are exempt from this requirement.

6. Security and equipment buildings. Security and equipment buildings on the site of solar farms shall be permitted uses accessory to the solar farm.

7. Controlled Access. The owner or operator shall contain all unenclosed electrical conductors located above ground within structures that control access.

E. SOLAR SITE PLAN REQUIREMENTS

1. A Solar Site Plan application shall be filed for all Ground Mount Solar Energy Systems sited on parcels 20 acres or less in size, contiguous or aggregate. The site area footprint size shall be computed by a determination of the Zoning Administrator.

2. Solar Site Plans shall require approval by the Zoning Administrator. Such approval shall be issued following an Administrative determination that the design requirements of this Ordinance have been met.

F. CONDITIONAL USE PERMIT (CUP) REQUIREMENTS

1. A Conditional Use Permit (CUP) shall be required for a Community Solar Energy System or a Solar Farm which is situated, (or which is staged to be eventually situated) on a contiguous or aggregate site area footprint larger than 20 acres in size, whether commonly owned/controlled or otherwise. Solar Farms and CSES's located on a site area 20 acres or less (contiguous or aggregate) in size shall be permitted uses. The site area footprint size shall be computed by a determination of the Zoning Administrator.
2. A CSBS or Solar Farm which has the capacity to generate 50 megawatts or more shall fall under the jurisdiction of the Minnesota Public Utilities Commission and shall not be subject to County review.

3. Landscaping:
Buffer Screening from routine view of the public right-of-way and immediately adjacent residences shall be required in an attempt to minimize the visual impact of above grade site improvements and any extensive or imposing perimeter security fencing that is proposed. Low lying screening, shrubbery, or other native vegetation shall be required around site perimeters or perimeter security fencing.

4. Corridor Preservation:
Natural wildlife, wetland, woodland or other lineal corridors shall remain open to travel by native fauna, reptilia and avialae. Perimeter fencing and security measures must accommodate unimpeded wildlife migration through large solar array development sites and areas. Plan approval may require corridor replacement, relocation, removal, and/or protection as determined by the Zoning Administrator.

5. Conditional Use Permit (CUP) Submittal Requirements.
CUP applications for solar energy systems shall be accompanied by horizontal and vertical elevation drawings, drawn to scale. The drawings shall show the location of the system components on the property, as well as other elements, including but not limited to the following:

- Existing features
- Proposed features
- Property boundaries
- Property zoning designation(s) including district property line and roadway setbacks
- Solar arrays, connecting lines, and all affiliated installations and structures
- Access points, drive aisles, security features, and fencing
- Topography & surface water drainage patterns and treatment systems
- Wetlands, Woodlands, Grasslands, Prairielands
- Existing and proposed/preserved/protected wildlife corridors (wetland/woodland/topography connectivity)
- Landscape Plan, including required screening of site perimeter and/or perimeter security fencing
- Floodplains
- Soils
- Historical features
- Archeological features
- Wildlife and ecological habitat
- Environmental mitigation measures
- Description of Project Staging (if applicable)

G. ZONING ORDINANCE AMENDMENTS.

The Chisago County Zoning Ordinance (08-3) shall be amended to reflect the above language upon its adoption, in all its relevant sections.

EFFECTIVE DATE
This Ordinance shall become effective following its publication in the official newspaper of the County.
Adopted by the Chisago County Board of Commissioners this 14th day of November, 2014

Chair, Richard Greene

This Instrument was drafted by
Chisago County Environmental Services
313 N. Main St., Rm. 243
Center City, MN 55012
North Star Solar Project
Environmental Assessment

In the Matter of the Combined Application of North Star Solar PV LLC for a Site Permit and Route Permit for the North Star Solar Electric Power Generating Plant and Associated 115 kV High Voltage Transmission Line in Chisago County

Minnesota Public Utilities Commission Docket no. IP6943/GS-15-33
Office of Administrative Hearings Docket no. 82-2500-32679

September 24, 2015
Abstract

North Star Solar PV, LLC (North Star) submitted a joint application to the Minnesota Public Utilities Commission (Commission) for a Site Permit to construct 100 MW of photovoltaic solar generation in in North Branch, Sunrise Township and Lent Township in Chisago County, and a Route Permit to build one-half mile of 115 kV transmission line to interconnect the Project at the Chisago Substation. The estimated developed area would cover approximately 800 acres.

North Star submitted its Site and Route Permit Application to the Commission on February 11, 2015. The Application was accepted as complete by the Commission on April 27, 2015. The docket number for the Site and Route Permits joint proceeding is E6943/GS-15-33.

Under the Power Plant Siting Act (Minn. Statute 216E), a site permit from the Commission is required to construct a large electric power generating plant or a high voltage transmission line. Department of Commerce (Commerce) Energy Environmental Review and Analysis (EERA) staff is responsible for conducting the environmental review for site and route permit applications submitted to the Commission (Minn. Rules 7850). Accordingly, EERA staff has prepared this Environmental Assessment (EA) for the North Star Solar Project. This EA addresses the issues required in Minnesota Rule 7850.3700, subpart 4, and those identified in the Department’s Scoping Decision of June 24, 2015.

Persons interested in this project can place their names on the Project Mailing List by contacting the Public Advisor: Tracy Smetana at consumer.puc@state.mn.us, 651-296-0406 or 1-800-657-3782. Documents of interest can be found on the Commerce and Commission eDockets system: https://www.edockets.state.mn.us/EFiling/search.jsp (enter the year “15” and the number “33”) or http://mn.gov/commerce/energyfacilities/Docket.html?Id=34064.
Following release of this Environmental Assessment, a public hearing will be held in the project area. The hearing will be presided over by an Administrative Law Judge from the Office of Administrative Hearings. Upon completion of the environmental review and hearing process, the record compiled on the Site and Route Permit Application will be presented to the Commission for a final decision. A decision on a Site and Route permit for the Project is anticipated by January 2016.
### Acronyms and Abbreviations

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ALJ</td>
<td>Administrative Law Judge</td>
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<tr>
<td>BMP</td>
<td>Best Management Practice</td>
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<tr>
<td>dBA</td>
<td>A-weighted sound level recorded in units of decibels</td>
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<td>EA</td>
<td>Environmental Assessment</td>
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<td>ECS</td>
<td>Ecological Classification System</td>
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<tr>
<td>EERA</td>
<td>Department of Commerce Energy Environmental Review and Analysis</td>
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<td>EMF</td>
<td>Electromagnetic field</td>
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<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
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<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
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<tr>
<td>kV</td>
<td>Kilovolt (one thousand volts)</td>
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<td>MW</td>
<td>Megawatt (one million watts)</td>
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<td>µG</td>
<td>Milligauss</td>
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<td>MDA</td>
<td>Minnesota Department of Agriculture</td>
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<td>Minnesota Department of Health</td>
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<td>MNDNR</td>
<td>Minnesota Department of Natural Resources</td>
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<td>MPCA</td>
<td>Minnesota Pollution Control Agency</td>
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<td>NAC</td>
<td>Noise Area Classification</td>
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<td>NEC</td>
<td>National Electrical Code</td>
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<td>National Electric Manufacturers Association</td>
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<td>NLCD</td>
<td>National Land Cover Database</td>
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<td>NLEB</td>
<td>Northern Long-eared Bat</td>
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<td>NHIS</td>
<td>National Heritage Information System</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<td>National Wetland Inventory</td>
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<td>POI</td>
<td>Point of Interconnection</td>
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<td>PWI</td>
<td>Public Waters Inventory</td>
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<td>Reinvest in Minnesota</td>
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<td>SHPO</td>
<td>State Historic Preservation Office</td>
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<td>Acronym</td>
<td>Description</td>
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<td>SPCC</td>
<td>Spill Control and Countermeasure</td>
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<tr>
<td>SSURGO</td>
<td>NRCS Soil Survey Geographic Database</td>
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<tr>
<td>SWPPP</td>
<td>Stormwater Pollution Prevention Plan</td>
</tr>
<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
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<td>USDA</td>
<td>United States Department of Agriculture</td>
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<tr>
<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
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1 Introduction

North Star Solar PV, LLC (North Star or Applicant) has made a joint application to the Minnesota Public Utilities Commission (Commission) for a Site Permit to construct 100 megawatts (MW) of photovoltaic (PV) solar generation in North Branch, Sunrise Township and Lent Township in Chisago County, and a Route Permit to build one-half mile of 115 kV transmission line to interconnect at the Chisago Substation (together referred to as the Project). North Star proposes to construct the Project at a single location in Chisago County, covering approximately 800 acres.

The permit application has been made pursuant to Minn. Statute 216E.04 and Minn. Rule 7850.

The Department of Commerce (Department) Energy Environmental Review and Analysis (EERA) staff is tasked with conducting environmental review on applications for site and route permits before the Commission. The environmental review process has produced this Environmental Assessment (EA) to inform the public, the applicant, and decision-makers about potential impacts and possible mitigation measures for the proposed Project.

This Environmental Assessment addresses the issues noted in Minn. Rule 7850.3700, subp. 4, and those identified in the Department’s Scoping Decision for the Project (see Appendix A), and is organized as depicted in Table 1 below:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Overview of this document and of the proposed Project.</td>
</tr>
<tr>
<td>2</td>
<td>Regulatory Framework</td>
<td>Delineation of the regulatory requirements and milestones associated with permitting and operation of the Project.</td>
</tr>
<tr>
<td>3</td>
<td>Proposed Project</td>
<td>Description of the Project as proposed by North Star, including PV arrays, roads and the electrical and transmission system.</td>
</tr>
<tr>
<td>4</td>
<td>Alternative Sites</td>
<td>Discussion of alternative sites considered and rejected for further consideration in the EA,</td>
</tr>
<tr>
<td>5</td>
<td>Human and Natural Impacts</td>
<td>Detail of the potential adverse impacts of the proposed Project on human and natural environments and measures that could be implemented to avoid, minimize or mitigate the impacts.</td>
</tr>
<tr>
<td>6</td>
<td>Siting Factors</td>
<td>Application of the information and data available in the record to date to the factors described in Minn. Rule 7850.4100.</td>
</tr>
</tbody>
</table>
1.1 Project Description

North Star has secured rights for 1,112 acres of agricultural land in southeast Chisago County. The final Project design (see Figure 1 below) is expected to occupy approximately 800 acres within that boundary. The Project’s primary components include PV modules mounted on a linear axis tracking system and solar inverters. The racking system foundations will utilize driven posts that for the most part would not require concrete. Other Project components include electrical cables, conduit, electrical cabinets, switchgears, step-up transformers, SCADA systems and metering equipment. The solar facility would be fenced and seeded in a low growth seed mix to reduce stormwater runoff and erosion.

Figure 1. Project Boundary and Vicinity
North Star expects to interconnect 100 MW of solar generation (accredited capacity of approximately 68 percent) at the 115 kV bus of the Chisago Substation in Lent Township (inside the southernmost portion of the Project boundary). This would require building approximately one-half mile of 115 kV line from the Project substation, across property owned by Xcel Energy to the Chisago Substation.

1.2 Project Purpose

The Project was proposed in response to Xcel Energy’s Solar Request for Proposals (RFP) to help fulfill the Minnesota Solar Energy Standard which requires the company to serve 1.5 percent of its retail load with solar energy by the end of 2020. As a result of the RFP, Xcel Energy negotiated Power Purchase Agreements (PPA) with three of the competing proposals for a total of 187 MW. The three solar projects are (1) Marshall Solar, a 62.25 MW project located near Marshall; (2) MN Solar I, a 24.75 MW project located near Tracy; and (3) the North Star 100 MW Project near North Branch. The Commission approved Xcel Energy’s "Solar Portfolio" in a March 24, 2015, Order.1

1.3 Sources of Information

Much of the information used in this EA is derived from documents prepared by North Star and Westwood Professional Services (Westwood), including the Joint Site and Route Permit Application (Application) and responses to questions from EERA staff (see Appendix D). In addition to material provided by North Star, information from scoping comments and from EERA analysis of the facility and the surrounding area, and EERA analysis of other solar facilities was used to prepare this document. GIS assistance was provided by EERA staff Andrew Levi.

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2 Regulatory Framework

Persons seeking to construct and operate a large electric power generating plant in Minnesota must seek permission to do so from the Minnesota Public Utilities Commission (Commission).

2.1 Certificate of Need

No person may construct a large energy facility in Minnesota without a Certificate of Need from the Commission (Minnesota Statute 216B.243). The proposed Project meets the definition of a large energy facility requiring a Certificate of Need under Minnesota Statute 216B.2421, subd. 2. However, under Minn. Statute 216B.243, subd. 9, the proposed Project is exempt from the Certificate of Need requirement because it is a solar electric generating facility that is intended to be used to meet the obligations of Minn. Statute 216B.1691.

2.2 Joint Site and Route Permit

Minnesota Statute 216E.03, subd. 1 prohibits construction of a large electric generating plant without a Site Permit from the Commission. A large electric power generating plant is defined as electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts or more (Minnesota Statute 216E.01, subd. 5). Minnesota Statute 216E.03, subd. 2 prohibits construction of a high-voltage transmission line (HVTL) without a route permit from the Commission. A high voltage transmission line is defined as a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length (Minnesota Statute 216E.01, subd. 4).

In 2014, the Legislature included large electric power generating plants powered by solar energy as eligible for review under the alternative permitting process (Minnesota Statute 216E.04, subd. 2 (8)). Minnesota Statute 216E.04, subd. 2 (3) qualifies high-voltage transmission lines of 115 kV as eligible for review under the alternative permitting process.

In addition, Minn. Rule 7850.1600 allows the proposer of a large electric power generating plant that will also require a high voltage transmission line to apply for both a site permit for the large electric power generating plant and a route permit for the high voltage transmission line in one application and in one process.

Considering all of the above, North Star Solar PV, LLC submitted a combined Application for a Site Permit and a Route Permit for review under the provisions of the Alternative Permitting Process as outlined in Minnesota Statute 216E.04 and Minn. Rule 7850.2800-3900.

Id.
2.3 Environmental Review

The Department of Commerce, through EERA staff, is responsible for administering the environmental review process. Environmental review under the alternative permitting process includes public information/scoping meetings and the preparation of an environmental review document, the Environmental Assessment (Minnesota Rule 7850.3700). The EA is a written document that describes the human and environmental impacts of the Project and methods to mitigate such impacts.

The Deputy Commissioner of the Department determines the scope of the EA. The EA must be completed and made available prior to the public hearing.

2.3.1 Scoping Process

On April 10, 2015, Commission and EERA staff sent notice of the place, date and time of the Public Information and Scoping meeting to local government units and those persons on the Project contact list. Notice of the public meeting was also published in the Chisago County Press newspaper on April 16, 2015.

Commission staff and EERA staff jointly held a public information and scoping meeting (see Table 2) in Lent Township on April 30, 2015, proximate to the facility location identified by North Star. The purpose of the meeting was to provide information to the public about the proposed Project, to answer questions, and to allow the public an opportunity to suggest alternatives and impacts (i.e., scope) that should be considered during preparation of the environmental review document. A court reporter was present at the meeting to document oral statements.

<table>
<thead>
<tr>
<th>Place</th>
<th>Meeting Location</th>
<th>Date and Time</th>
<th>Attendance</th>
<th>Public Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lent Township</td>
<td>Town Hall 33155 Hemingway Avenue</td>
<td>Thursday, April 30, 2015 6:00 - 8:00 p.m.</td>
<td>100</td>
<td>22</td>
</tr>
</tbody>
</table>

4 Notice of Public Information/Scoping Meeting, April 10, 2015, eDocket no. 20154-109178-01
5 Affidavit of Publication, April 16, 2015, eDocket no. 20154-109599-02
6 Oral Comments Received During Scoping Meeting, April 30, 2015, eDocket no. 20155-110394-01
EERA received 18 written comments from the public by the end of the scoping comment period on May 15, 2015, in addition to the 22 comments offered at the public meeting. EERA also received six letters from federal, state and local governments.

Public comments addressed a variety of concerns, including: compliance with local ordinances; appearance and methods to mitigate the visual impact of the facilities; concern over possible health impacts from EMF; impacts of the proposed facilities on property values of adjacent properties; impacts of the facilities on the local economy; potential wildlife dislocation; the overall appearance of the solar installations and the potential for glare; and impacts of noise during construction and potentially during operation of the facilities. Other letters included comments on personal property rights, support for building in this area of lower yield agricultural lands, and general support for solar energy generation.

The Minnesota Department of Transportation (MnDOT) noted that the Project does not abut a state trunk highway. However, MnDOT requested that any site or route construction work or delivery of materials that may affect MnDOT right-of-way (ROW) should be coordinated with the agency.

The U.S. Fish and Wildlife Service (USFWS) provided a list of species that may occur in the Project vicinity. USFWS did not identify records of any federally listed species or proposed critical habitat in the Project area. They did recommend construction restrictions to protect the Northern Long-eared Bat and migratory birds.

The city of North Branch and Chisago County both submitted letters requesting the Commission consider the existing local solar ordinances when issuing a site permit, especially pertaining to setbacks and screening clauses. Lent Township submitted a similar letter but also included a recommendation for an alternative site (see Section 4).

Scoping comments are available for viewing on the Department’s EERA website; view or download at http://mn.gov/commerce/energyfacilities/Docket.html?Id=34064. Alternately, look up on eDockets at https://www.edockets.state.mn.us/EFiling/search.jsp (enter “15” for year and “33” for number).

These items and issues were incorporated into the EERA staff’s recommendation to the Department’s Deputy Commissioner on the EA Scoping Decision.

2.3.2 Scoping Decision

On June 19, 2015, after considering what action the Commission should take in regard to the alternatives put forth during the scoping process, the Commission elected to take no action in this matter.
After consideration of the comments, the Deputy Commissioner issued his Scoping Decision on June 24, 2015. A copy of this decision is attached in Appendix A. The items and issues brought forth during the scoping process were incorporated into the Scoping Decision.

### 2.4 Public Hearing

The Commission is required by Minnesota. Rule 7850.3800 subp 1 to hold a public hearing once the EA has been completed. The hearing will be conducted by Administrative Law Judge (ALJ) Barbara Case and is scheduled to be held on October 8, 2015 (see Table 3).

<table>
<thead>
<tr>
<th>Place</th>
<th>Meeting Location</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Region EMS</td>
<td>40245 Fletcher Ave, North Branch</td>
<td>Wednesday, October 7, 2015</td>
</tr>
</tbody>
</table>

The hearing was noticed separately from the EA, and details can be found online at http://mn.gov/commerce/energyfacilities/Docket.html?Id=34064. Interested persons may comment on the EA at the public hearing. Persons may testify at the hearing without being first sworn under oath. ALJ Case will ensure that the record created at the hearing is preserved and will provide the Commission with a report setting forth findings, conclusions and recommendations on the merits of the proposed project applying the siting criteria set forth in statute and rule.

Comments received on the EA become part of the record in the proceeding. EERA staff is not required to revise or supplement the EA document. A final decision on the Site and Route permits will be made by the Commission at an open meeting following the public hearing and filing of the ALJ’s report.

### 2.5 Final Decision

The Commission’s obligation is to choose sites that minimize adverse human and environmental impacts while ensuring continuing electric power system reliability and integrity, and also while ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion. Site and Route permits contain conditions specifying siting, construction and operation standards; permit templates prepared for the Project by Commission staff are attached in Appendices B and C.

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7 Scoping Decision, June 24, 2015, Department of Commerce, eDocket no. 20156-111832-01
8 Notice of Public Hearing, Commission, September 16, 2015, eDocket no. 20159-114043-01
There are a number of potential impacts associated with power plants or HVTLs that must be taken into account on any large electric power project. Minnesota Rule 7850.4100, A through N, identifies 14 factors that the Commission must consider when designating a site or route for a large electric power facility:

a. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;
b. effects on public health and safety;
c. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;
d. effects on archaeological and historic resources;
e. effects on the natural environment, including effects on air and water quality resources and flora and fauna;
f. effects on rare and unique natural resources;
g. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;
h. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;
i. use of existing large electric power generating plant sites;
j. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;
k. electrical system reliability;
l. costs of constructing, operating, and maintaining the facility which are dependent on design and route;
m. adverse human and natural environmental effects which cannot be avoided; and
n. irreversible and irretrievable commitments of resources.

At the time the Commission makes a final decision on the permit application, the Commission shall determine whether the EA and the record created at the public hearing address the issues identified in the scoping decision (Minn. Rule 7850.3900 Subp. 2).

The Commission shall make a final decision on a site permit within 60 days after receipt of the record from the ALJ. A final decision must be made within six months after the Commission’s determination that an application is complete. The Commission may extend this time limit for up to three months for just cause or upon agreement of the applicant (Minn. Rule 7850.3900 Subp. 1).

2.6 Other Permits

The Public Utilities Commission Site and Route permits are the only permits required for construction of a large electric power generating plant, but other permits or approvals may be required for certain construction activities such as construction activities within wetlands or new driveways. Table 4 identifies potential permits that may be required for North Star Solar to complete this Project.
<table>
<thead>
<tr>
<th>Regulatory Authority</th>
<th>Permit or Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal Approvals</strong></td>
<td></td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers (USACE)</td>
<td>Wetland Delineation Approvals</td>
</tr>
<tr>
<td></td>
<td>Jurisdictional Determination</td>
</tr>
<tr>
<td></td>
<td>Federal Clean Water Act Section 404 and Section 10 Permit(s)</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>Review for Threatened and Endangered Species – informal coordination</td>
</tr>
<tr>
<td>Environmental Protection Agency (EPA) Region 5 in coordination with the Minnesota Pollution Control Agency (MPCA)</td>
<td>Spill Prevention Control and Countermeasure (SPCC) Plan</td>
</tr>
<tr>
<td>Lead Federal Agency</td>
<td>Federal Section 106 National Historic Preservation Act Review – will occur if Project triggers a federal nexus such as USACE individual permit</td>
</tr>
<tr>
<td>U.S. Department of Agriculture</td>
<td>Form AD-1006 Farmland Conversion Impact Rating – will occur if Project triggers a federal nexus such as USACE individual permit</td>
</tr>
<tr>
<td></td>
<td>Conservation/Grassland/Wetland Easement and Reserve Program releases and consents</td>
</tr>
<tr>
<td></td>
<td>Farm Services Agency Mortgage Subordination &amp; Associated Environmental Review</td>
</tr>
<tr>
<td></td>
<td>Market-Based Rate Authorization</td>
</tr>
<tr>
<td></td>
<td>Waiver of Open Access Transmission Tariff, Open Access Same-Time Information System, and Standards of Conduct requirements applicable to transmission providers with respect to Seller’s ownership of generator interconnection facilities</td>
</tr>
<tr>
<td>Regulatory Authority</td>
<td>Permit or Approval</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Federal Aviation Administration</td>
<td>Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)</td>
</tr>
</tbody>
</table>

**State of Minnesota Approvals**

<table>
<thead>
<tr>
<th>Regulatory Authority</th>
<th>Permit or Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board of Water and Soil Resources</td>
<td>Wetland Conservation Act Approval</td>
</tr>
<tr>
<td>Minnesota Pollution Control Agency</td>
<td>Section 401 Water Quality Certification</td>
</tr>
<tr>
<td></td>
<td>National Pollutant Discharge Elimination System Permit (NPDES) – MPCA General Stormwater Permit for Construction Activity</td>
</tr>
<tr>
<td></td>
<td>Very Small Quantity Generator (VSQG) License – Hazardous Waste Collection Program</td>
</tr>
<tr>
<td></td>
<td>Aboveground Storage Tank (AST) Notification Form</td>
</tr>
<tr>
<td>Minnesota Department of Health</td>
<td>Environmental Bore Hole (EBH)</td>
</tr>
<tr>
<td></td>
<td>Water Supply Well Notification</td>
</tr>
<tr>
<td></td>
<td>Plumbing Plan Review</td>
</tr>
<tr>
<td>Minnesota Department of Natural Resources (MNDNR)</td>
<td>License to Cross Public Land and Water</td>
</tr>
<tr>
<td>Minnesota Department of Transportation</td>
<td>Utility Permits on Trunk Highway Right-of-way</td>
</tr>
<tr>
<td></td>
<td>Overweight Permit for State Highways – for transport of transformers, inverters</td>
</tr>
<tr>
<td></td>
<td>Access Driveway Permits for MnDOT Roads</td>
</tr>
<tr>
<td>Minnesota Department of Labor and Industry</td>
<td>Building Plan Review and Permits</td>
</tr>
<tr>
<td>Minnesota Public Utilities Commission</td>
<td>Site Permit for Power Plant Site</td>
</tr>
<tr>
<td></td>
<td>Exemption from Certificate of Need for Power Plant</td>
</tr>
<tr>
<td>Minnesota State Historic Preservation Office (SHPO)</td>
<td>Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey</td>
</tr>
</tbody>
</table>
## Regulatory Authority

<table>
<thead>
<tr>
<th>Permit or Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local Approvals</strong></td>
</tr>
<tr>
<td>Watershed Districts</td>
</tr>
<tr>
<td>Stormwater, drainage, floodplain permits</td>
</tr>
<tr>
<td>County</td>
</tr>
<tr>
<td>Right-of-way permits, road access permits, driveway permits</td>
</tr>
<tr>
<td>for access roads and electrical collection system, Wetland</td>
</tr>
<tr>
<td>Conservation Act Approval, parcel splits, platting</td>
</tr>
<tr>
<td>Townships</td>
</tr>
<tr>
<td>Right-of-way permits, crossing permits, parcel splits, platting</td>
</tr>
<tr>
<td>Municipality</td>
</tr>
<tr>
<td>Road access permits, and driveway permits for access roads</td>
</tr>
<tr>
<td>and electrical collection system, parcel splits, platting</td>
</tr>
</tbody>
</table>

### 2.7 Issues outside the Scope of the EA

The EA does not consider the following:

- No-build alternative
- Issues related to Project need, size, type or timing
- Any site or route alternatives not specifically identified in the Scoping Decision
- The manner in which landowners are compensated for rights or easements
3 Proposed Project

North Star has secured rights for 1,112 acres of agricultural land north of the Chisago Substation. The final Project design (see Figure 2 below) is expected to occupy approximately 800 acres within the city of North Branch and Sunrise and Lent townships (see Table 5). The Project’s primary components include PV modules mounted on a linear axis tracking system and solar inverters. The racking system foundations will utilize driven posts that for the most part would not require concrete. Other Project components include electrical cables, conduit, electrical cabinets, switchgears, step-up transformers, SCADA systems and metering equipment. The solar facility would be fenced and seeded in a low growth seed mix to reduce stormwater runoff and erosion.

<table>
<thead>
<tr>
<th>Township</th>
<th>Range</th>
<th>Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Branch</td>
<td>T35N</td>
<td>R21W</td>
</tr>
<tr>
<td>Sunrise Township</td>
<td>T35N</td>
<td>R20W</td>
</tr>
<tr>
<td>Lent Township</td>
<td>T34N</td>
<td>R21W</td>
</tr>
</tbody>
</table>

North Star expects to interconnect 100 MW of solar generation (accredited capacity of approximately 68 percent) at the 115 kV bus of the Chisago Substation in Lent Township (inside the southernmost portion of the Project boundary). This would require building approximately one-half mile of 115 kV line from the Project substation, across property owned by Xcel Energy to the Chisago Substation.

Since its initial Application, North Star has submitted an addendum to its Application making a minor modification to its Project by adding 10 acres as described and depicted in its filing (see Figure 2 below).

3.1 The Solar Generation Project

The facility will comprise PV modules mounted on linear axis tracking systems and centralized inverters. In addition to the modules grouped into arrays, the facility will also include electrical cables and conduit, electrical cabinets, step-up transformers, SCADA systems and metering equipment, an operations and maintenance (O&M) area, and roads providing access to the equipment. A perimeter fence will surround the Project.

3.1.1 PV Arrays

Each facility will include PV modules approximately 6.5 feet long and 3.25 feet wide mounted on a linear single-axis tracking system. The modules will be grouped into arrays.
Figure 2. Preliminary Project Design\textsuperscript{10}

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\textsuperscript{10} APP Addendum at Attachment A
While there are different technological variations, the most common PV cells consist of a specially treated conductor made up of two layers with relative positive and negative charges. This conductor is between two contacts that are connected to an external load. Individual PV cells can be combined as a module, or solar panel, to generate greater quantities of electricity. North Star’s current plan is to use the “Jinko JKM315P-72,” a 72-cell solar module. These modules are 77 x 39 x 1.6 inches, and will likely range from 310 to 315 watts per module. Grouped solar panels are referred to as a solar array. This progression is depicted in Figure 3.

![Figure 3. Photovoltaics](image)

PV systems convert both direct and indirect solar energy (direct and scattered sunlight) to electrical energy by capitalizing on nature’s inherent desire to keep electrical charges in balance. At the most basic level, electrical current is the flow of electrons through a conductor. When solar radiation strikes a PV cell some of it is absorbed exciting electrons within the cell. Some of these electrons move freely between layers from negative to positive. In the process, electrons from the positive layer are disrupted and “flow” back to the negative layer through the external load creating a continuous flow of electrons, or, a continuous flow of electric current as depicted in Figure 4.

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11 North Star Data Submission, EERA Question 01, August 21, 2015 (Appendix D)
PV systems can be configured as a “fixed” or “tracking” system. Permanently mounted in a stationary position, fixed systems are aligned to gather the greatest level of solar radiation over the course of the year. These systems are often subject to site-specific constraints, e.g., roof angle, which limit their overall efficiency.

The Project will use a single axis tracking system to allow the panels to track the sun across the sky. While more expensive than fixed-tilt systems, tracking systems can increase system efficiencies by as much as 33%. There are two general types of tracking systems: single axis and dual axis. Single axis systems track the sun from east to west throughout the day. Dual axis systems track the sun both east to west throughout the day and north to south throughout the year.

The panel blocks will be mounted on metal racks that will be installed on a series of posts driven into the soil. North Star anticipates that most, if not all of the tracking system foundations will be driven directly into the soil. In some cases the results from geotech soil tests may dictate concrete foundations be used. Each panel block contains internal access drives and electrical utilities to support the array. Power production circuits are separated from the tracking circuits, allowing the PV modules to operate during an unscheduled outage of the tracker system.

### 3.1.2 Roads

Within the facility gravel roads, typically 12 to 20 feet in width, will be constructed to provide access to the facility equipment for maintenance and, when necessary, emergency vehicles. Road configuration is dependent upon final design: a preliminary road configuration is depicted in the preliminary facility layout in yellow in Figure 2 above.

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14 National Aeronautics and Space Administration, 2011
The facility will be accessed from the public road network, through existing drives or possibly through establishment of a new access point. Other than the establishment of new facility access or improvements to existing access points, no upgrades or changes to existing roadway systems are necessary for construction or operation of the Project.\(^{16}\)

### 3.1.3 Operations and Maintenance Area

North Star will construct an Operations and Maintenance (O&M) area at the facility, probably near the Project substation. An offsite centralized warehouse may also be used to house strategic spare parts. An O&M area would have a flat gravel or grass area for parking and receiving. A building of approximately 3,000 to 5,000 feet would need to be constructed to house equipment used to operate and maintain the solar facility.

Lights will be installed on temporary 18-foot service poles during the construction phase of the Project. After construction, the temporary service poles will be removed and permanent motion-activated lighting installed near O&M areas, security gates and in perimeter areas. Lighting will be down lit to minimize impacts to adjacent landowners.

### 3.1.4 Electrical System

PV cells generate direct current (DC) electricity, which must be converted to alternating current (AC) electricity to be utilized on the electrical grid. This is done by an inverter. The electric cabling used to deliver the DC power from the panels to the inverters will typically be located in an underground trench (approximately two to three feet deep and one to two feet wide).

The final number of inverters for each facility is dependent upon the inverter size, inverter and panel availability as well as the final facility design. Each panel block will require one or more inverters, depending on the size of the panel block. Inverters will be installed adjacent to the panel blocks on an inverter skid or on a concrete pad, either of which may be enclosed. After inverters have converted the electricity to AC, transformers step up the electricity from low voltage to medium voltage (34.5 kV). Each inverter pad will contain one or more transformers to which the inverters will feed electricity.

The electricity from the step-up transformers will be collected via underground cables at the Project Substation. The Project Substation will occupy approximately two acres of fenced land, include a parking area and will be accessible using the Project access roads. It will consist of supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, and control equipment according to the specifications of the Interconnection Agreement with MISO and Xcel Energy. The Project Substation will transform the electric voltage from the intermediate level of 34.5kV to the interconnection voltage of 115kV. From there, the electricity will move onto the grid via the North Star HVTL (NS HVTL) at the Point of Interconnect (POI) at the Chisago Substation.

\(^{16}\) APP at 21
3.2 The HVTL Project

The NS HVTL Project will be constructed within a 75-foot right-of-way (ROW), mostly located parallel to existing transmission lines within Xcel Energy property, from the Project Substation to the Chisago Substation. It will be a single-circuit, 115 kV line built on wood or steel direct-embedded, braced-arm poles approximately 70 feet in height. Typical spans will be 300 to 340 feet. (See anticipated pole design in Figure 5). See Figure 6 for the anticipated alignment.

The proposed conductor for the NS HVTL Project is a 795 kcmil Aluminum Conductor Composite Reinforced (ACCR) line. The Applicant states the proposed transmission line will be designed to meet or surpass all relevant local and state codes, North American Electric Reliability Corporation (NERC) standards, and the National Electric Safety Code (NESC). These standards will be met for construction and installation, and all applicable safety procedures will be followed during construction and operation of the transmission line.  

17 Id. at 22
18 Id. at 23
Figure 6. Updated NS HVTL Proposed Route\textsuperscript{19}

\textsuperscript{19} North Star Data Submission, EERA Question 05, August 21, 2015 (Appendix D)
3.3 Project Construction

North Star anticipates that construction will begin in February 2016, with all facilities online by the end of 2016. See Table 6 below for an estimated construction schedule for the facility.

Table 6. Approximate Construction Timeline for Project

<table>
<thead>
<tr>
<th>Date</th>
<th>Construction Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2016</td>
<td>Commission Site and Route Permit Decisions</td>
</tr>
<tr>
<td>02/01/16</td>
<td>Construction begins:</td>
</tr>
<tr>
<td></td>
<td>• Grading and vegetation clearing where necessary</td>
</tr>
<tr>
<td></td>
<td>• Preparation of roadways, staging/laydown yards</td>
</tr>
<tr>
<td></td>
<td>• Installation of job site trailers, temporary restroom facilities</td>
</tr>
<tr>
<td></td>
<td>• Installation of foundation piles and racking</td>
</tr>
<tr>
<td></td>
<td>• Access road construction</td>
</tr>
<tr>
<td>05/30/16</td>
<td>Foundations for inverters, transformers, substation and O&amp;M building</td>
</tr>
<tr>
<td></td>
<td>Installation of transformers and inverters begin</td>
</tr>
<tr>
<td></td>
<td>Ongoing restoration/revegetation activities as necessary</td>
</tr>
<tr>
<td>06/01/16</td>
<td>HVTL construction begins</td>
</tr>
<tr>
<td>06/30/16</td>
<td>HVTL construction complete</td>
</tr>
<tr>
<td></td>
<td>Project Substation construction begins</td>
</tr>
<tr>
<td>08/01/16</td>
<td>Complete interconnection facilities</td>
</tr>
<tr>
<td>November 2016</td>
<td>Testing of the Solar Project commences</td>
</tr>
<tr>
<td></td>
<td>Commercial Operation</td>
</tr>
</tbody>
</table>

3.3.1 Site Preparation

North Star details its construction and restoration plan in its Application. Once necessary permits are obtained, North Star will begin preparing the facility location for construction. Once access to the site is established, woody vegetation will be cleared in areas where the PV installations and roads will be constructed. Additional site preparation tasks include establishment or improvement of access to the site, grading in some areas of the site to establish a level area for installation of the PV equipment, and establishment of staging and laydown areas within the Project boundary.

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20 APP at 26
21 Id. starting at 23
In order to provide a level surface for solar arrays, North Star anticipates grading approximately 170 acres. The intent of the grading is to establish a relatively uniform surface to accommodate the single axis tracking systems. The preliminary determination of areas to be graded was determined through assessment of the current grade, the direction of the grade and the desire to maximize useable space for the solar arrays.

The proposed grading process would include both cut and fill activities. Higher areas would be excavated (cut) and the material used to raise the surface (fill) of nearby lower areas. North Star will attempt to design the site so as not to require either the import or export of soils. North Star anticipates spreading any excess soils across the facility. An appropriate volume of topsoil will be stockpiled for replacement during decommissioning of the facility. Such materials will be stockpiled at multiple locations around the site in low berms and stabilized for long-term protection.

Early in the construction process, staging and laydown areas of approximately two to four acres will be established within the facility boundary. The staging areas will be used to receive and store delivery of construction materials and may house a temporary onsite construction office.

### 3.3.2 Construction of Solar Energy Facility

Following site preparation, solar arrays will be constructed in blocks ranging in size from 1 MW to 2 MW in rated nameplate capacity. Access roads will be constructed between the blocks. The size of the blocks will be dependent upon inverter and racking equipment specifications.

PV panels will be installed on a single-axis tracking system. North Star anticipates that the majority of the tracking system foundations will be a driven pier, although soil conditions at some locations may require that the tracking systems be installed in concrete foundations.

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

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

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22 North Star Data Submission, EERA Question 04, August 21, 2015 (Appendix D)
23 Id.
24 APP at 24
North Star will use Best Management Practices (BMPs) to limit erosion and soil compaction, during construction. Disturbance will occur during the normal course of work, which can take several weeks in any one location. As construction is completed, North Star will restore and revegetate disturbed areas.

### 3.3.3 Construction of HVTL Facility

Construction of the NS HVTL is anticipated to take approximately four weeks to complete, occurring around May or June of 2016. The Applicant expects to hire a contractor with experience constructing transmission, including using industry best practices of right-of-way clearing, staging, erecting transmission line structures and stringing transmission lines.

Vegetation will be cleared from the approved right-of-way according to NESC standards, minimizing the amount and effect of vegetation clearing activities where possible. The Applicant does not anticipate significant clearing and grading as the preferred alignment generally falls within existing transmission corridors or agricultural fields. Transmission structures will be stored in laydown areas and moved to location using Solar Project access roads and the existing transmission corridor.

Transmission poles will be direct-embedded and back-filled with crushed rock and soil. Spoil from the holes will be removed from the site as necessary or placed according to previous arrangements with the landowner; spoil will not be placed in any wetlands or other native habitats. Concrete pole foundations and guy wires may be used when necessary to address site specific soil conditions and to accommodate turns in the line.25

### 3.3.4 Post-Construction Restoration

As construction is completed, areas disturbed during construction will be restored. Temporary staging and laydown areas will be vacated and any temporary roads will be decommissioned and restored. The site will be graded to its natural contours, access roads will be re-graded, filled and dressed as needed. Any post-construction erosion control methods specific to the site will be implemented consistent with permits and contractor specifications. Soil compacted during construction will be loosened if necessary.

With the exception of access roads, all areas disturbed during construction will be re-vegetated with a weed-free, low-growing seed mix, e.g., clover, short grasses or flowers, low-growing forbs, low-growing wetland seed mixes or some other low-growing perennial cover. North Star anticipates working collaboratively with the Minnesota Department of Natural Resources (MNDNR) to establish and manage vegetation to benefit pollinators and other wildlife.26 Post-construction clean-up and site restoration activities are anticipated to take approximately two to four weeks to complete.

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25 *Id.* at 24
26 *Id.* at 26
3.4 Project Operation and Maintenance

The expected service life of the solar facility is 25 to 30 years. The expected service life of a transmission line would normally be significantly longer than that as a standalone facility. However, the NS HVTL only has use as part of the overall solar generation and associated facilities, so its expected service life is the same.

Solar generating facilities can be remotely operated through a real-time control system (SCADA) for most operations functions. However, North Star anticipates a permanent staff of up to 12 FTE, with at least some staff onsite daily. More staff will be onsite for scheduled maintenance (see Table 7). An operations and maintenance (O&M) facility will be constructed onsite for storage and local work space.

North Star will hire trained and qualified personnel for all maintenance activities. Regular maintenance of the Project facilities will include scheduled equipment inspections, road maintenance, vegetation maintenance including mowing the ground cover that is planted under the arrays at each facility, fence and gate inspection, lighting system checks, and PV panel washing as necessary (minimal to no washing is anticipated to be needed at Project facilities). Regular inspection for facility components will include inspection of:

- PV panels: visual examination of the panels and tracking system and surrounding grounds to verify panel and tracking integrity;
- Inverters, transformer and electrical panels: visual inspection of the devices including connection cabinets and the grounding network, check for presence of water and dust;
- Electrical inspection: measurement of insulation level and dispersion, inspection of main switches and safety devices (fuses);
- Cabling and wiring: visual inspection of buried and overhead electrical line and connection box to verify integrity;
- HVTL and Project Substation: regular visual inspection of the transmission system and substation checks and maintenance; and
- General facility inspection: visual inspection for the presence of animals, integrity of the fencing, nests, noise check for abnormal sounds.

North Star will create a maintenance plan for the Project to ensure continued performance of the solar facilities. The plan will include scheduled inspection of the major components and a scheduled maintenance cycle that counters the degradation or loss of efficiency (also referred to as derating/degradation) of the components that is expected over time. Once construction is complete, one or two trucks may be on site periodically, at intervals associated with the maintenance schedule (Table 7).

Id. at 26
Table 7. Solar Facility Operations and Maintenance\textsuperscript{28}

<table>
<thead>
<tr>
<th>Component and Task</th>
<th>Anticipated Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Photovoltaic Field</strong></td>
<td></td>
</tr>
<tr>
<td>PV modules visual check</td>
<td>Every two months</td>
</tr>
<tr>
<td>Wirings and junction boxes visual check</td>
<td>Quarterly</td>
</tr>
<tr>
<td>PV strings measurement of the insulation</td>
<td>Quarterly</td>
</tr>
<tr>
<td>PV strings and string boxes faults</td>
<td>Weekly</td>
</tr>
<tr>
<td>PV panels washing</td>
<td>Only as conditions warrant</td>
</tr>
<tr>
<td>Grass cutting (if necessary at site)</td>
<td>Once in Spring, once in Summer</td>
</tr>
<tr>
<td><strong>Electric boards</strong></td>
<td></td>
</tr>
<tr>
<td>Case visual check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Fuses check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Surge arresters check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Torque check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>DC voltage and current check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Grounding check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Case visual inspection</td>
<td>Every two months</td>
</tr>
<tr>
<td>Air intake and filters inspections</td>
<td>Every two months</td>
</tr>
<tr>
<td><strong>Inverters</strong></td>
<td></td>
</tr>
<tr>
<td>Conversion stop for lack of voltage</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>AC voltage and current check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Conversion efficiency inspection</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Datalogger memory download</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Fuses check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Grounding Check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Torque check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td><strong>Support Structures</strong></td>
<td></td>
</tr>
<tr>
<td>Visual check</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>PV module torque check on random sample</td>
<td>Twice Yearly</td>
</tr>
</tbody>
</table>

\textsuperscript{28} Id. at 29
3.5 Project Costs

North Star has estimated that the installation of the Solar Project as proposed will cost approximately $180 million, or $1.8 million per MW AC. Once operational, North Star anticipates annual operating costs of approximately $12 million. These estimates include labor, materials, and production taxes.\(^{29}\)

The construction of the NS HVTL is expected to cost approximately $500,000,\(^{30}\) presuming the Project Substation costs are subsumed under the Solar Project. Typically, transmission operating utilities assume between $2,000 to $5,000 per mile per year for line maintenance, including vegetation management and regular aerial inspection of the ROW. The North Star transmission connection is less than one mile in length.

3.6 Decommissioning or Repowering

North Star anticipates the useful life of the solar facility will be approximately 25 to 30 years.\(^{31}\) Determination of a facility’s useful life is influenced by energy market conditions, regulations, anticipated equipment lifetime, highest and best use of the underlying property and ongoing operations costs.

At the end of the Project’s useful life, North Star will determine whether to decommission the facility consistent with the terms of the Site Permit, or to seek repowering of the facility. A number of criteria play into deciding whether or not to decommission or to extend or repower a facility, including the following:

- Extension of an existing or the execution of a new power purchase agreement. The decision on whether to extend the power purchase agreement considers the local energy demand and the cost of electricity from other generation sources;
- The cost to repower and generate the electricity, including the cost to repair or replace non-power producing equipment such as racking and foundations;
- The cost to decommission;
- The opportunity cost to utilize the land differently (best and highest use of the land);
- Regulations; and
- On-going maintenance and operational costs.

Section 9 of the Site Permit Template (see Appendix B) requires that North Star prepare a Decommissioning Plan prior to operation of the Project. The Decommissioning Plan should document North Star’s plan for decommissioning of the Project, restoration of the site, estimated cost of decommissioning, and a description of how North Star will ensure that the financial funds necessary to decommission the Project are available.

\(^{29}\) Id. at 15
\(^{30}\) Id. at 16
\(^{31}\) Id. at 30
North Star estimates it will take approximately six months to complete all decommissioning tasks, assuring that all equipment is either recycled or disposed of properly, and that full restoration is complete. North Star has provided the following breakdown of typical decommissioning tasks:

- Modules are inspected for physical damage, tested for functionality, and removed from racking. Functioning modules are packed and stored for reuse. Non-functioning modules are sent to the manufacturer or a third party for recycling or other appropriate disposal;
- Racking, poles and fencing are dismantled and removed to a metal recycling facility;
- Aboveground wire is sent for proper disposal and recycling. Belowground wire may be abandoned in place;
- Aboveground conduit is disassembled onsite and sent to a recycling facility;
- Junction boxes, combiner boxes, external disconnect boxes, etc., are sent to an electronics recycler;
- Inverters are sent to the manufacturer or an electronics recycler as applicable, and functioning parts will be reused;
- Concrete pads are sent to a concrete recycler; and
- Computers, monitors, hard drives, and other components are sent to an electronics recycler, and functioning parts are reused.

For the NS HVTL installation, conductor is removed first; any anchors or guy wires used are removed. Materials from the anchors or guys more than four feet in the ground can be abandoned in place. Poles are removed, and holes are subsequently back-filled. HVTL conductor, anchors, guy wires, and pole structures are recycled or disposed of as applicable.

After all equipment is removed, the facility is restored. Holes created by poles, concrete pads, and other equipment are filled in with soil. Access roads are removed, with the land restored to preconstruction conditions. Where necessary, topsoil is replaced to restore land for its original (existing) purpose. 32

North Star's Decommissioning Plan is required to include financial plans for assuring sufficient resources for decommissioning costs. 33 At this point, North Star intends to establish an escrow account, enter into a surety bond or create a reserve fund for decommissioning approximately halfway through the Project life (in order to best predict anticipated decommissioning costs or salvage values). In addition, North Star has included an obligation to decommission the Solar Project and NS HVTL Project components in its applicable landowner easements. 34

32 Site Permit Condition 9.2
33 Site Permit Condition 9.1
34 APP at 30
4 Alternative Sites or Routes

Alternatives are not required under the alternative permitting process in Minnesota Statutes 216E.04 subd.3. North Star did not consider any alternative sites or routes for the Project.35

References were made during the scoping meeting about the possibility of alternatively siting the Project in the Carlos Avery Wildlife Management Area (WMA) and the possibility of using rooftop installations. EERA concluded that these are not feasible alternatives. Use of the Carlos Avery WMA is not feasible because of conflicts with Department of Natural Resources intended use policies, including hunting, wildlife habitat protection and availability for public access to the area. Since the facility location proposed by North Star is 800 acres in size, there is simply not enough rooftop space available for a locational match between a utility-scale solar project and the identified interconnection substation.

Lent Township proposed a hybrid project area36 that excluded sections of the North Star proposal and incorporated the combined development of other solar facilities near the proposed North Star Project. North Star stated that relocating or combining any portion of its proposed Project with these properties could be challenging. In particular, an active competitor would need to release its rights and control of the parcels in question to North Star. Without eminent domain authority, North Star is dependent on voluntary property agreements.

The proposed transmission route is short (approximately 1/2 mile), on one owner's property (Xcel Energy) and unopposed. The entire route length is within the proposed Project boundary. No alternative routes were suggested by the public.

Alternative Sites and Routes Included in the EA

On June 4, 2015, EERA staff provided the Commission with a summary of the EA scoping process.37 The summary indicated that EERA staff favored including the facility location proposed in the North Star Application and the Lent Proposal alternative site. EERA did not recommend any transmission route alternatives.

On June 19, 2015, the Commission stated it did not consider the Lent Proposal would assist in making the ultimate decision on the permit application (Minn. Rule 7850.3700); especially considering the Applicant's lack of interest in developing in that area and the Commission's own concerns about permitting a site currently controlled by other developers.

Given the lack of interest by the Applicant in expanding its Project boundary to include any of the alternative sites, and given the concerns of the Commission in considering an alternative site for permitting, this Environmental Assessment reviews only the site and route in North Star's Joint Site and Route Permit Application.

35 Id. at 15
36 Lent Township Scoping Comment, eDocket no. 20155-110565-05
37 EERA Comments on the Scoping Process, June 19, 2015, eDocket no. 20156-111167-01
5 Potential Impacts of the Proposed Project

This section provides an overview of the resources and potential impacts and mitigation measures associated with the Proposed Project. Specifically, this section discusses and analyzes:

- The human and environmental resources affected by the project,
- Potential impacts to human and environmental resources, and
- Opportunities to avoid, minimize, or mitigate potential impacts.

5.1 Consideration of Potential Impacts

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

Direct impacts are caused by the proposed action and occur at the same time and place as the action. An indirect impact is caused by the proposed action, but is further removed in distance or occurs later in time. It must be reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. Cumulative impacts are the result of the incremental effects of the project in combination with other past, present, and reasonably foreseeable future projects.

5.1.1 Potential Impacts and Mitigation

Section 5 explains potential impacts from the Proposed Project on various resources. In addition, impacts are put into context using the following concepts:

Duration. Impacts vary over time. Short-term impacts are generally associated with project construction. Long-term impacts are associated with the operational life of the project and usually end with project decommissioning. Permanent impacts extend beyond the decommissioning stage of the project.

Size. Impacts vary by size. Size is a measure of how big something is. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.

Intensity. Impacts vary in intensity. Intensity is a measurement of the severity of an impact on a resource condition or function. To the extent possible, potential impacts are described quantitatively, for example, the percentage of affected individuals in a population.
**Location.** Impacts are location dependent. For example, noise impacts decrease as distance from the source increases, or common resources in one location might be uncommon in another.

**Uniqueness.** Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.

In combination with the anticipated on-the-ground effect, context is used to determine an overall resource impact level, and can range from highly beneficial to highly harmful. Impact levels are described using a qualitative scale, which is explained below. These terms are not intended as value judgements, but rather as a means to both ensure a common understanding among readers and, typically, to compare resource impacts between alternatives.

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

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

**Significant.** Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Effects might be spread out over a large area making them difficult to observe, but can be estimated by modeling. Significant impacts can be of any duration, and affect common or uncommon resources.

This section also discusses opportunities to avoid, reduce, or mitigate the level of impact. These actions are collectively referred to as mitigation.

**Avoid.** Avoiding an impact means it 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 project size or moving the project from a given location.

**Mitigate.** Impacts that cannot be avoided or further minimized might be mitigated. Mitigating an impact means fixing it by repairing, rehabilitating or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.
Some impacts are avoidable or can be minimized; some might be unavoidable but can be mitigated; others might be unavoidable and unable to be mitigated.

### 5.1.2 Potential Impacts and Regions of Influence

Potential impacts to human and environmental resources are analyzed in this EA within specific geographic bounds or regions of influence (ROI). The ROI for each resource is the geographic area within which a particular impact may exert some influence; it is useful as the basis for assessing the potential impacts to each resource as a result of the Project. Regions of influence vary with the resource being analyzed and the potential impact. The ROI for resources analyzed in this EA are summarized in Table 8.

The ROI for most human and environmental resources is the transmission line ROW and the permanent footprint of the Solar Project. Resources within the ROW and footprint could be impacted by the construction and operation of the project. For example, soils could be compacted; trees could be removed. Other resources may be impacted at a greater distance from the project. In this EA, the following ROI will be used for these resources:

- **Right of Way/Project Footprint** (the parcels within the Project Boundary, i.e., surrounding the transmission line/substation and those within the solar project footprint). This EA analyzes the impacts of displacement, agriculture, forestry and mining, soils, and flora using these ROI.

- **Immediate Area** (within 1500 feet of the project boundary). This ROI will be used for analyzing potential aesthetic, noise, property value and electric and magnetic field impacts. No impacts from these elements would be expected beyond this point.

- **Project Area** (one-mile buffer surrounding the project boundary). This ROI will be used for analyzing potential wildlife impacts and impacts to archaeological and historic resources and to rare and unique species. Direct impacts, if they occur, are anticipated to diminish relatively quickly such that potential impacts outside of the route width or Project footprint would be minimal to moderate. However, indirect impacts may extend beyond the ROW and the project. For example, indirect impacts to rare and unique species may extend beyond the ROW and Project footprint, particularly for wildlife species. Wildlife may move throughout a project area and may be impacted by limitations on their movement and their ability to access cover, food, and water.

- **Larger Area** (defined generally here as the county within which the Project occurs). Here, Chisago County will be used as the ROI for analyzing potential impacts to cultural values, socioeconomics, public utilities, airports, emergency services, air quality, and tourism and recreation. These are resources for which impacts may extend throughout communities in the project area.
Table 8. Regions of Influence for Human and Environmental Resources

<table>
<thead>
<tr>
<th>Type of Resource</th>
<th>Specific Resource/Potential Impact to Resource</th>
<th>Region of Influence (ROI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Settlement</td>
<td>Displacement</td>
<td>Right-of-Way or Project Footprint</td>
</tr>
<tr>
<td></td>
<td>Aesthetics, Noise, Property Values, Electronic Interference</td>
<td>Immediate Area</td>
</tr>
<tr>
<td></td>
<td>Zoning and Land Use Compatibility</td>
<td>Project Area</td>
</tr>
<tr>
<td></td>
<td>Socioeconomics, Cultural Values, Public Utilities, Airports, Emergency Services</td>
<td>Larger Area</td>
</tr>
<tr>
<td>Public Health and Safety</td>
<td>Electric and Magnetic Fields, Implantable Medical Devices, Stray Voltage, Induced Voltage</td>
<td>Immediate Area</td>
</tr>
<tr>
<td></td>
<td>Air Quality</td>
<td>Project Area</td>
</tr>
<tr>
<td>Land-Based Economies</td>
<td>Agriculture, Forestry, Mining</td>
<td>Right-of-Way or Project Footprint</td>
</tr>
<tr>
<td></td>
<td>Tourism and Recreation</td>
<td>Larger Area</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>Soils, Flora, Fauna</td>
<td>Right-of-Way or Project Footprint</td>
</tr>
<tr>
<td></td>
<td>Water Resources</td>
<td>Project Area</td>
</tr>
<tr>
<td>Archaeological and Historic</td>
<td>---</td>
<td>Project Area</td>
</tr>
<tr>
<td>Species</td>
<td>Rare and Unique Species</td>
<td>Project Area</td>
</tr>
</tbody>
</table>

5.2 Description of Environmental Setting

The North Star Solar Project and NS HVTL Project combined area is located on approximately 1,400 acres of land within the city of North Branch and Lent and Sunrise Townships in Chisago County, north of the Chisago Substation. This area is in the Wisconsin and Minnesota Thin Loess and Till Southern Part of the Northern Lake States Forest and Forage Region.38

This area is typically flat, with cropland and forestland as the major land uses. The Sunrise River parallels the Project about a mile east; an unnamed creek runs within a mile of the western boundary; and an unnamed, intermittent creek runs between the planned Solar Project and the Chisago Substation.

The MNDNR and the U.S. Forest Service have jointly developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota. The ECS places the Project within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Pre-settlement vegetation consisted of a mosaic of forest types. However, most areas have been cleared for agricultural use.

EERA staff uses the National Land Cover Database (NLCD) to provide an overview of current vegetative cover by land use in the Project area. The NLCD uses satellite imagery to display land cover across the United States. NLCD uses 16 classes of land cover, as described in Table 9, of which 14 are found within the study area (the Project Boundary plus a one-mile buffer).

Land cover within the Project Boundary is currently dominated by cultivated crops (79 percent). In addition, there are dispersed forested areas (7.5 percent), generally in windrows and shelterbelts. The developed space (6 percent) encompasses the Chisago Substation area. The proposed location avoids the limited wetlands in the area (see Figure 7).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Water</td>
<td>All areas of open water, generally with less than 25% cover or vegetation or soil</td>
</tr>
<tr>
<td>Developed, Open Space</td>
<td>Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.</td>
</tr>
<tr>
<td>Developed, Low Intensity</td>
<td>Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed, Medium Intensity</td>
<td>Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.</td>
</tr>
<tr>
<td>Developed, High Intensity</td>
<td>Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.</td>
</tr>
<tr>
<td>Barren Land (Rock/Sand/Clay)</td>
<td>Barren areas of bedrock, desert pavement, scarpes, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.</td>
</tr>
<tr>
<td>Deciduous Forest</td>
<td>Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.</td>
</tr>
<tr>
<td>Evergreen Forest</td>
<td>Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.</td>
</tr>
<tr>
<td>Mixed Forest</td>
<td>Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.</td>
</tr>
<tr>
<td>Shrub/Scrub</td>
<td>Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environments.</td>
</tr>
<tr>
<td>Grassland/Herbaceous</td>
<td>Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.</td>
</tr>
<tr>
<td>Pasture/Hay</td>
<td>Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.</td>
</tr>
<tr>
<td>Cultivated Crops</td>
<td>Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being tilled.</td>
</tr>
</tbody>
</table>
### Classification and Definition

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woody Wetlands</td>
<td>Areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.</td>
</tr>
<tr>
<td>Emergent Herbaceous Wetlands</td>
<td>Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.</td>
</tr>
</tbody>
</table>

**Table 10 and Figure 7** below provide a summary and visual of NLCD land cover within the Project Boundary and within the Project Area.

#### Table 10. Project NDLC Land Cover

<table>
<thead>
<tr>
<th>Land Cover Type (NLCD)</th>
<th>Project Boundary</th>
<th>Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Percent</td>
</tr>
<tr>
<td>Open Water</td>
<td>1.72</td>
<td>0.12</td>
</tr>
<tr>
<td>Developed, Open Space</td>
<td>56.98</td>
<td>4.06</td>
</tr>
<tr>
<td>Developed, Low Intensity</td>
<td>24.12</td>
<td>1.72</td>
</tr>
<tr>
<td>Developed, Medium Intensity</td>
<td>6.65</td>
<td>0.47</td>
</tr>
<tr>
<td>Developed, High Intensity</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Barren Land</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Deciduous Forest</td>
<td>91.09</td>
<td>6.49</td>
</tr>
<tr>
<td>Evergreen Forest</td>
<td>14.05</td>
<td>1.00</td>
</tr>
<tr>
<td>Mixed Forest</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Shrub/Scrub</td>
<td>16.90</td>
<td>1.20</td>
</tr>
<tr>
<td>Grassland Herbaceous</td>
<td>22.80</td>
<td>1.63</td>
</tr>
<tr>
<td>Pasture/Hay</td>
<td>43.19</td>
<td>3.08</td>
</tr>
<tr>
<td>Cultivated Crops</td>
<td>1,108.00</td>
<td>78.97</td>
</tr>
<tr>
<td>Woody Wetlands</td>
<td>2.68</td>
<td>0.19</td>
</tr>
<tr>
<td>Emergent Herbaceous Wetlands</td>
<td>14.82</td>
<td>1.06</td>
</tr>
<tr>
<td>Totals</td>
<td>1403</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 7. Project Area NLCD Land Cover
5.3 Effects on Human Settlement

Construction and operation of new generation or transmission facilities have the potential to impact human settlement. These impacts may be short-term, such as an influx of construction jobs, traffic impacts during the construction phase due to increased traffic or oversized loads or construction noise that is noticeable at neighboring residences or recreation facilities. Once constructed, there may also be long-term impacts such as changes in land use, displacement of homes or businesses or an increase in the local tax base.

5.3.1 Socioeconomic

The proposed facility is located in a rural area of Chisago County, immediately north of the Twin Cities area. Table 11 provides an overview of the population characteristics in the communities where the facility is proposed. The Project is located away from the population concentration centers of the local governments. The entire Project is in agricultural or rural residential-zoned areas.

Table 11. Socio-Economic Matrix of Proposed Project Area

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>5,303,925</td>
<td>5,453,218</td>
<td>2.8</td>
<td>66.6</td>
<td>17.4</td>
<td>59,836</td>
<td>11.5</td>
</tr>
<tr>
<td>Chisago County</td>
<td>53,887</td>
<td>54,134</td>
<td>0.5</td>
<td>129.9</td>
<td>5.5</td>
<td>67,157</td>
<td>7.5</td>
</tr>
<tr>
<td>North Branch</td>
<td>10,125</td>
<td>10,286</td>
<td>1.6</td>
<td>284.4</td>
<td>7.1</td>
<td>62,874</td>
<td>8.4</td>
</tr>
<tr>
<td>Lent Twn.</td>
<td>3,091</td>
<td>3,072</td>
<td>-0.6</td>
<td>95.4</td>
<td>5.1</td>
<td>80,104</td>
<td>6.1</td>
</tr>
<tr>
<td>Sunrise Twn.</td>
<td>1,994</td>
<td>1,985</td>
<td>-0.5</td>
<td>44.3</td>
<td>2.6</td>
<td>75,855</td>
<td>4.4</td>
</tr>
</tbody>
</table>

* Minority population includes all persons excluding non-Hispanic white.

The Proposed Project is not located in an area of disproportionately high minority populations or low-income populations.

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41 2010 U.S. Census  
43 2010 U.S. Census (Density calculated using land area.)  
44 U.S. Census Bureau 2009-2013 American Community Survey 5-Year Estimates  
45 Id.  
46 Id.
Potential Impacts
Socioeconomic impacts resulting from the project will be primarily positive with an influx of wages and expenditures made at local businesses during the construction of the project, increased tax revenue and increased opportunities for business development.

There will be a short-term influx of contractor employees during construction of the various aspects of the project. North Star anticipates that approximately 250-300 jobs will be directly created during the construction phase of the Project. The communities near the project are expected to experience short-term positive economic impacts during the construction phase of the Project through the use of the hotels, restaurants and other consumer goods and services by the various workers, as well as purchase of some materials such as fuel, concrete and gravel from local vendors.

Once the Project becomes operational, North Star anticipates up to 12 permanent employees will be required to operate and maintain the facilities.

North Star will pay property taxes on the facility to local governments in accordance with state and county law. Property taxes are calculated on the land underlying the facility; the value of the equipment at the facility is not included in the calculation. In lieu of the personal property tax on the equipment, Minnesota has adopted a production tax of $1.20 per MWh. Production taxes are calculated based on energy production, and are paid to the local governments where the facility is located; 80 percent to the county and 20 percent to the city or township. Based on North Star’s estimated annual electricity production of approximately 200,000 MWh, the production tax would produce approximately $240,000 annually for local governments.

The majority of the Project Area is currently used for agricultural purposes. The North Star Solar Project will result in up to 800 acres being removed from agricultural production for at least the anticipated 25 year minimum useful life of the Project. Impacts to agriculture are discussed further in Section 5.3.1, but the change in land use would result in a negligible loss of overall crop production in the county (about 0.7 percent of the 113,744 acres of farm land in Chisago County). North Star will compensate landowners for the land used for the facility, either through lease payments or purchase of the land.

If a PV facility is abandoned or is not decommissioned properly at the end of its useful life, the responsibility for proper disposal of the project components and restoration could fall on the landowner.

47 APP at 43
48 Id.
49 Minnesota Statutes 272.0295
50 2012 Census of Agriculture, USDA National Agricultural Statistics Service
Mitigative Measures

Socioeconomic impacts resulting from construction of the Project would be primarily positive with an influx of wages and expenditures made at local businesses during the construction.

North Star will compensate landowners for loss of use of the development area through lease payments or purchase of the land.

Section 9 of the Site Permit Template (Appendix B) addresses decommissioning and site restoration. Section 9.1 of the Site Permit Template would require North Star to file a Decommissioning Plan with the Commission prior to operation. Section 9.2 of the Site Permit Template would establish North Star as the responsible party for carrying out decommissioning tasks and sets out minimum standards for restoration. Section 9.3 of the Site Permit Template addresses abandoned solar installations.

5.3.2 Land Use and Zoning

Zoning is a regulatory tool used by local governments (counties, cities and some townships) to geographically restrict or promote certain types of land uses. Minnesota statutes provide local governments with zoning authority to promote the public health and general welfare.

The North Star Project is subject to permitting under Minnesota’s Power Plant Siting Act. With respect to the role of state permitting of large energy facilities, Minnesota Statute 216E.10, subdivision 1 states:

To assure the paramount and controlling effect of the provisions herein over other state agencies, regional, county, and local governments, and special purpose government districts, the issuance of a site permit or route permit and subsequent purchase and use of such site or route locations for large electric power generating plant and high-voltage transmission line purposes 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.

Although North Star is not required to seek permits or variances from local government to comply with local zoning, impacts to local zoning are clearly an impact to current and planned human settlement, and the Commission considers impacts to human settlement as a factor in its siting decision.

The facility is located in an area zoned by the local governments as agricultural or rural residential (see Figure 8 below). Rural residential zones are typically transitional areas between agricultural and urban areas. The North Star Solar Project is a compatible use within those zones.
Chisago County, North Branch and Lent Township address utility-scale solar facilities in their zoning ordinances, specifying zoning districts where they are compatible or incompatible and in many cases identifying performance standards such as setbacks and screening. The excluded areas, such as shoreland protection areas, do not occur in this case.

51 APP at Appendix C-3
Potential Impacts

The development of the facility would change the land use of the developed area from a generally agricultural use to an industrial use for at least 25 years. After its useful life, the development area could be restored for use as agricultural or other planned land uses. No other development plans have come to light for the immediate area for which the Project would serve as an impediment. Rather, the facility may serve a useful role in ensuring a productive use of the land until the location is ripe for other uses, or a return to its original use.

Mitigative Measures

There are no shoreland protection areas that require setbacks in the Project Area, so no mitigation or special appliance of local ordinance would be required.

Landscaping plans, described in Section 5.2.7, can be used to minimize visual impacts to adjacent land uses.

5.3.3 Property Values

Property values are influenced by a complex interaction of factors specific to individual parcels. These factors can include, but are not limited to, condition, improvements, acreage, or neighborhood characteristics, as well as proximity to schools, parks, and other amenities. In addition, local and national market conditions often influence property values. The presence of a utility-scale PV facility would become one of many interacting factors that could affect a property’s value.

Electrical generating facilities have the potential to impact property values. Often, negative effects from these facilities are the result of impacts that extend beyond the immediate footprint. Examples include noise, emissions and visual impacts. Unlike fossil-fueled electric generating facilities however, a PV facility would have no emissions and essentially no noise impacts to adjacent land uses during operation of the facility. The installation of PV facilities would create a visual impact, but lacking the height of smokestacks or wind turbines, the visual impact at ground level, or within a neighboring building, would be more limited.

A review of the literature found no research specifically aimed at quantifying impacts to property values based solely on proximity to utility-scale PV facilities. As the recently permitted Aurora Distributed Solar Project involves the first utility-scale PV facilities across Minnesota, comparable sales data do not exist. As the industry continues to develop comparable data should become available.

For these reasons, the impact to the value of one particular property based solely on its proximity to a utility-scale PV facility is difficult to determine. Widespread negative impacts to property values are not anticipated. In unique situations it is possible that individual property values might be negatively impacted.
**Mitigative Measures**

Landscaping plans, described in Section 5.2.7, can be used to minimize visual impacts to adjacent land uses. In addition, North Star has noted to EERA that they have made purchase offers to homeowners within the Project Boundary who might experience a visual impact.

**5.3.4 Public Services and Transportation**

Public services in the form of fire, law enforcement and emergency services are provided by Chisago County and local government units where the proposed facilities are located.\(^{52}\)

Telephone and electric services are delivered by electric utilities, and distribution lines are typically located along public roads. A major transmission corridor runs north and south through the western portion of the Project Boundary.

Water and sewer services in the area are generally provided by private wells and septic. The Minnesota Department of Health (MDH) County Well Index identifies three wells within the development footprint, including two irrigation wells.\(^{53}\)

**Potential Impacts**

Construction activities may inadvertently disrupt utilities. Underground utilities are particularly vulnerable to disruption, as construction personnel may not be aware of their existence.

North Star does not anticipate that facilities will be served by city water or sewer. They may install a well and septic system at an O&M facility to provide sanitary services and water for maintenance. North Star would need to obtain appropriate state and local permits for wells or septic systems installed as part of the facility.

Impacts to local electrical service are not expected, as the Project will interconnect with Xcel Energy’s transmission system at the Chisago Substation, but not its distribution system.

The facility is not crossed by a railroad, so there will be no impact to rail traffic. Potential impacts to air traffic are discussed in Section 5.2.8. None of the solar facility will be constructed over the Viking Pipeline.

The existing public road system that services and provides access to the proposed facilities is generally located along section lines and is managed by local government units. The facility will be accessed from the public road network. North Star will generally be able to use existing road access points, while in some cases it may require establishment of a new access point from the existing roadway network.

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\(^{52}\) APP at 45

\(^{53}\) Id.
Other than the establishment of facility access, no upgrades or changes to existing roadway systems are necessary for construction or operation of the Project. North Star will use existing roadways to deliver construction materials and personnel to facility construction sites, which may add approximately 40 vehicle trips per day during construction. No impacts to roads would be expected during the operation of the facility, as minimal traffic would occur during regular maintenance.

There are two FAA recognized airports located within three miles west and southwest of the Project Boundary. North Star screened whether or not FAA Notice form 7460-1 needed to be filed. North Star notes that the Project does not exceed notice criteria. Additionally, transmission structures are expected to be only about 70 feet tall.

EERA conducted a preliminary glare analysis using the Sandia National Laboratories' Solar Glare Hazard Analysis Tool (see Appendix E). The results indicate the Project would produce a "low potential for temporary after-image" at the two airports at only a limited number of times during the year. There was no indication the Project would cause any higher potentiality or any potential for physical/visual damage.

**Mitigative Measures**

As part of the facility design process, North Star would need to identify the locations of underground utilities and avoid impacts to those utilities in final facility design. Prior to construction, utility locations would be marked on site plans and on the ground to avoid impacts from construction activities.

North Star would need to follow MDH procedures to shut down private wells located within the development area.

New drives or access roads would require approval by appropriate local governments.

No mitigation is necessary for local airports, including for potential solar glare.

### 5.3.5 Displacement

Because of the land requirements, solar facilities are generally sited away from homes or businesses. North Star does not anticipate removing any of the three homes in the ProjectBoundary in the course of constructing and operating the solar facility. Therefore no potential impacts are noted, and no mitigative measures are required.

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54 *Id.* at 46
55 *Id.*
56 *Id.* at Appendix A-3
5.3.6 Noise

Noise, typically defined as a loud or unpleasant sound, is measured in units of decibels (dB) on a logarithmic scale. The A weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. For example, a noise level change of 3 dBA is barely perceptible to average human hearing while a 5 dBA change in noise level is noticeable. For the Project, noise would primarily be experienced during the construction phase of the Project and to a lesser extent during the operations phase from the inverters and transformers.

Recognizing that some level of noise is the necessary result of human activity, and that sensitivity to noise can reasonably differ depending upon the activity and site, the Minnesota Pollution Control Agency (MPCA) has established noise limits. Land use activities associated with residential, commercial and industrial land are grouped together into Noise Area Classifications (NAC). Residences, which are typically considered sensitive to noise, are classified as NAC 1. Each NAC is assigned both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) noise limits for land use activities within the NAC. Table 12 shows the MPCA daytime and nighttime limits in dBA for each NAC. The limits are expressed as a range of permissible dBA within a one-hour period; \( L_{50} \) is the dBA that may be exceeded 50 percent of the time within an hour, while \( L_{10} \) is the dBA that may be exceeded 10 percent of the time within one hour.

Residences would be the typical noise sensitive receptors in the Project Area. Current average noise levels in a similarly rural area would typically be in the 30 to 40 dBA range, well within acceptable limits for residential land use activities. Ambient noise in rural areas is commonly made up of farm equipment, wind, rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, would be expected near roadways, urban areas and commercial and industrial properties surrounding the Project vicinity.

Table 12. MPCA Daytime and Nighttime Noise Limits

<table>
<thead>
<tr>
<th>Noise Area Classification</th>
<th>Daytime</th>
<th>Nighttime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( L_{50} )</td>
<td>( L_{10} )</td>
</tr>
<tr>
<td>1</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>80</td>
</tr>
</tbody>
</table>

Potential Impacts

Noise concerns for the Project are related primarily to the construction phase as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction materials and personnel to and from the work area. North Star anticipates that construction activities will only occur during daylight hours.
During operation of the Project, the primary source of noise will be from the inverters, and to a lesser extent from the transformers and rotation of tracking systems, located at each facility. All electrical equipment will be designed to National Electrical Manufacturer Association (NEMA) Standards. The anticipated inverter model under consideration produces 65 dBA at the source. Preliminary facility design indicates that the closest home would be approximately 250 feet from any solar array. Because the inverters would be located within the solar arrays, noise impacts beyond the MPCA limits are not expected at residences during operation of the facility.

Noise from the electric collection system is not expected to be perceptible.

Because the facilities will not be generating electricity at night, the tracking systems would not be rotating and noise from inverters would be at less than peak levels.

While most maintenance activities would be performed during the day, it may be preferable to perform some maintenance activities after the sun is down in order to limit impacts to energy production.

**Mitigative Measures**

Section 4.2.5 of the Site Permit Template would require North Star to limit construction and routing maintenance activities to daytime working hours as defined in Minnesota Rule 7030.0200.

Maintenance activities that may potentially create excessive noise would necessarily be performed during the day in order to minimize noise impacts to nearby residents.

No mitigation measures are proposed for the operational phase of the project, as operational noise levels are not predicted to exceed the state noise limits.

### 5.3.7 Aesthetics

Aesthetics refer to the natural and built landscape that contribute to the public’s experience and appreciation of their environment. Features, such as wetlands, surface waters, landforms, forests and vegetation patterns are among the natural landscape features that define an area’s visual character. Buildings, roads, bridges and other structures represent the built environment imposed upon the natural landscape.

The scenic value or visual importance of an area is a subjective matter and depends upon the perception and philosophical or psychological response of the viewer. The level of impact to visual resources is also subjective and generally depends on the sensitivity and exposure of a particular viewer. The perceived impact can vary greatly from one individual to the next.

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58 APP at 40
Figure 9. Houses within 500, 1000 and 1500 Feet of Project Boundary

Legend
- Solar Project Boundary
- Boundary 500 ft Buffer
- Xcel Land Boundary
- Boundary 1000 ft Buffer
- Road
- Boundary 1500 ft Buffer
- Residence

59 Original Map generated by Westwood; homes located using aerial photography.
Potential Impacts

Installation of the proposed solar facilities will result in visible landscape changes as land that is now primarily covered in row crops or pastureland is converted to a solar facility. Based on preliminary facility design, up to 800 acres will be converted from its current use, primarily cropland or pasture, for at least 25 years, the minimum estimated useful life of a PV facility. The primary components of a PV solar facility that alter the landscape are solar arrays and the perimeter fencing. Samples of existing solar facilities near Oronoco Minnesota and Lambton County, Ontario are shown in Figure 10 and Figure 11.

Because of their relatively low profile, the facilities will not be visible from great distance. The aesthetic impacts will be experienced primarily by nearby residents and people using the roads adjacent facilities. There are 114 houses in the immediate area; 55 within 500 feet of the Project Boundary. (There are 34 within 500-1,000 feet and 25 within 1,000 to 1,500 feet; see Figure 9).

Figure 10. 517 kV Solar Facility - Oronoco, MN

When the PV panels are at a zero degree angle (sun is directly overhead) panels will be approximately four to six feet off of the ground. When panels are at their maximum tilt of 45 degrees (tilted east in the morning and west in the afternoon as the panels follow the sun) the tops of the panels will be approximately eight to ten feet off the ground.

Unlike concentrating solar, which uses mirrors to concentrate the solar energy to create heat energy used to create electricity, PV panels are constructed of dark, light-absorbing material and covered with an anti-reflective coating in order to limit reflection. Because of the materials used, glare and reflection are expected to be minimal (see Appendix E for glare analysis).

60 Aurora Distributed Solar
A limited amount of tree-clearing is anticipated in parts of the solar facility. The collector lines that connect the solar facility to the Project Substation are anticipated to be underground. Overhead transmission lines approximately 70 feet tall will run from the Project Substation for less than one mile south to the Chisago Substation. This 115 kV line will be smaller than other transmission lines (a 230 kV and a 500 kV line) sharing the same corridor. The line will, again, require limited tree-clearing.

Typical solar facilities are enclosed by an 8-foot security fence (a seven-foot chain link fence topped by another foot of barbed wire).

Lights will be installed on temporary service poles to provide lighting during the construction phase of the Project. After construction, the temporary service poles will be removed and permanent motion-activated lighting will be installed near O&M areas, security gates and in perimeter areas. Lighting will be down lit to minimize impacts to adjacent land uses. North Star anticipates that most maintenance activities will be performed during the day, although it may be preferable to perform some maintenance activities that require activation of facility lighting after the sun is down in order to limit impacts to energy production.

**Mitigative Measures**

The primary strategy for minimizing aesthetic impacts is choosing a site where solar facilities are in keeping with the existing landscape, separated as far as possible from existing homes or shielded from view by terrain or existing vegetation.

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61 Aurora Distributed Solar
Landscaping plans can be developed to identify site-specific landscaping techniques including vegetation screening, berms or fencing to minimize visual impacts to adjacent land uses.

As an alternative to chain link fencing (e.g., a seven-foot fence with an additional extension angled outward at 45 degrees), North Star is evaluating the suitability of an eight-foot wood pole and woven wire fence. This fence design is frequently referred to as a "deer fence" or an "agricultural fence." This wood pole and woven wire fence design potentially offers superior aesthetics to the standard chain link fence. North Star also asserts it meets the requirements for security and safety in the National Electrical Code 110.31 (D).

Screening the solar facility from residences is the most effective means to affect aesthetics. Chisago County, North Branch and Lent Township have each included a section on solar energy systems in their zoning ordinances, and each addresses the importance of screening. Lent Township (and North Branch in an amended version of its ordinance) included the following specifics for its permits:

1. Two rows staggered of conifer trees which must be a minimum of eight (8) feet in height at the time of installation, and reach a minimum maturity height of twelve (12) feet will be required to screen the use from public right-of-way and immediately adjacent residences or

2. Alternative buffer and screening using a combination of trees, shrubs, fences and/or berms that completely screen the use from public right-of-way and immediately adjacent residences.

The Commission can consider local ordinances in its decision or impose reasonable conditions of its own in the Site Permit.

North Star is developing a landscaping plan applicable to each residence that is immediately adjacent the project, accounting for the existing visual corridor between a residence and the proposed project, such as existing vegetation, topography and distance. North Star plans a tailored approach that will comprise a combination of evergreen trees and ornamental flowering trees and shrubs. Screening made up of these different species is intended to provide year-round visual screening and also serve as wildlife habitat.

**5.3.8 Public Health and Safety Including EMF**

Safety issues at PV facilities are largely associated with construction. Safety concerns associated with the operation of a PV facility are limited.

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62 North Star Data Submission, EERA Question 02, August 21, 2015 (Appendix D)
63 Ordinance No. 2015-1, Section 4.18 (Solar Energy Systems), Lent Township
64 North Star Data Submission, EERA Question 03, August 21, 2015 (Appendix D)
Potential Impacts

The manufacturing process for PV panels does involve the use of hazardous chemicals, and proper disposal of the PV panels at the end of the Project is necessary to prevent leaching of the materials, in particular lead used in the soldering of individual cells onto a module.65

Unauthorized access to PV facilities, both during construction and operation phases, could result in safety issues. As with any large construction project, there is a potential for construction accidents including falls, vehicle accidents, electrical accidents, and power tool accidents. Unlike wind turbine installations, construction activity occurs close to ground level and special emergency procedures for rescue in tall and confined spaces are not necessary.

Compared to other solar technologies such as Concentrating Solar Power, PV installations, especially ones using anti-reflective surfaces such as proposed by North Star, are unlikely to create hazards to aircraft. North Star conducted the FAA Notice Criteria screening tool for the two FAA-registered airports within three nautical miles of the facility and determined no further aeronautical study or FAA filing is needed.66

Electric and Magnetic Fields

Voltage transmitted through any conductor of electricity produces both an electric field and a magnetic field in the area surrounding the wire. For example, the electric field associated with electric transmission lines extends from the energized conductors to other nearby objects. The magnetic field associated with electric transmission lines surrounds the conductor. Together, these fields are generally referred to as electromagnetic fields, or EMF. These effects decrease rapidly as the distance from the conductor increases.

The North Star Project will require construction of a short 115 kV transmission line. The Project will also have buried 34.5 kV collections lines transmitting from the individual inverters and transformers to the Project Substation. This collection system is well removed from the public, with the closest residence to an inverter at approximately 400 feet distant.67 The transmission line is also set back from residences, with the closest residence approximately 1,100 feet away.68

Electric Fields

Voltage on any conductor produces an electric field in the area surrounding the wire. The electric field associated with a transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings and vehicles. The electric field from a transmission line gets weaker as one moves away from the transmission line. Nearby trees and building material also greatly reduce the strength of transmission line electric fields.

66 APP at Appendix A-3
67 *Id.* at 32
68 *Id.* at 33
The intensity of electric fields is associated with the voltage of the transmission line and is measured in kilovolts per meter (kV/M). Transmission line electric fields near the ground are designated by the difference in voltage between two points (usually 1 meter). There is no federal standard for transmission line electric fields. The Commission, however, has historically imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground. The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater.

North Star has modeled the electric field at and near the transmission line based on the maximum operating voltage (nominal voltage plus 5 percent) as noted in Table 13 below.

**Table 13. Calculated Electric Fields (kV/m) at One Meter above Ground**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Maximum Operating Voltage (kV)</th>
<th>-300'</th>
<th>-200'</th>
<th>-100'</th>
<th>-50'</th>
<th>0'</th>
<th>50'</th>
<th>100'</th>
<th>200'</th>
<th>300'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braced Post Steel or Wood Pole; Single-Circuit 115kV</td>
<td>121</td>
<td>0.006</td>
<td>0.013</td>
<td>0.056</td>
<td>0.200</td>
<td>0.739</td>
<td>0.188</td>
<td>0.058</td>
<td>0.015</td>
<td>0.007</td>
</tr>
</tbody>
</table>

**Magnetic Fields**

Current passing through any conductor, including a wire, produces a magnetic field in the area around the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as milligauss (µG), and is dependent upon the current flowing through the conductor. The peak magnetic field values for the NS HVTL were calculated at one meter above the ground at a point directly under the transmission line, where the conductor is closest to the ground. The same relative point was used to calculate the field going out from the alignment.

Buildings and other materials do not block magnetic fields in the same way that they block electric fields. However, the magnetic field associated with a transmission line still decreases rapidly with increasing distance from the conductor.

North Star has modeled the magnetic field at and near the transmission line based on the maximum operating voltage (nominal voltage plus 5 percent) as noted in Table 14 below. Actual current flow on the line will vary, so magnetic fields will generally be less than peak levels during most hours of the year.

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**Notes:**

69 Id. at 33
Table 14. Calculated Magnetic Flux Density (Milligauss) at One Meter above Ground\textsuperscript{70}

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Maximum Current (amps)</th>
<th>Distance to Centerline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-300'</td>
</tr>
<tr>
<td>Braced Post Steel or Wood Pole; Single-Circuit 115kV</td>
<td>502</td>
<td>0.56</td>
</tr>
</tbody>
</table>

\textit{Mitigative Measures}

Site permits typically require compliance with FAA determinations.

Construction will comply with local, state, and federal regulations regarding installation of the facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Project.

All facilities will be fenced to prevent unauthorized access to the facility.

Section 8.9 of the Site Permit Template requires North Star to prepare an \textit{Emergency Response Plan} prior to Project construction. The \textit{Emergency Response Plan} will identify procedures to be followed in the event of an emergency during construction. Contact information for emergency officials and the location of hospitals should be included in the \textit{Emergency Response Plan}.

There should be little or no change from the existing, ambient EMF outside the solar facility. There are no homes within the requested route, all within Xcel Energy property, or within 1,000 feet of the proposed alignment. Therefore, again, there would be no change from the existing EMF levels for any residence. In addition, based upon current scientific evidence, no adverse impacts from electric or magnetic fields associated with the Project solar or transmission projects are anticipated.

Since no EMF impacts are anticipated, this EA does not contain an exhaustive discussion of current literature and findings. For the reader who has more interest in EMF, Stray Voltage and other related issues and potential impacts, further information is available in other EERA environmental documents. The author refers the reader as an example to the Environmental Assessment for the Elko New Market Cleary Lake Area 115 kV Transmission Upgrade.\textsuperscript{71}

\textsuperscript{70} Id. at 34
\textsuperscript{71} Environmental Assessment, EERA, February 21, 2014, eDocket no. 20142-96692-01 at Section 5.7
5.3.9 Recreation

Outdoor recreational opportunities in the area include hiking, biking, camping, hunting, fishing, wildlife viewing, cross-country skiing and snowmobiling. Figure 12 displays the location of several areas of recreational use within and around the Project Area. None of these fall within the Project Boundary.

The only recreational use area that transacts the Project is the North Branch Sno Drifters Trail, a snowmobile trail that follows public right-of-way along 367th Street across a 1.25 mile portion of the Project. The Project itself is set back away from the public right-of-way, so the solar facility would not interfere with free movement along or require any relocation of the trail.

There are no federal, county or state parks within or adjacent the proposed facilities. There are three county parks within one to two miles of the planned facilities. One park, the Kost Dam County Park is within one-half mile to the east along the Sunrise River.

The Minnesota DNR has established Wildlife Management Areas (WMAs) to provide wildlife habitat, improve wildlife production, and provide public opportunities for hunting and trapping. WMAs are open to the public for hunting, fishing, trapping and wildlife viewing but are closed to all-terrain vehicles and horses because of potential detrimental effects on wildlife habitat. There are no Project facilities within any WMA. The North Star Solar Project is within one mile of both the Carlos Avery and Jane Johnson WMAs.

Scientific and Natural Areas (SNAs) are designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values. There are no SNAs within one mile of the Project facilities.

Waterfowl Production Areas (WPAs) provide habitat for a vast variety of plants and wildlife. WPAs provide opportunities for hunting, wildlife watching and photography. There are no WPAs located within one mile of the proposed facilities. A State Wetland Conservation Area is approximately one mile west of the Project Boundary.

There are no National Parks or National Wildlife Refuges identified within one mile of the Project facilities.

Potential Impacts

The proposed Project facilities will be located on private lands, so no public recreational lands will be directly impacted by construction or operation of the proposed PV or HVTL facilities. Visual impacts may affect individuals utilizing public or private lands within or near the proposed Project. Temporary noise impacts could be experienced by individuals using the recreational resources in the area during construction of the facilities.
Figure 12. Public Parks and Recreation Areas near the North Star Project\textsuperscript{72}

\textsuperscript{72} APP at Appendix C-2
Mitigative Measures

The proposed facilities will not have a direct impact on any public lands. No interference with the local snowmobile trail is anticipated. Except for specific visual screening for any perceived aesthetic impact to recreation, no other mitigative measures should be required.

5.4 Land-based Economies

Installation of a solar PV facility will result in a change of land use. The current land use would be displaced with the PV panels and the roads, fencing, inverters, electrical collection system and other infrastructure necessary to support the operation of the PV facility.

To the extent that the PV facility displaces other economic uses of the land, such as farming, mining or forestry, the facility will impact land-based economies at the site. Impacts on land-based economies on neighboring parcels are not anticipated.

5.4.1 Agriculture

Rural areas, with their relatively large parcels of relatively flat open land, tend to be attractive locations for developers seeking to site ground-mounted PV projects requiring 7 to 10 acres per MW.

Although much of the land in the Project Area has historically been used for agricultural purposes, there are differences in the quality and suitability of land for purposes of agricultural production. The United States Department of Agriculture (USDA) defines prime farmland as follows:

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Examples of soils that qualify as prime farmland are Palouse silt loam, 0 to 7 percent slopes; Brookston silty clay loam, drained; and Tama silty clay loam, 0 to 5 percent slopes.\(^{73}\)

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Although “prime farmland” characteristics are the same nationwide, the USDA also realizes that certain areas that do not meet the specific characteristics determined by soil classification data, are nevertheless important at a statewide level.

Additional farmland of statewide importance is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some States, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by State law.

The rules governing the siting of power plants provide for up to 0.5 acres of prime farmland to be used per MW in most areas unless there is no feasible alternative (Minnesota Rule 7550.4400). In this case, the 100 MW Project could use up to 50 acres of prime farmland. However, prime farmland is nonexistent within the Project Boundary. Also, the great majority of farmland of statewide importance in the area falls outside the Project Boundary.

Farmland that would be prime if drained is a minuscule percentage of all farmland in the area. In fact, drain tiling is generally not employed in the Project Area. North Star verified with participating landowners that no drain tile systems were in use within the Project Boundary.

Table 15 and Figure 13 summarize the quality of farmland as detailed in the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO).

### Table 15. Farmland Types in the Project Area

<table>
<thead>
<tr>
<th>Farmland Types (SSURGO)</th>
<th>Project Boundary</th>
<th>Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Percent</td>
</tr>
<tr>
<td>Prime</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Prime, if Drained</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Statewide Importance</td>
<td>80.83</td>
<td>5.76</td>
</tr>
<tr>
<td>All Other</td>
<td>1,322.17</td>
<td>94.24</td>
</tr>
<tr>
<td>Totals</td>
<td>1403</td>
<td>100</td>
</tr>
</tbody>
</table>

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74 Id.
75 APP at 49
Figure 13. Farmland Types (SSURGO) in the Project Area
Potential Impacts

The Table 15 total acreage within the Project Boundary (1403) represents the land in the Solar Project and the Transmission Project. The transmission should repurpose only a nominal amount of land for the areas immediately surrounding the pole structures. The solar facility could remove up to 800 acres from agricultural production. At the end of the facility’s useful life, a minimum of 25 years, North Star could decommission the facility and restore the land to agricultural use.

Construction of the facilities has the potential to damage agricultural soils through compaction or erosion if best management practices (BMP) are not implemented to minimize damage.

No areas of prime farmland would be removed from agricultural production for any part of the Project. Regardless, the prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to this Project because it is within "home rule charter or statutory cities; areas located within two miles of home rule charter or statutory cities of the first, second, and third class; or areas designated for orderly annexation."

Mitigative Measures

As part of the voluntary agreement between North Star and landowners, North Star will compensate the owners of the parcels directly affected by Project facilities through the negotiated purchase or lease of the land.

Section 4.2.7 of the Site Permit Template requires reasonable measures to minimize erosion during construction. Other permits have also included requirements to implement measures to protect and segregate topsoil and measures to minimize soil compaction.

According to the Applicant, "topsoil excavated during grading will be stockpiled and re-spread prior to the start of panel installation in the general array areas that are subject to cut [grading]. This will enhance the presence of topsoil for establishing vegetation during operations and for future agricultural use. Areas of fill will be initially filled with sub-soil and topped with a layer of topsoil as available. An appropriate volume of topsoil will be stocked piled [sic] for placement within the civil infrastructure footprint during decommissioning of the facility. Such materials will be stockpiled at multiple locations around the site in low berms and stabilized for long-term protection. The grading associated with the project will result in a more level site that will not impair future agricultural production. The permanent vegetative cover established during operations will enhance the organic composition of the soil and will very likely enhance the future use of the area for agriculture."

77 North Star Data Submission, EERA Question 04, August 21, 2015 (Appendix D)
5.4.2 Forestry

Although there are forested areas within the facility location, these areas are associated with shelterbelts, homesteads and waterways and are not managed for economic purposes. No economically significant forestry resources will be affected by the Project.

Mitigative Measures

No impacts to forestry resources are anticipated and therefore no mitigative measures are proposed.

5.4.3 Tourism

Tourism in the area of the proposed facility location is largely associated with the recreational activities discussed in Section 5.3.9. Impacts to tourism would be expected if the proposed facilities affected the overall experience of visitors to tourism sites, either through aesthetic impacts, noise or degradation of the natural resources such as air or water quality. No impacts to tourism are anticipated from the Project.

Mitigative Measures

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

5.4.4 Mining

Although there are four inactive gravel pits in the general vicinity of the proposed facilities, there are no active gravel pits or other mineral extraction sites located within or directly adjacent the development area.

Potential Impacts

Construction or operation of the proposed facilities would not impact any mining or mineral extraction activities. If sites are activated around the Project Boundary, that activity could have an effect on solar operations and efficiency due to fugitive dust. Local permitting agencies may consider dust control measures for those operations.

Mitigative Measures

As no impacts to mining or mineral extraction are anticipated, no mitigative measures are proposed.

5.5 Archaeological and Historic Resources

North Star requested a records search of Minnesota State Historic Preservation Office (SHPO) records for the Project Area in September 2014. North Star also performed a Phase I archaeological survey within the Project Boundary in October 2014.
The background review revealed an historic railroad bed (SHPO no. CH-LEN-009) located on Xcel Energy property in the HVTL Project Corridor, which had previously been recommended as not eligible for the National Register of Historic Places (NRHP). This site is not expected to be impacted by construction of the transmission line.

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78 APP at Appendix C-4
The Phase I survey identified three historic farmsteads (see Figure 14 above) within the Solar Project boundary. These sites were designated SHPO nos. 21-CH-0133, 21-CH-0134 and 21-CH-0135. Of the three, only the last would be impacted by construction of the solar facility under the proposed layout.

**Potential Impacts**

Archaeological and historic resources and artifacts can be impacted by the construction of a PV facility as soil is disturbed. If a site would be impacted, the first test of the significance of any resources would be to determine the site’s potential eligibility for enrollment in the NRHP. In the case of 21-CH-135, North Star commissioned a preliminary archaeological evaluation of the site by Westwood Professional Services and 10,000 Lakes Archaeology, Inc.

The study determined, "The Holtman site (21-CH-0135) is recommended not eligible to the NRHP due to a lack of archaeological integrity, and an inability to answer significant historic research questions. No additional field investigation on this site is recommended. Design plans for the parcel may proceed."79

As with any construction project, there remains a potential for impacts to unidentified archaeological properties in previously undisturbed portions of the facilities.

**Mitigative Measures**

Avoidance of archaeological and historic architectural properties is the preferred mitigative policy for construction of infrastructure projects. If avoidance is not possible, North Star has noted that appropriate mitigative measures will be developed in consultation with Minnesota SHPO, the State Archaeologist, and consulting American Indian communities.80

Section 4.2.16 of the Site Permit Template requires North Star to coordinate with SHPO in the event that new unrecorded sites are discovered during construction. The procedures outlined in permit condition could be formalized in an Unanticipated Discoveries Plan to outline the process for resolution should any previously unknown archaeological resource or human remains be encountered.

5.6 **Natural Environment**

The consideration of the impacts of an electric generation project on the natural environment, including air quality, water resources and flora and fauna is required as part of the environmental review. The range of potential impacts for a PV facility depends upon the characteristics of the facility site, facility design, construction techniques and the ongoing maintenance activities during the facility’s operation.

80 APP at 53
Air quality is generally good, and the trend has been improving for most pollutants. The enactment of the Clean Air Act in 1970 dramatically reduced air emissions from large facilities.\textsuperscript{81} Temporary short-term air quality impacts would occur during the construction phase of the Project. Once operational, the Project would not generate criteria pollutants or carbon dioxide.

**Potential Impacts**

During construction of the Project, temporary short-term air emissions are expected as a result of vehicle exhaust from the construction equipment and from vehicles traveling to and from facility locations. The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions from primarily diesel equipment would vary according to the phase of construction but would be minimal and temporary.

In addition to emissions from construction equipment, short-term air quality impacts from fugitive dust may result from travel on unpaved roads, grading at some sites and limited amounts of excavation for foundations for inverter boxes, O&M buildings and potentially solar array piers at some locations. Fugitive dust is considered particulate matter under air quality regulations. The concentrations of fugitive dust that is fine particulate matter (P.M. less than 2.5 microns or PM2.5) is generally small, or approximately 3 percent to 10 percent of total particulate matter (USEPA’s AP-42, Sections 13.2 and 11.9). Since fine particulate matter has the potential to travel further into the lungs, it is of greater concern than larger particle size ranges.

**Mitigative Measures**

Dust from construction traffic can be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits on site. Emissions from construction vehicles can be minimized by keeping construction equipment in good working order.

**5.6.2 Soils and Groundwater**

Soils within the Solar Project and the NS HVTL Project areas are typically fine and loamy fine sands\textsuperscript{82} on generally level topography. There are no at risk land features such as sinkholes, shallow limestone formations, unconfined or shallow aquifers, and no karst conditions in the Project Boundary.\textsuperscript{83}

\textsuperscript{82} See the NRCS soils map at APP at Appendix C-5  
\textsuperscript{83} APP at 54-55
Potential Impacts

Construction of the facilities will disturb up to 800 acres. As with any ground disturbance, construction of the Project has the potential for soil compaction, erosion and sedimentation as a result of construction activities.

North Star anticipates that infrastructure, including the direct-embedded piers supporting the PV tracking installations, foundations for inverters and the Operations and Maintenance facility, and embedded transmission poles will be installed at a depth above the average depth to groundwater of 15-40 feet.84

Mitigative Measures

The use of BMPs (including, but not limited to containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust) would protect topsoil and minimize the potential for soil erosion.

Section 4.2.7 of the Site Permit Template would require North Star to develop a Soil Erosion and Sediment Control Plan. The plan may be the same as the Storm Water Pollution Protection Plan (SWPPP) submitted to the MPCA as part of the National Pollutant Discharge Elimination System (NPDES) permit application. As part of the SWPPP, North Star will be required to prepare a Spill Prevention, Control and Countermeasure (SPCC) Plan to minimize the potential for spills of hazardous materials and their transport to groundwater resources.

As part of the SWPPP preparation for the facility, North Star will identify BMPs to minimize the potential for soil erosion. Once the construction is complete, no mitigations should be necessary as permanent vegetation will be established over the Solar Project area, excluding access roads.

North Star has already conducted a Phase I Environmental Site Assessment in order to identify any existing hazardous material contamination. No Recognized Environmental Conditions (REC) were found,85 meaning no design for avoidance of contaminated areas is necessary.

5.6.3 Surface Water

Public waters are wetlands, water basins and watercourses of significant recreational or natural resource value in Minnesota, as defined in Minnesota Statute 103G.005; MNDNR has regulatory jurisdiction over these waters. The MNDNR Public Waters Inventory (PWI) identifies lakes, wetlands, and watercourses over which the MNDNR has regulatory jurisdiction. Minnesota law (Minnesota Statute 84.415 administered through Minnesota Rule 6135) requires that a license be obtained from the MNDNR Division of Lands & Minerals for the passage of any utility over, under or across any state land or public waters.

84 Id. at 55
85 Id. at 56
There are two (unnamed) MNDNR Public Watercourses within the Project Boundary, both in the HVTL Project area; one intermittent stream and one perennial stream. The closest surface water resource near the Project is the Sunrise River which runs within a mile to the north and east of the Projects. There are also five MNDNR PWI wetlands located to the west, south, and east of the Project Boundary.

**Potential Impacts**

During construction, there is the possibility of sediment reaching nearby surface waters and wetlands as the ground is disturbed by excavation, grading and construction traffic. In the case of this Project, the potential for impacts to surface waters is limited, as the facility location generally avoids surface water features. The noted streams can be spanned for construction of the HVTL if necessary. Maintenance and operation activities for the PV facilities are not expected to have an adverse impact on surface water quality.

**Mitigative Measures**

The use of BMPs (including, but not limited to containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust) would protect topsoil and minimize the potential for soil erosion.

Again, Section 4.2.7 of the Site Permit Template would require North Star to develop a SWPPP, including an SPCC Plan to minimize the potential for spills of hazardous materials and their transport to streams and other water bodies. North Star would identify BMPs to minimize the potential for soil erosion and sedimentation.

Many local governments have designated shoreland protection areas that require setbacks from the ordinary high water level of surface waters in order to limit impacts to surface waters. The North Star site, however, would not require construction within any Shoreland Overlay Districts and would not conflict with any local shoreland ordinances.

**5.6.4 Wetlands and Floodplains**

Wetlands are important resources for flood abatement, wildlife habitat and water quality. Minnesota uses two systems to classify wetlands:

- The Circular 39 system: This system was developed by the U.S. Fish and Wildlife Service in 1956 and updated in 1971. Under the Circular 39 system, wetlands are divided into eight types based on the depth of water and the characteristics of vegetation.

- The Cowardin system: In 1979 the USFWS developed a more precise tiered system for classifying wetlands. Under the Cowardin system, each tier describes the characteristics of a wetland more specifically than the previous tier.

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86 Id. (Also see APP at Appendix C-6)
Westwood conducted wetland delineations in the Project Area in the fall of 2014. The delineations classify wetlands based on both classifications. Westwood delineated 15 areas (see Figure 15), the majority of which were Circular 39 Type 2 fresh wet meadows.

Figure 15. Wetlands Delineated within the Project Boundary

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87 Id. at 57-58
89 APP at Appendix C-6
Potential Impacts

The USFWS began producing maps of wetlands based on aerial photographs and Natural Resources Conservation Service soil surveys starting in the 1970s; these wetlands are known as the National Wetland Inventory (NWI). It is important to note that NWI wetlands are based on aerial imagery and are not field verified. The U.S. Army Corps of Engineers (USACE) verified the Westwood field verification as accurate.\textsuperscript{90}

In Minnesota, wetlands are also protected under the Wetland Conservation Act (WCA), which is administered by the Board of Water and Soil Resources (BWSR) and the identified Local Government Unit (Chisago County). The only impact to wetlands would be posts along an approximately 560-foot segment of the perimeter fencing (total impact of 56 square feet). Chisago County issued a Notice of Decision on August 12, 2015, that no replacement plan is required for the construction in the wetland;\textsuperscript{91} a decision of \textit{de minimus} impact.

USACE determined the construction qualified as a “non-reporting” activity and that no application was required to the Corps for the Project under the Clean Water Act (CWA).\textsuperscript{92}

Floodplains are low-lying areas that are subject to periodic inundation due to heavy rains or snowmelt. Floodplain areas are generally found adjacent to lakes, rivers and streams. In their natural state, floodplains provide for temporary water storage during flooding events. The only Federal Emergency Management Agency (FEMA) floodplains in the Project Area are associated with the Sunrise River. There are no floodplains within the Project Boundary.

Mitigative Measures

Construction and maintenance of a solar facility has the potential to result in long-term and temporary loss of wetlands or wetland function. The preferred method for minimizing impacts to wetlands is to avoid disturbance of the wetland through project design. North Star’s proposed site plan generally avoids wetlands. Temporary construction impacts can be minimized by using BMP’s that include construction mats and directional bores under wetlands for installation of electrical collection lines.

Section 4.2.9 of the Site Permit Template requires that solar panels and associated facilities not be placed in public waters wetlands, as defined in Minnesota Statutes section 103G.005, subdivision 15(a). Under this definition, public water wetlands are all Types 3, 4 and 5 wetlands of 10 or more acres in unincorporated areas or 2.5 acres in incorporated areas.\textsuperscript{93} All the wetlands identified in the delineation are smaller than the statutory standard for meeting a public waters wetland.

\textsuperscript{90} USACE Letter, June 9, 2015, eDocket no. 20156-111329-01
\textsuperscript{91} WCA Notice of Decision, Chisago County, August 12, 2015, eDocket no. 20158-113316-02
\textsuperscript{92} USACE Letter, July 21, 2015, eDocket no. 20158-113155-02
\textsuperscript{93} Minnesota Statute 103G.005, \url{https://www.revisor.mn.gov/statutes/?id=103G.005}
5.6.5 Vegetation

Consistent with the current agricultural use of the facility location, native plant communities are generally absent, and the overwhelming majority of vegetative cover, row crops, pasture and maintained grass areas, has been established and maintained by humans. Non-native invasive species cover is also quite limited due to the intensive weed management associated with agriculture. Section 5.2 provides additional information about local land cover.

North Star has not identified any Reinvest in Minnesota (RIM), and the only Conservation Easements in the Project Area expired in 1997. 94

Potential Impacts

Construction and operation of the Project would change the vegetative cover of up to 800 acres for at least the 25 year expected lifespan of the Project. Areas developed for the Project, mostly now cultivated or in pastureland, would be re-seeded with a low growing, low maintenance seed mix suited to the sandy soils of this region. 95

Construction activities may introduce invasive species. The Minnesota Noxious Weed Law defines a noxious weed as an annual, biennial or perennial plant that the Commissioner of Agriculture designates to be injurious to the public health, the environment, public roads, crops, livestock or other property. 96 The Minnesota Department of Agriculture’s (MDA) Noxious & Invasive Weed Program assists local governments and landowners with resources for managing noxious and invasive weeds throughout Minnesota.

A limited number of trees will be removed from the development area for construction. In some areas, North Star may seek agreements with neighboring landowners to conduct limited tree trimming on adjacent parcels if shading of the PV arrays becomes a concern. In general, most tree clearing will be associated with the HVTL line, especially along a 2,500 foot stretch that would require widening the existing transmission corridor (see Figure 6). That could potentially clear 2-4 acres of trees.

Mitigative Measures

Section 4.2.11 of the Site Permit Template requires North Star to clear the site only to the extent necessary to assure suitable access for construction, safe operation and maintenance of the project. The condition also requires North Star to work with MNDNR to establish and manage vegetation that will benefit pollinators and other wildlife, to the extent that the vegetation will not interfere with the operation of the facility. Sections 4.2.13 and 4.2.14 include restrictions to manage for noxious weeds and invasive species.

94 APP at 62 and Appendix C-8
95 Id. at 62
96 Minnesota Statute 18.75 – 18.91, https://www.revisor.mn.gov/statutes/?id=18
A vegetation management plan can be developed to formalize measures to minimize the disturbance and removal of vegetation for the Project, prevent the introduction of noxious weeds and invasive species and re-vegetate disturbed areas consistent with the safe and reliable operation of the Project. A recent communication from MNDNR to EERA\textsuperscript{97} included the recommendation to establish prairie species on prior farmed land to:

- improve water quality by reducing soil erosion;
- increase soil water retention;
- improve soil composition and structure with the extensive root system;
- reduce applications of fertilizer and herbicides; and
- provide habitat for pollinators and other wildlife.

### 5.6.6 Wildlife

As discussed in the above section, vegetative cover at the proposed facility locations is dominated by cultivated agricultural field and to a lesser extent by pasturelands. The predominance of non-native cover types are typically used by common wildlife species that are accustomed to agricultural habitats. Examples of such species would include deer, squirrel, raccoons, mice, voles, common perching birds, red-tail hawks, reptiles and amphibians. It is anticipated that these species’ use of the proposed facility locations is largely limited to occasional foraging in the fields and shelter within wooded areas that may surround the fields. The only surface water is the perennial stream in the southern (transmission route) portion of the Project Boundary. This could contain certain warm-water fish species such as mud minnows and brook stickleback.

**Potential Impacts**

Wildlife that resides within the construction zone will likely be temporarily displaced to adjacent habitats during the construction process. The wildlife species near the facilities do not generally require specialized habitats and are able to find generally suitable habitat nearby. Comparable habitat is near the facility locations, and it is likely that these animals would only be displaced a short distance.

Once restoration of the facilities is established after construction, the current non-native habitats that are used by habitat generalists will be replaced by a modified habitat that may be attractive to some species and less attractive to species that use the open farm and pasturelands.

During Project operation, access to facilities will be limited by a perimeter fence. Although a variety of birds, small mammals, reptiles and amphibians are likely to still be able to gain access to facilities to use the habitats under and around the solar arrays, access will be limited for larger wildlife. Fencing around facilities may also disturb wildlife movement corridors.

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\textsuperscript{97} Email, MNDNR, June 16, 2015
Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact terrestrial and aquatic wildlife populations as well as snag in maintenance machinery, resulting in costly repairs and delays. Wildlife entanglement in and death from plastic netting and other man-made plastic materials has been documented in birds, fish, mammals and reptiles.98

A National Fish and Wildlife Forensics Laboratory report99 has identified some avian risks associated with PV facilities. Some birds in the study suffered impact trauma, and related predation. Preliminary findings, based on limited data, suspect the danger is the possible appearance of the facility as a large body of water. Migrating birds may attempt to land, consequently incurring the trauma. However, the design of the North Star Project should help minimize this potential danger. The single-axis tracking system will occupy only about 33 percent of the overall footprint,100 so the arrays will not appear as an unbroken expanse (like water). It will also continually alter its appearance while tracking the sun during the day.

**Mitigative Measures**

The short transmission line is along a corridor of an existing, larger transmission lines. The visibility of the lines, and the lack of adjacent waterfowl habitat, should help to minimize impacts to birds. Consultation with MNDNR and USFWS would help North Star determine if and where they should install bird diverters on the conductors. The design of the single-axis array system should help limit avian injury or death associated with the Solar Project.

Siting of facilities in locations that avoid or minimize impacts to known wildlife movement corridors can minimize impacts to wildlife. The Site Permit could require that Biological and Natural Resource Inventories include identification of any known wildlife movement corridors. The MNDNR recommends that the southern project border fence along the highway be set back sufficiently to encourage wildlife (primarily deer) to follow the fence line around the Project well away from the highway, instead of pushing them back into traffic.101

Avoiding the use of photodegradable erosion-control materials where possible and using biodegradable materials (typically made from natural fibers) instead, preferably those that will biodegrade under a variety of conditions, can minimize the impact to wildlife. The Site Permit could include the use of these materials as a standard condition or as a special condition.

Checking open trenches and removing trapped turtles before filling trenches can minimize impacts to turtles.

100 APP at 65
101 Email, MNDNR, June 16, 2015
5.7 Rare and Unique Natural Resources

Construction and maintenance of solar facilities might destroy individual plants and animals or might alter their habitat so that it becomes unsuitable for them. For example, trees used by rare birds for nesting might be cut down, soil disturbance from construction activities may destroy rare plant species or communities, or soil erosion may degrade rivers and wetlands that provide required habitat.

Endangered species are species whose continued existence is in jeopardy. Threatened species are likely to become endangered. Species of special concern have some problems related to their abundance or distribution, although more study is required.

The MNDNR Division of Ecological and Water Resources manages the Natural Heritage Information System (NHIS) which provides information on Minnesota's rare plants, animals, native plant communities and other rare features. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities and other natural features. Its purpose is to foster better understanding and conservation of these features.

Some areas of the state have not been surveyed extensively or recently, so the NHIS database cannot be relied upon as a sole information source for rare species. Nevertheless, the NHIS database provides a starting point for anticipating potential impacts to rare and unique natural species and communities.

Potential Impacts

The MNDNR NHIS database was queried by Westwood to obtain the locations of rare and unique natural species. A list of threatened and endangered species within one mile of the Project Boundary can be found in the Application.102 Within the Project Boundary, the search turned up two records for Blanding's turtles (Emydoidea blandingii) and one historic (1892) record for Tooth-cup (Rotala rotundifolia).103 Both are threatened species. No endangered species records were found inside the Project Boundary or the within the Project Area.

Although no instances of the northern long-eared bat (Myotis septentrionalis) NLEB were identified at the Project site, the species is known to occur in suitable forested habitats throughout Minnesota. The USFWS issued a final decision and interim rule104 as of May 4, 2015, designating the NLEB as threatened under the Endangered Species Act. Any tree removal at this location will likely be required to be conducted outside the summer roost period for the species. The northern long-eared bat would not be anticipated to be present in the action area between the months of October 1st and March 30th.

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102 APP at 68  
103 Id. at Appendix A  
104 Interim Rule 4(d),  
**Mitigative Measures**

The mitigative measures described for Vegetation and Wildlife in Sections 5.6.5 and 5.6.6 are also applicable to minimizing impacts to sensitive species. Avoidance of identified areas of biological significance and rare species is the most effective mitigation strategy to limit direct impacts to the sensitive natural resources.

The Site Permit should require field surveys of sensitive biological areas. Information from field surveys would be used to identify areas to be avoided in final site design. Areas to be avoided are typically marked in site plans in order to minimize the potential for inadvertent incursions into these areas during the construction phase.

North Star has committed to using wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding’s turtle. North Star should provide training to construction workers so they can identify and avoid impacts to Blanding’s turtles for work within the species' habitat.

Most of the tree-clearing for the Project occurs for HVTL construction. The Project would likely require designation under Interim Rule 4(d) as "Limited Expansion of Existing Rights-of-Way and Transmission Corridors" in order to qualify for incidental take. To avoid taking, tree removal should avoid the active season (April 1-September 30). To determine the conditions and timing of tree-clearing under the rule, North Star will need to consult with the USFWS.
6 Application of Siting and Routing Factors

The Power Plant Siting Act requires the Commission to locate large electric power facilities in an orderly manner compatible with environmental preservation and the efficient use of resources and in a way that minimizes adverse human and environmental impact while insuring electric power reliability. Minnesota Statute Section 216E.03, subdivision 7(b) identifies considerations that the Commission must take into account when making its final determination on siting of large electric power facilities. Minnesota Rule 7850.4100, lists 14 factors to guide Commission site and route designations, including the evaluation and minimization of adverse environmental impacts, impacts to public health and welfare, and adverse economic impacts. These factors are outlined in Section 2.5 of this document.

6.1 Relative Merits

Generally, an Environmental Assessment will review the Factors to help establish the relative merits of a proposed project against any alternative routes or sites that have been reviewed in the EA. Since only the Proposed Solar Site and Proposed HVTL are being considered in the current review, the concept of relative merits is not applicable.

6.2 Review of the Siting and Routing Factors

This review looked not only at the Factors, but also the Elements that make up those Factors (see subsections below). For the most part, adherence to best practices during construction and operation and the general permit conditions in the Site and Route Permit Templates provided by Commission Staff in this record (Appendices B and C) is anticipated to result in minimal to moderate impacts from the facilities. In some instances, however, the addition of special permit conditions could help to minimize impacts.

6.2.1 Factor: Effects on Human Settlement

Potential impacts and mitigative measures related to human settlement are discussed in Section 5.3.

Elements: Noise, cultural values, public services, recreation

Impacts related to noise, cultural values, public services and recreation are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template. The only impact to recreation would be an alteration of the view along the North Branch Sno Drifters snowmobile trail that runs along the Project for approximately 1.25 miles along 267th Street. That change in view should be no more than a minimal impact to no impact, depending on the aesthetic of the trail rider.

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105 Minnesota Statute 216E.02, https://www.revisor.mn.gov/statutes/?id=216E.02
Element: Displacement

Construction of the North Star Solar Project would not result in the removal of any homes at the site, so there would be no displacement. North Star does not have the authority to exercise Eminent Domain for the Project; therefore, the removal of a home would necessarily be through a voluntary agreement between North Star and the affected landowner.

Element: Aesthetics

Impacts are anticipated to be minimal with the use of standard construction techniques and the general conditions identified in the Site Permit Template.

Aesthetic impacts at solar facility are anticipated to be minimal to moderate, but may be mitigated to a degree with special permit conditions. Given the proximity of the facility to existing homes in the immediate area, development of a landscaping plan that identifies site-specific landscaping techniques (including, but not limited to, vegetation screening, berms and fencing) could be used to minimize visual impacts to adjacent homes.

Aesthetics impacts from the HVTL should be minimal, as the line would be a similar use to the existing use of the area as a transmission corridor and substation.

Element: Consistency with Local Land Use and Planning

Chisago County, North Branch and Lent Township all have ordinances that include siting solar facilities. In each case, the North Star Solar Project qualifies as a compatible use given local zoning and land use. The local ordinances preclude construction of solar facilities within designated shoreland protection areas, however, none exist within the Project Boundary.

Details on screening a solar project are part of each local ordinance. North Star is currently developing a residence-specific landscaping and screening plan.

6.2.2 Factor: Effects on Public Health and Safety

Construction presents the only potential impacts to public health and safety. These are anticipated to be minimal with use of standard construction techniques and the general conditions identified in the Site Permit Template. Operation of the facility is not anticipated to be a public health or safety concern, especially considering the secured access.

6.2.3 Factor: Effects on Land-Based Economies

Elements: Forestry, Tourism and Mining

Impacts to forestry, tourism and mining are generally avoided; therefore any potential impacts are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.
**Element: Agriculture**

Impacts to agriculture are anticipated to be minimal with use of standard construction techniques and the general conditions identified in the Site Permit Template, especially concerning management of topsoils.

Minnesota Rule 7550.4400, Subp. 4 allows for the use of up to 0.5 acres of prime farmland per MW in most areas unless there is no feasible alternative. The 0.5 acre per MW limit does not apply to the North Star Project because it is within two miles of a first, second or third class city, North Branch. Regardless, no prime farmland exists in the Project Boundary.

If a proper vegetation management plan is implemented, the Project could serve an anti-erosion and conservation service that should preserve the land to be returned to its original agricultural use in the future.

**6.2.4 Factor: Effects on Archaeological and Historic Resources**

Impacts are anticipated to be minimal with use of standard construction techniques and the general conditions identified in the Site Permit Template. The one archaeological site identified within the Project Boundary that would be impacted by construction was subsequently determined to be not eligible for the NRHP. Any possible impact to two additional sites identified should be mitigated through avoidance or development of a special mitigation plan in consultation with SHPO, if they are determined eligible for the NRHP.

The procedures outlined in Section 4.2.16 of the Site Permit Template provide an outline of the process for resolution should any previously unknown archaeological resource or human remains be encountered.

**6.2.5 Factor: Effects on Natural Environment**

**Element: Air**

Impacts to air quality are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

**Element: Surface Water**

Impacts to surface waters are anticipated to be minimal with the use of standard construction techniques and the general conditions identified in the Site Permit Template, and the nominal open water space in the Project Boundary. There are no Shoreland Overlay Districts.

**Element: Wetlands**

Impacts to wetlands are expected to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.
Direct impacts to water resources from the HVTL can be avoided by placement of the pole structures outside of any wetland or the perennial stream and spanning the distance for crossings over wetlands and streams.

**Element: Soils and Groundwater**

Impacts to soils and groundwater are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

**Element: Vegetation**

Impacts to vegetation are anticipated to be moderate with the use of standard construction techniques and the general conditions in the Site Permit Template.

In addition to the general conditions in the Site Permit Template, a vegetation management plan, such as required in Commission permits for High Voltage Transmission Lines, should be developed. The plan should formalize measures to 1) minimize the disturbance and removal of vegetation for the Project; 2) prevent the introduction of any noxious weeds or invasive species; 3) maintain the ground cover to minimize erosion and stormwater runoff; and 4) re-vegetate disturbed areas consistent with the safe and reliable operation of the Project.

**Element: Wildlife**

Impacts to wildlife are anticipated to be minimal to moderate with the use of standard construction techniques and the general conditions in the Site Permit Template.

In addition to the general conditions in the Site Permit Template provided by Commission staff in this record, the site permit should require that the design of the facilities preserves or replaces identified natural wildlife, wetland, woodland or other corridors:

**6.2.6 Factor: Effects on Rare and Unique Natural Resources**

The North Star Project does not appear poised to impact any rare and unique natural resources. Recommendations for Blanding’s turtles and northern long-eared bats can be included in the Site Permit. Otherwise, impacts should be minimal with standard construction techniques and the general conditions in the Site Permit Template.

**6.2.7 Factor: Project Design**

**Element: Design Options to Maximize Energy Efficiencies**

North Star’s Proposed Project is a single-axis tracker and module layout designed to maximize exposure to the sun and use of the available land. The locations of the inverters and the layout of the electrical collection system have been designed to avoid energy losses.
Element: Design Options to Accommodate Potential Expansion

There is insufficient information in the record to fully assess the Project’s ability to expand its generating capacity. North Star has designed the proposed facility in accordance with agreements with landowners, environmental and siting constraints specific to the Project Area, and its POI agreement at the Chisago Substation. North Star’s ability to expand its facility depends upon a number of criteria, including:

- availability of additional land from willing landowners;
- suitability of additional land to support a PV facility; and
- capacity at the substation to deliver the power into the grid.

If North Star could meet those criteria, and had interest in expanding the Project, they would need to seek a modification to the Site Permit from the Commission or, more likely, file a new Site Permit Application.

Element: Design Options to Mitigate Adverse Environmental Effects

A description of mitigative measures that could be used to avoid and minimize impacts is thoroughly addressed in the descriptions of impacts in Section 5. To the extent that special conditions may be appropriate for particular Elements, those mitigative measures are identified in the individual subsections.

6.2.8 Factor: Use of Existing Large Electric Power Generating Plant Sites

The North Star Solar Project does not make use of existing Large Electric Power Generating Plant sites. A solar facility’s unique siting requirements, particularly the relatively large land requirements, preference for a site without large structures that may limit solar access, and the need for willing landowners, make using existing power plant sites more challenging.

6.2.9 Factor: Use of existing transmission systems or rights-of-way;

The North Star HVTL Project follows an existing transmission corridor for much of it’s length. This routing choice will minimize the impact of vegetative clearing, depending on the degree to which the Project ROW shares the existing rights-of-way.

6.2.10 Factor: Electrical System Reliability

Electrical system reliability was addressed in a separate docket (eDocket 14-162). The North Star 100 MW Solar Project was determined by the Commission to be an appropriate segment of Xcel Energy’s solar portfolio. Reliability was also a focus of the Project’s MISO interconnection agreement.
6.2.11 Factor: Design-Dependent Costs

This 100 MW Project is the largest solar proposal to date in Minnesota. The centralization of that energy production in one location creates efficiencies for construction, infrastructure, transmission and interconnection costs.

6.2.12 Factor: Irreversible and Irretrievable Commitments of Resources

A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, and other materials (aggregate minerals, steel/metals, etc.).

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

6.2.13 Factor: Unavoidable Impacts

Where feasible, the EA suggests mitigation measures to be incorporated into the planning, design, and construction of the Proposed Project to substantially eliminate the adverse impacts. In other areas of consideration, adverse impacts can be reduced but not eliminated and are therefore determined to be unavoidable. Most unavoidable adverse impacts would occur during the construction phase of the proposed project and would be temporary. A review of impacts and possible mitigation measures is located in Chapter 5 of this document.

Unavoidable adverse effects related to the Proposed Project construction would last only as long as the construction period, and would include the following:

- Soil compaction, erosion, and vegetation degradation;
- Disturbance to and displacement of some species of wildlife;
- Disturbance to nearby residents;
- Traffic delays in some areas; and
- Minor air quality impacts due to fugitive dust.

Unavoidable adverse effects related to The Proposed Project that would last at least as long as the life of the Project would include the following:

- The addition to the visual landscape of PV modules and security fencing; and
- Changes in land use and development patterns surrounding the Facility.
7 References


**GIS Data Sources**


Information Packet
North Star Solar Project

Community Energy Solar “About the North Star Solar Project” Handout

Site Permit Map
North Star Solar Energy Generating Facility
PUC Docket IP-6943/GS-15-33

Route Permit Map
PUC Docket IP-6943/GS-15-33
North Star High Voltage Transmission Line Project

Community Energy Solar North Star Solar web site project page
Distinguishing Features
Local Impact
About Solar Energy
About Community Energy Solar
Contact Information

North Star Solar Project Public Hearing PowerPoint Presentation

Public Utilities Commission January 20, 2016 Meeting Notice & Agenda

Public Utilities Commission January 20, 2016, Staff Briefing Papers
Statement of the Issues
Project Overview
Procedural History
Statutes and Rules
Report of the Administrative Law Judge
Exceptions to ALJ Report
Staff Discussion
Commission Decision Alternatives

Star Tribune “Large Solar Farm Wins Approval” by David Shaffer

January 27, 2016
About the North Star Solar Project

- Community Energy is proposing to build a 100-megawatt (MW) solar energy facility and associated one-mile long, 115-kilovolt (kV) transmission line.
- The solar project and transmission line are proposed to be located on approximately 800 acres of agricultural land within the city of North Branch and Lent and Sunrise townships in Chisago County, Minnesota.
- The North Star Solar Project is a solution to the growing demand for solar energy due to a new state law (Minn.Stat.216B.1691) requiring public utilities to produce at least 1.5 percent of retail electricity sales from solar energy by 2020.
- Significant electrical infrastructure already exists in Chisago County - allowing the project to generate low-cost and efficient solar energy for Minnesota ratepayers.
- Total engineering, procurement and construction costs for the project are estimated to be approximately $180 million.
- Before the project can proceed, the Minnesota Public Utilities Commission must approve site and route permits. This process is expected to be completed by January 2016.
- Opportunities for public input are available through the Minnesota Public Utilities Commission. (Please see www.mn.gov/puc and docket number 15-33 for full details.)
- If approved, the North Star Solar Project would become the largest solar energy facility in the Midwest.
NORTH STAR SOLAR

SIZE: 130 MW (DC) / 100 MW (AC)

LOCATION: Chisago County, MN

DISTINGUISHING FEATURES

- Community Energy is proposing to build a 100-megawatt (MW) solar energy facility and associated one-mile long, 115-kilovolt (kV) transmission line.
- The solar project and transmission line are proposed to be located on approximately 800 acres of agricultural land within the city of North Branch and Lent and Sunrise townships in Chisago County, Minnesota.
- The North Star Solar Project is a solution to the growing demand for solar energy due to a new state law (Minn.Stat.216B.1691) requiring public utilities to produce at least 1.5 percent of retail electricity sales from solar energy by 2020.
- Significant electrical infrastructure already exists in Chisago County – allowing the project to generate low-cost and efficient solar energy for Minnesota ratepayers.
- Total engineering, procurement and construction costs for the project are estimated to be approximately $180 million.
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- Opportunities for public input are available through the Minnesota Public Utilities Commission. (Please see www.mn.gov/puc and docket number 15-33 for full details.)
- If approved, the North Star Solar Project would become the largest solar energy facility in the Midwest.

LOCAL IMPACT

- The project includes local sourcing of labor, services and materials.
- The year-long construction process would generate approximately 300 jobs. Once operational, the project would create 6-12 full-time jobs.
- Chisago County and the local jurisdictions would collectively receive more than $300,000 of property tax payments each year.
- The North Star Solar Project is collaborating with the Minnesota Department of Natural Resources to develop a vegetation plan that incorporates a mix of grasses and flowers on project land that will be beneficial to wildlife and pollinators.
- The project would produce enough clean energy to power approximately 20,000 homes every year.

ABOUT SOLAR ENERGY

https://communityenergysolar.com/project/north-star-solar/
• Photovoltaics convert solar energy from the sun into usable electrical energy.
• According to the U.S. Department of Energy, solar energy is the most abundant energy resource on earth.
• Solar energy is environmentally friendly because the sun is a natural energy source that does not require the burning of fossil fuels.

ABOUT COMMUNITY ENERGY SOLAR

• Community Energy has maintained a strong record of building responsible projects and being a good neighbor. The North Star Solar Project is following this core principle.
• Community Energy has started construction or built solar facilities in Colorado, Indiana, Massachusetts, New Jersey, New York, North Carolina, and Pennsylvania.
• The company has also led renewable energy development and the construction of more than 1,000 megawatts of wind and solar generating facilities across the U.S. – representing more than $1.5 billion in new energy investments.

QUESTIONS ABOUT NORTH STAR SOLAR?

Chase Whitney | Originator
Community Energy Solar, LLC
Chase.Whitney@CommunityEnergyInc.com
North Star Solar Project

Public Hearing
Minnesota Public Utilities Commission (PUC)
Office of Administrative Hearings (OAH)

MN PUC Docket Number 15-33 | OAH Docket Number 82-2500-32679
North Star Solar Project

Community Energy

- Pioneers in renewable energy development and marketing
- Developed more than 1000 megawatts of wind and solar capacity
- Solar portfolio includes projects completed or underway throughout the United States

Comanche Solar
120 MW/AC
Pueblo, CO

Butler Solar
100 MW/AC
Taylor County, GA

Eastern Shore Solar
80 MW/AC
Delmarva Peninsula, VA
North Star Solar Project

Project background

- Minnesota Solar Energy Standard
- 1 of 3 projects selected out of 111 competitive proposals
- Power purchase contract between North Star and Xcel Energy was approved by the MN PUC on 2/12/15

Project details

- 100 megawatts of solar photovoltaic capacity
- Approximately 800 acres of agricultural land
- Single axis tracking technology to maximize production
- Grid connection at the Chisago substation
- 25-year power purchase contract with Xcel Energy
North Star Solar Project

Why here?

- Chisago substation – infrastructure and strong ties to Xcel Energy customers
- Non-prime agricultural land
- Few environmental constraints
- Existing local ordinances
North Star Solar Project

Project economics

- $180M total investment
- Approximately 300 local jobs associated with construction and installation
- More than 1,000 direct and indirect jobs

Operations

- $2.5M in annual economic output
- Approximately $350k in annual property taxes
- 6-12 full-time employees
- Annually generate enough electricity for 20,000 homes
North Star Solar Project

Crystalline silicon solar photovoltaics

- Safe, mature, reliable and abundant
- Most common solar cells used in commercially available panels
- Module lifetimes of 25+ years with minimal long-term degradation
- Silicon is the second most abundant element on Earth
North Star Solar Project

Project components

- Solar modules
- Racking system with tracking capability
- Electrical components
  - DC electrical collection
  - Inverters
  - Transformers
  - AC electrical collection
  - System controls
  - Grid connection
- Access roads
- Fencing
- Vegetation
North Star Solar Project

Construction, operation and decommissioning

Site prep – trenching – pile installation – racking and module installation
  • Six to nine month process

Electrical connections – testing – commissioning
  • Electrical wiring
  • Construction of short transmission line to the Chisago substation
  • Grid connection and facility commissioning

Operations
  • Commercial operations Fall 2016
  • Regular maintenance and inspections

Decommissioning
North Star Solar Project

Vegetation plan

- Opportunity to manage vegetation at project sites as restored short-grass prairies or meadows
- Native plants and flowers that are beneficial to wildlife and pollinators

Anticipated benefits

- Improved water quality
- Reduced soil erosion
- Increased water retention
- Improved soil composition
- Less use of fertilizers and herbicides
- Critical habitat
North Star Solar Project

Landscaping and visual buffers

- A key development focus: residences and public corridors
- Professional landscape design using native vegetation
- Residential buffering - combination of setback, plant type, density and placement, and fencing
North Star Solar Project

Fencing update

- Deer fence / agricultural fence
- NEC requirements

https://blogs.cornell.edu/hort/2013/12/04/deer-fencing-installed-at-freeville-farm/
North Star Solar Project

Solar energy – a global perspective
NOTICE OF COMMISSION MEETING

Issued: January 8, 2016

The items listed on the attached agenda will be heard at the Commission’s regularly scheduled meeting.

DATE: Wednesday, January 20, 2016

TIME: 9:30am

LOCATION: Public Utilities Commission Large Hearing Room
121 7th Place East, Suite 350
St. Paul MN  55101-2147

DIRECTIONS: Visit mn.gov/puc or
Call 651-296-0406 or 1-800-657-3782, Option 3

Occasionally items may need to be rescheduled. Commission staff will make all reasonable efforts to notify you if your item is rescheduled. However, if you wish to confirm this hearing date, please visit mn.gov/puc or call 651-296-0406 or 1-800-657-3782.

Bad weather? Find out if a meeting is canceled. Call (toll-free) 1-855-731-6208 or 651-201-2213 or visit mn.gov/puc

Change your mailing preferences: E-mail docketing.puc@state.mn.us or call 651-201-2234

The Commission hearing rooms have wheelchair access. If other reasonable accommodations are needed to enable you to fully participate in a Commission meeting (e.g., sign language or large print materials), please call 651-296-0406 or 1-800-657-3782 at least one week in advance of the meeting. Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service.
Wednesday, January 20, 2016 9:30 AM  Large Hearing Room

INTRODUCTION

ORAL ARGUMENT ITEMS

DELIBERATION ITEMS

DECISION ITEMS

1. Details 2014-007
   * IP6828/WS-09-1197  Pleasant Valley Wind, LLC
     In the Matter of the Application of Pleasant Valley Wind, LLC for a Large Wind Energy Conversion System Site Permit for the 301 MW Pleasant Valley Wind Project in Dodge and Mower Counties.

     Should the Commission approve the post-construction noise study proposal? (PUC: Ek)

2. Details 2015-067
   ** IP6943/GS-15-33  North Star Solar PV LLC
     In the Matter of the Combined Application of North Star Solar PV LLC for a Site Permit and Route Permit for the North Star Solar Electric Power Generating Plant and Associated 115 kV High-Voltage Transmission Line in Chisago County, Minnesota.

     - Should the Commission adopt the administrative law judge’s Findings of Fact, Conclusions of Law, and Recommendation?
     - Should the Commission find that the environmental assessment and the record created at the public hearing adequately address the issues identified in the scoping decision?
     - Should the Commission grant issue a site permit for the 100 megawatt North Star solar energy generating facility Solar Electric Power Generating Plant in Chisago County?
     - Should the Commission grant issue a route permit for the 115 kilovolt transmission line associated with the North Star solar energy generating facility Solar Electric Power Generating Plant in Chisago County? (PUC: Ek)

ADJOURNMENT

* One star indicates agenda item is unusual but is not disputed.
** Two stars indicate a disputed item or significant legal or procedural issue to be resolved. (Ex Parte Rules apply)
Please note: For the complete record, please see eDockets
REVISED
Minnesota Public Utilities Commission
Staff Briefing Papers

Meeting Date: January 20, 2016
Company: North Star Solar PV LLC
Docket No. IP-6943/GS-15-33

In the Matter of the Combined Application of North Star Solar PV LLC for a Site Permit and Route Permit for the North Star Solar Electric Power Generating Plant and Associated 115 kV High-Voltage Transmission Line in Chisago County, Minnesota

Issues:

- Should the Commission adopt the administrative law judge’s Findings of Fact, Conclusions of Law, and Recommendation?
- Should the Commission find that the environmental assessment and the record created at the public hearing adequately address the issues identified in the scoping decision?
- Should the Commission grant a site permit for the 100 megawatt North Star Solar Energy Generating Facility in Chisago County?
- Should the Commission grant a route permit for the 115 kilovolt transmission line associated with the North Star Solar Energy Generating Facility in Chisago County?

Staff: Scott Ek | 651-201-2255 | scott.ek@state.mn.us

Relevant Documents

Combined Application for a Site and Route Permit ........................................February 11, 2015
Commission Order Finding Application Substantially Complete ..................April 27, 2015
Addendum to Combined Application for a Site and Route Permit ..................April 29, 2015
Environmental Assessment Scoping Decision.................................June 24, 2015 (Filed June 29, 2015)
Environmental Assessment ...............................................................September 24, 2015
Errata to Environmental Assessment .................................................September 28, 2015
DOC-EERA Exceptions to Administrative Law Judge Report ..................December 24, 2015

This document can be made available in alternative formats (e.g., large print or audio) by calling 651-296-0406 (voice). Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service.
Attached Documents

Proposed Solar Energy Generating System Site Permit
Proposed High-Voltage Transmission Line Route Permit

The attached materials are work papers of the Commission staff. They are intended for use by the Minnesota Public Utilities Commission and are based upon information already in the record unless noted otherwise.

I. STATEMENT OF THE ISSUES

- Should the Commission adopt the administrative law judge’s Findings of Fact, Conclusions of Law, and Recommendation?
- Should the Commission find that the environmental assessment and the record created at the public hearing adequately address the issues identified in the scoping decision?
- Should the Commission grant a site permit for the 100 megawatt (MW) North Star Solar Energy Generating Facility in Chisago County?
- Should the Commission grant a route permit for the 115 kilovolt (kV) transmission line associated with the North Star Solar Energy Generating Facility in Chisago County?

II. PROJECT OVERVIEW

North Star Solar PV LLC (North Star) has applied to the Minnesota Public Utilities Commission (Commission) for a site permit and a route permit to construct a 100 MW photovoltaic solar energy generating facility and an associated one-mile long 115 kV high-voltage transmission line (North Star Solar Project). The final solar facility design is expected to occupy 800 acres of land within the city of North Branch and Lent and Sunrise townships in Chisago County, Minnesota.

The primary components of the solar facility include photovoltaic modules mounted on a linear single-axis tracking system, solar inverters, and a project substation. The associated 115 kV transmission line is proposed to be constructed within an approximately 75-foot right-of-way that would connect the project substation with the existing Xcel Energy Chisago Substation.
III. PROCEDURAL HISTORY

On January 9, 2015, North Star filed a letter with the Commission noticing its intent to file a site permit application for a 100 MW solar energy generating facility under the alternative permitting procedures set forth in Minn. Stat. § 216E.04 and Minn. R. 7850.2800 to 7850.3900.

On January 29, 2015, North Star filed a letter with the Commission noticing its intent to file a combined site and route permit for a 100 MW solar energy generating facility and associated 115 kV transmission line. The letter expanded the January 9, 2015 initial notice to include notice of intent to file a high-voltage transmission line route permit application.

On February 11, 2015, North Star filed a combined site and route permit application under Minn. Stat. § 216E.04 and Minn. R. 7850.2800 to 7850.3900 for its proposed solar energy generating facility and 115 kV transmission line project.


On April 30, 2015, staff from the Commission and the Department of Commerce Energy Environmental Review and Analysis unit (DOC-EERA) conducted a public information and environmental assessment scoping meeting at the lent Town Hall in Stacy, Minnesota. A comment period was open from April 10, 2015 to May 15, 2015.

On June 29, 2015, the deputy commissioner of the Department of Commerce filed the scoping decision for the environmental assessment.

On July 7, 2015, the Commission issued its Order Directing Use of Summary Proceedings.

On September 24, 2015, DOC-EERA filed the environmental assessment of the North Star project.

On October 7, 2015, a public hearing in this matter was held before an administrative law judge (ALJ) at Lakes Region EMS in North Branch, Minnesota. Following the public hearing, a comment period was open until October 21, 2015.

On December 16, 2015, the ALJ filed Findings of Fact, Conclusions of Law, and Recommendation in this matter.

On December 24, 2015, DOC-EERA filed its exceptions to the ALJ Report.
IV. STATUTES AND RULES

Minn. Stat. § 216E.03, subd. 1, provides that no person may construct a large electric generating plant without a site permit from the Commission and that a large electric generating plant may be constructed only on a site approved by the Commission. Minn. Stat. § 216E.01, subd. 5, defines a large electric power generating plant as electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50 megawatts or more. The proposed project is a solar facility capable of generating 100 MW of electric energy and, therefore, requires a site permit before it can be constructed.

Minn. Stat. § 216E.03, subd. 2, provides that no person may construct a high-voltage transmission line without a route permit from the Commission and that a high-voltage transmission line may be constructed only along a route approved by the Commission. Minn. Stat. § 216E.01, subd. 4, defines a high-voltage transmission line as a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kV or more and is greater than 1,500 feet in length. The proposed transmission line associated with the solar facility is a one-mile 115 kV transmission line and, therefore, requires a route permit before it can be constructed.

Minn. Stat. § 216B.243, subd. 2, provides that no large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Commission. A large energy facility is defined under Minn. Stat. § 216B.2421, subd. 2, as:

- Any electric power generating plant or combination of plants at a single site with a combined capacity of 50 megawatts or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system.

- Any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length.

- Any high-voltage transmission line with a capacity of 100 kilovolts or more with more than 10 miles of its length in Minnesota or that crosses a state line.

The proposed solar energy facility is considered a large energy facility because it is a power generating plant capable of 100 megawatts of generating capacity. However, the proposed project was already considered and selected by the Commission as part of Xcel Energy’s 2014 Solar Resource Solicitation. In its order approving the solar portfolio, the Commission ruled that,
under Minn. Stat. § 216B.243, subd. 9, the proposed project was exempt from the requirement to obtain a certificate of need.¹

In addition, a certificate of need is not required for the transmission line associated with the solar facility because the proposed transmission line has a capacity of less than 200 kV, is less than 10 miles in length, and does not cross a state border.

The proposed project is subject to Minnesota Statutes Chapter 216E which requires that large electric power generating plants and high-voltage transmission lines be located consistent with state policy and in a manner that minimizes adverse human and environmental impact while insuring continuing electric power system reliability and integrity and insuring that electric energy needs are met and fulfilled in an orderly and timely fashion. In determining whether to issue a permit for a large electric power generating plant or a high-voltage transmission line, the Commission must consider the factors contained under Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4100.

Under Minn. 7850.4600, the Commission may impose conditions in any site permit for a large electric power generating plant or route permit for a high voltage transmission line as it deems appropriate and that are supported by the record. Specifically, when issuing a route permit for a high-voltage transmission line, the Commission must specify the design, route, right-of-way preparation, facility construction and operation it deems appropriate.

V. REPORT OF THE ADMINISTRATIVE LAW JUDGE

On September 8, 2013, the ALJ filed Findings of Fact, Conclusions of Law and Recommendations (ALJ Report) in this matter. The ALJ Report addressed the combined site and route permit application of North Star for the construction and operation of a 100 MW photovoltaic solar energy generating facility and an associated one-mile long 115 kV high-voltage transmission line.

The ALJ Report included 262 findings of fact, including a summary of public comments and government agency participation; 17 conclusions of law; and six recommendations. The ALJ documented the actions taken to comply with the procedural requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. The ALJ presented findings on each of the criteria under Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4100, that must be considered when issuing a site permit for a large electric power generating plant and a route permit for a high-voltage transmission line.

The ALJ recommended that the Commission grant a site permit for the 100 MW photovoltaic solar energy generating facility and a route permit for the associated one-mile 115 kV high-voltage transmission line in Chisago County, Minnesota.

In making the recommendation, the ALJ, as summarized by staff, concluded that:

- The Commission had complied with the procedural requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850.

- The environmental assessment was prepared in compliance with the procedures in Minn. R. 7850.3700, and the environmental assessment and the record addressed the issues identified in the scoping decision.

- The site permit should include the mitigation measures and conditions contained in the generic site permit template including the following modifications:

  Modify Section 4.1 concerning notice of permit as follows:

  Within 14 days of issuance of this permit, the Permittee shall send a copy of the permit to any regional development commission, county, city, and township in which any part of the site is located.

  The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of first contact with the affected landowners after issuance of this permit. The Permittee shall contact participating landowners prior to entering their property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

  Add a special condition under Section 5.0 concerning landscaping plan requirements as follows:

  The Permittee shall develop a site specific Landscaping Plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all adjacent residences. The Landscaping Plan shall be filed in this docket and approved by the PUC prior to construction beginning.

  Add a special condition under Section 5.0 concerning vegetation management plan requirements as follows:
The Permittee shall develop a Vegetation Management Plan in consultation with the MnDNR to the benefit of pollinators and other wildlife, and to enhance soil water retention and reduce storm water runoff and erosion. The Vegetation Management Plan shall be filed in this docket at least 14 days prior to the pre-construction meeting.

Add a special condition under Section 5.0 concerning security fence requirements as follows:

The security fence surrounding the Project shall be designed to minimize the visual impact of the project. While maintaining compliance with the National Electrical Code, the Permittee shall install an eight-foot wood pole and woven wire fence, or substantially similar, around the perimeter of the Project. This type of fence is commonly referred to as a “deer fence” or “agricultural fence.” Permittee shall consult with MnDNR to insure the design of the facilities preserves or replaces identified natural wildlife, wetland, woodland or other corridors.

Add a special condition under Section 5.0 concerning tree removal requirements as it relates to the northern long-eared bat and migratory birds as follows:

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds.

- The route permit should include the mitigation measures and conditions contained in the generic site permit template.

VI. EXCEPTIONS TO ALJ REPORT

Under Minn. R. 7829.2700, exceptions to the ALJ Report must be filed within 15 days of the filing of the report for cases subject to statutory deadlines. The ALJ report was filed on December 16, 2015, therefore, the filing deadline for exceptions was December 31, 2015. Exceptions were filed by DOC-EERA, and were the only exceptions filed in this matter.

A. Department of Commerce EERA Exceptions to ALJ Report

On December 24, 2015, DOC-EERA filed exceptions to the ALJ Report. DOC-EERA agreed with the ALJ Report and the recommendation to issue a site permit and a route permit for the North Star Solar Project. DOC-EERA also agreed with: 1) the ALJ’s Conclusions 8 and 11 that
indicate the mitigation measures and conditions contained in the generic site and route permit templates are appropriate; and 2) the ALJ’s recommended special permit conditions (Conclusion 10) concerning landscaping plan requirements, vegetation management plan requirements, and security fence requirements.

DOC-EER also agreed with the ALJ’s special permit condition related to tree removal timetables for the protection of threatened species (Conclusion 10), but recommended modifications to the language. DOC-EERA believed that the timetable may be restrictive and suggested additional language based on conditions of past permits that would allow the permittee to consult with the U.S. Fish and Wildlife Service on what specific timeframe is allowable under federal rules for tree removal in the project area, as follows:

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall efile an account of that consultation 14 days prior to the pre-construction meeting.

DOC-EERA recommended that the above modified special condition be included in the site permit and the route permit, if granted.

VII. STAFF DISCUSSION

Based on information in North Star’s combined site and route permit application, the analysis provided in the environmental assessment, public comments, briefs, the ALJ Report, exceptions received in this matter, and other evidence in the record; staff provides the following discussion.

A. Administrative Law Judge Report

Staff has examined the full record in this case and agrees with the findings, conclusions, and recommendations reached by the ALJ. Staff finds that the ALJ Report is a sound, comprehensive and common sense ruling that is reflective of the case record. The report documents that the procedural requirements were followed and presents findings of fact for each of the decision criteria that must be met for a site permit for a large electric generating plant and a route permit for a high-voltage transmission line. Therefore, staff recommends that the Commission approve the ALJ Report with the following minor modifications:

Finding 169 recommended that the applicant file a stormwater pollution protection plan (SWPPP) for Commission approval to ensure proper mitigation measures are in place concerning erosion and sediment control best management practices. A SWPPP is a plan that is regulated
under the MPCA’s National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit, thus, the MPCA would be the state agency with the authority to approve the plan not the Commission. Therefore, staff recommends that Finding 169 be stricken from the ALJ Report.

It should be noted that the proposed standard permit language for both the site and route permit includes the following language as it relates to soil erosion and sediment control:

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

Where larger areas of one acre or more are disturbed or other areas designated by the MPCA, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA that provides for development of a stormwater pollution prevention plan (SWPPP) that describes methods to control erosion and runoff.

Conclusion 10 identified additional special condition language for the site permit concerning landscaping plan requirements, vegetation management plan requirements, security fence, and tree removal timetables. Staff recommends that Conclusion 10 be modified at § 5.0.1 to clarify the compliance requirement concerning the landscape plan, and at § 5.0.4 to include additional language that would allow consultation with the U.S. Fish and Wildlife Service on appropriate tree removal times as recommended by DOC-EERA, as follows:

§ 5.0.1 The Permittee shall develop a site specific Landscaping Plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all adjacent residences. The Landscaping Plan shall be filed in this docket at least 14 days prior to the pre-construction meeting and approved by the PUC prior to construction beginning.
§ 5.0.4 Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation 14 days prior to the pre-construction meeting.

B. Environmental Assessment Completeness

Staff has reviewed the environmental assessment and agrees with the ALJ that the DOC-EERA conducted an appropriate environmental analysis of the project for purposes of this proceeding, and that the environmental assessment satisfies Minn. R. 7850.3700. Specifically, the environmental assessment and the record created at the public hearing addresses the issues identified in the scoping decision.

C. Site Permit Conditions

Staff agrees with the ALJ and DOC-EERA that the site permit should include the mitigation measures and conditions contained in the generic site permit template. Staff also agrees with the ALJ’s recommendation to modify Section 4.1 concerning notice of permit (Conclusion 9), and adding special conditions to Section 5.0 (Conclusion 10) concerning landscaping plan requirements, vegetation management plan requirements, and security fence requirements, as follows:

Section 4.1 Notification

Within 14 days of issuance of this permit, the Permittee shall send a copy of the permit to any regional development commission, county, city, and township in which any part of the site is located.

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of first contact with the affected landowners after issuance of this permit. The Permittee shall contact participating landowners prior to entering their property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

Section 5.2 Landscaping Plan

The Permittee shall develop a site specific Landscaping Plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all adjacent residences. The Landscaping Plan shall be
filed in this docket at least 14 days prior to the pre-construction meeting and approved by the PUC prior to construction beginning.

Note: Staff suggests a modification to the last sentence of the ALJ’s conclusion that would instead require the permittee to submit the landscaping plan at least 14 days prior to the pre-construction meeting rather than an approval by the Commission. This modified language is consistent with other similar compliance submittals.

Section 5.2 Vegetation Management Plan

The Permittee shall develop a Vegetation Management Plan in consultation with the DNR to the benefit of pollinators and other wildlife, and to enhance soil water retention and reduce storm water runoff and erosion. The Vegetation Management Plan shall be filed in this docket at least 14 days prior to the pre-construction meeting.

Section 5.3 Site Security Fence

The security fence surrounding the Project shall be designed to minimize the visual impact of the Project. While maintaining compliance with the National Electrical Safety Code, the Permittee shall install an eight-foot wood pole and woven wire fence, or substantially similar, around the perimeter of the Project. This type of fence is commonly referred to as a “deer fence” or “agricultural fence.” The Permittee shall consult with the DNR to insure the design of the facilities preserves or replaces identified natural wildlife, wetland, woodland or other corridors.

Concerning the ALJ’s recommendation regarding a special permit condition related to tree removal timetables (Conclusion 10) for the protection of threatened species, Staff agrees with the modifications recommended by DOC-EERA, as follows:

Section 5.4 Tree Removal Timetables

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation 14 days prior to the pre-construction meeting.

D. Route Permit Conditions

Staff agrees with the ALJ and DOC-EERA that the route permit should include the mitigation measures and conditions contained in the generic route permit template. Staff also agrees with
DOC-EERA that a special permit condition regarding tree removal timetables for the protection of threatened species, as modified, should also be included in a route permit. However, because route permits typically do not require a pre-construction meeting, staff suggests the following modification to DOC-EERA’s recommendation regarding document submittal timelines:

Tree Removal Timetables

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation as part of the plan and profile submission. The Permittee shall file an account of that consultation 14 days prior to the pre-construction meeting.

Staff has attached a proposed site permit and route permit that incorporates the modifications as suggested by the ALJ, DOC-EERA, and staff in these briefing papers.

*****

COMMISSION DECISION ALTERNATIVES

A. Should the Commission adopt the administrative law judge’s Findings of Fact, Conclusions of Law, and Recommendation?

1. Adopt the ALJ Findings of Fact, Conclusions of Law and Recommendation for the North Star Solar electric power generating plant and associated 115 kV high-voltage transmission line in Chisago County, Minnesota.

2. Adopt the ALJ Findings of Fact, Conclusions of Law and Recommendation for the North Star Solar electric power generating plant and associated 115 kV high-voltage transmission line in Chisago County, Minnesota, with the following modifications:

   a. Strike Finding 169 as recommended by Commission Staff.

   b. Modify Conclusion 10 as recommended by Commission Staff as follows:

   The Permittee shall develop a site specific Landscaping Plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all
adjacent residences. The Landscaping Plan shall be filed in this docket at least 14 days prior to the pre-construction meeting.

c. Modify Conclusion 10 as recommended by DOC-EFRA as follows:

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation 14 days prior to the pre-construction meeting.

3. Do not adopt the ALJ Findings of Fact, Conclusions of Law and Recommendation for the North Star Solar electric power generating plant and associated 115 kV high-voltage transmission line in Chisago County, Minnesota.

4. Take some other action deemed appropriate.

B. Should the Commission find that the environmental assessment and the record created at the public hearing adequately address the issues identified in the scoping decision?

1. Determine that the environmental assessment and the record created at the public hearing addresses the issues identified in the environmental assessment scoping decision.

2. Take some other action deemed appropriate.

C. Should the Commission grant a site permit for the 100 MW North Star Solar Energy Generating Facility in Chisago County?

1. Grant North Star Solar PV LLC a solar energy generating site permit identifying permit conditions for the 100 MW North Star Solar Energy Generating Facility in Chisago County.

2. Require the site permit to include the mitigation measures and conditions contained in the generic site permit template including the following modifications and special conditions:

   a. Modify Section 4.1 (Notification) as follows:
Within 14 days of issuance of this permit, the Permittee shall send a copy of the permit to any regional development commission, county, city, and township in which any part of the site is located.

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures after issuance of this permit. The Permittee shall contact participating landowners prior to entering their property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

b. Add a special condition concerning landscaping plan requirements as follows:

The Permittee shall develop a site specific landscaping plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all adjacent residences. The landscaping plan shall be filed at least 14 days prior to the pre-construction meeting.

c. Add a special condition concerning vegetation management plan requirements as follows:

The Permittee shall develop a vegetation management plan in consultation with the DNR to the benefit of pollinators and other wildlife, and to enhance soil water retention and reduce storm water runoff and erosion. The vegetation management plan shall be filed at least 14 days prior to the pre-construction meeting.

d. Add a special condition concerning security fence requirements as follows:

The security fence surrounding the Project shall be designed to minimize the visual impact of the project. While maintaining compliance with the National Electrical Safety Code, the Permittee shall install an eight-foot wood pole and woven wire fence, or substantially similar, around the perimeter of the Project. This type of fence is commonly referred to as a “deer fence” or “agricultural fence.” The permittee shall consult with DNR to insure the design of the facilities preserves or replaces identified natural wildlife, wetland, woodland or other corridors.
e. Add a special condition concerning tree removal timetables as follows:

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation 14 days prior to the pre-construction meeting.

3. Do not grant North Star Solar PV LLC a solar energy generating site permit identifying permit conditions for the 100 MW North Star Solar Energy Generating Facility in Chisago County.

4. Take some other action deemed appropriate.

D. Should the Commission grant a route permit for the 115 kV transmission line associated with the North Star Solar Energy Generating Facility in Chisago County?

1. Grant North Star Solar PV LLC a high-voltage transmission line route permit identifying a specific route and permit conditions for the North Star Solar Project 115 kV Transmission Line in Chisago County.

2. Require the route permit to include the mitigation measures and conditions contained in the generic route permit template including the following special condition concerning tree removal timetables as follows:

Tree removal required by the Projects shall be done between October 1st and March 30th to mitigate negative impacts to the northern long-eared bat and to minimize potential impacts on migratory birds, unless other appropriate time limitations on tree clearing are determined in consultation with the USFWS. The Permittee shall file an account of that consultation as part of the plan and profile submission.

3. Do not grant North Star Solar PV LLC a high-voltage transmission line route permit identifying a specific route and permit conditions for the North Star Solar Project 115 kV Transmission Line in Chisago County.

4. Take some other action deemed appropriate.
Staff Recommendation: A2(a-c), B1, C1, C2(a-c), D1, and D2
Large solar farm wins approval

The $180 million power project is planned for leased farmland in Chisago County.

By DAVID SHAFFER
david.shaffer@startribune.com

The largest solar power project in Minnesota won approval Wednesday from state regulators.

North Star Solar, a $180 million solar farm to serve Xcel Energy customers, is planned on leased farmland southeast of North Branch in Chisago County. The project, covering an area the size of two Lake Calhounss, will generate roughly the amount of electricity used in 25,000 homes.

The Minnesota Public Utilities Commission voted 4-0 to grant permits to Community Energy Solar of Radnor, Pa., to erect solar panels and a related power line. The company will own and operate the project, and expects to begin selling the power to Xcel by the end of the year.

It is by far the biggest in a wave of large, ground-mounted solar arrays that energy companies are planning to build across Minnesota in the next few years. The solar boom is driven by state requirements that investor-owned utilities get 1.5 percent of their power from solar by 2020 and by growing demand from consumers who choose electricity from shared projects called solar gardens.

The Minnesota Solar Energy Industries Association, a trade group, is projecting a 30-fold increase in the state’s solar generating capacity by the end of 2017. Hundreds of large shared-solar projects are planned in rural areas and on the urban fringe, including Wright, Dakota and Washington counties, mostly to serve customers of Xcel, the state’s largest power company.

“We are expecting to go from 25 megawatts of mostly rooftop solar to 750 megawatts by the end of next year,” said David Shaffer, development director and general counsel of the trade group.

See SOLAR on D2+
State’s largest solar array wins approval

**SOLAR** from DI

One megawatt equals 1 million watts, and the output of North Star Solar will be 100 megawatts, the equivalent of a modest-sized traditional power plant.

Many of the new solar projects will replace farmland with fields of glass. Some people who live near the North Star project object to the transformation of the rural landscape even though the developer is required to plant trees for screening.

Seven unhappy homeowners who would be surrounded by the North Star project are being bought out by the developer — a voluntary step that regulators applauded. Even so, Commissioner John Tuma, who lives in rural Rice County, said the PUC or the Legislature may need to consider additional protections for rural residents.

“

You do have these little clusters out there, where people who bought their little Xanadu are living,” Tuma said.

“This is the ideal place for these facilities, so we have to figure out how to balance.”

Not all of North Star’s neighbors got buyers offers, and the commission’s decision disappointed them. It will take 20 to 25 years for the trees to grow up,” Bob Zangs, who lives south of the North Star site, said in an interview after the meeting in St. Paul.

Another neighbor is considering moving, but feels caught in a bind. “We don’t know what we are going to do,” said Rick Raemager, who also lives south of the project.

“If you sell the place, what are you going to get for it, and where are you going to go?”

Similar issues have been raised by neighbors of another large solar project that NextEra Energy Resources proposes to build for Xcel near Marshall, Minn. That project, still awaiting regulatory approval, is about two-thirds the size of the North Star project. Another 25-megawatt solar project is planned by Juwi Energy near Tracy, Minn., also for Xcel.

Unlike most solar arrays, which are positioned at a fixed angle facing south, North Star’s panels will mechanically tilt from east to west, tracking the sun’s movement. At noon, the panels will be horizontal. The tracking system captures more solar power late on summer days, when power demand often spikes.

“With the tracking system, you can maintain maximum output of the project into the evening as air conditioning load peaks,” said Chase Whitney, an executive with Community Energy Solar. “A tracking solar project that can generate into the evening peak is a more valuable asset from the utility’s perspective.”

Xcel, the Minneapolis based utility serving 1.2 million electric customers in the state, has contracted to buy all of the electricity from the North Star, Marshall and Tracy projects for 25 years. They were selected after the utility solicited bids from energy developers in 2014.

“Xcel also has approved applications from energy developers to build 46 community solar gardens in its service region. More than 700 other solar garden projects remain under review. Many of those projects are to be built in clusters of five solar gardens, with each group covering a land area roughly equivalent to eight football fields.”

by the end of the first quarter.

Analysts noted that division sales and the expiration of strategic alliances come on the heels of a series of pricey acquisitions and divestitures. While 3M is known for its wealth of additive products, “this small s is not likely reflective of a major change in the fit of additives into 3M’s portfolio broadly,” said Matt Arnold, analyst with Edward Jones.

“We would look at it as a reflection of a ‘bottom up’ evaluation of the product line that may not be of importance strategically anymore.”

After years of tiny or no deals, 3M spent $2.5 billion in June to buy protective equipment maker Safeskin based in Bloomington. In August, the company spent $1 billion on Polyvore’s Sana filter “Separations Media business.”

3M CEO Inge Thulin told analysts last month that “these deals will enhance two of our core platforms, personal safety and filtration.”

In respect to selling other businesses, “ultimately, we determine that selling these businesses will result in the greatest value creation for our company,” Thulin said.

The company’s stock fell 1 percent to close at $136.56 Wednesday.
Solar Siting and Environmental Review Working Group

Final Report

March 2015
Abstract

As of September 2014, Minnesota’s installed solar capacity is 19.3 megawatts (MW), a nine-fold increase since 2009. To date the largest solar installation in Minnesota is two MW. Recently announced utility-scale solar projects, ranging in size from 25 to 100 MW, would increase Minnesota’s solar capacity to over 300 MW if all are constructed.

In 2013, the Minnesota Legislature established a stand-alone solar energy standard that requires, with certain exceptions, 1.5 percent of an Investor-owned utility’s utility electrical sales come from solar sources by 2020. This requirement is anticipated to increase Minnesota’s installed solar capacity to over 400 MW. The Legislature, also in 2013, established a goal of achieving 10 percent of the state’s total electrical sales from solar sources by 2030.

The growth in installed solar capacity will come from a mix of smaller rooftop residential and commercial installations that have represented the bulk of solar installations to date, but will also include much larger ground installations ranging in size from one to at least 100 MW. With approximately seven to ten acres of land per MW required for ground installations, this increase in solar capacity has the potential to result in noticeable changes in the landscape.

Recognizing that Minnesota is entering a period of unprecedented solar growth and development, the Minnesota Department of Commerce (Department) convened the Solar Siting and Environmental Review Working Group (Working Group) to discuss and identify issues and opportunities related to reviewing, permitting, and siting new solar facilities.

The Working Group – a small but broad stakeholder group of advocates, developers, local governments, state agencies, and utilities – agreed there is a state interest in permitting solar facilities below the current 50 MW specified in the Minnesota Power Plant Siting Act. Participants also agreed that a local permitting option should exist for local governments that have ordinances addressing solar facilities. The Working Group reached consensus on the following thresholds:

- State permitting, and associated environmental review, for solar facilities greater than 10 MW.

- A local permit delegation option for solar facilities greater than 10 MW but less than 25 MW if local governments have ordinances that adequately address solar facilities.

- No state permitting requirements for solar facilities 10 MW or less.
Acronyms, Abbreviations, and Definitions
Department  Minnesota Department of Commerce
EA   Environmental Assessment
EAW   Environmental Assessment Worksheet
EEERA   Department of Commerce Energy Environmental Review and Analysis
EIS   Environmental Impact Statement
MW   megawatt or 1,000,000 watts
PPSA   Minnesota Power Plant Siting Act
PUC   Minnesota Public Utilities Commission
PV   Photovoltaic
Working Group   Solar Siting and Environmental Review Working Group

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1 Background

In the United States, installed photovoltaic (PV) capacity increased 41 percent in 2013,\(^1\) and the generation of electricity utilizing solar energy was the fastest growing sector of the renewable energy market, outpacing the installed capacity of new wind generation facilities by 60 percent or 2,338 megawatts (MW).\(^2\)

As of September 2014, installed solar capacity in Minnesota was 19.3 MW. As shown in Figure 1, installed capacity has increased more than nine-fold since 2009.

Currently, the largest solar facility in Minnesota is a 2 MW PV facility located in Slayton. The Slayton facility became operational in January 2013. The output of the Slayton facility is sold to Xcel Energy and is expected to provide power to 376 homes annually. Currently the only other Minnesota solar facility with an installed capacity greater than 1 MW is located on the roof of the IKEA store in Bloomington. A 3 MW PV facility is currently under construction at the Minneapolis – St. Paul Airport.


Minnesota’s installed solar capacity, as well as the overall size of individual facilities, is expected to increase significantly over the next several years. This increase is in response to a combination of federal and state government policies promoting solar generation and market forces that have significantly reduced the installed cost per watt of solar generating capacity.

In 2013, the Minnesota Legislature established a stand-alone solar energy standard that requires, with certain exceptions, 1.5 percent of investor-owned utility electrical sales come from solar sources by 2020. This requirement is anticipated to increase Minnesota’s installed solar capacity to over 400 MW. The 2013 legislation also established an ambitious goal of achieving 10 percent of the state’s total electrical sales from solar sources by 2030.³

**Upcoming Solar Projects**
Aurora Distributed Energy, LLC proposes to construct the 100 MW Aurora Distributed Energy Project in response to a competitive resource acquisition process to meet Xcel Energy’s identified generation need. The Aurora project would consist of PV facilities at up to 24 locations throughout Xcel Energy’s service territory. Individual facilities would vary in size between 1.5 and 10 MW.

In a separate proceeding, Xcel Energy requested approval from the Minnesota Public Utilities Commission (PUC) to acquire 187 MW of PV generating capacity from three projects:

- 24.75 MW Minnesota Solar I Project near Tracy
- 100 MW North Star Solar Project near North Branch

Utility-scale PV facilities are anticipated to occupy approximately seven to ten acres of land per MW of installed capacity. As a result, the increase in installed solar capacity has the potential to result in noticeable land use changes in various locations throughout the state.

**Permitting**
Permitting requirements for solar facilities vary by generation capacity. Minnesota Statute 216E, the Minnesota Power Plant Siting Act (PPSA), requires all non-wind electric generating facilities capable of generating 50 MW or more of electricity to obtain a site permit from the PUC prior to construction.⁴ Groups of solar facilities determined to be a single development,⁵ and capable of generating 50 MW or more of electricity also fall under PUC’s permitting authority. As part of the PUC permitting process, an environmental review document in the form of an Environmental Impact Statement (EIS) or Environmental Assessment (EA) is prepared by the Department of Commerce (Department).

Solar facilities with installed capacity of less than 50 MW are permitted locally. Under the PPSA, applicants may seek local permitting for facilities capable of generating between 50 MW and 80 MW of electricity, with the local government responsible for preparing an EA for

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³ Minnesota Statutes 216B.1691, subd. 2f(c)
⁴ Minnesota Statutes 216E.03. Subd. 1.
⁵ Minnesota Statutes 216E.021
the project. Typically, construction would require a conditional use permit and may be precluded in certain areas.

Environmental review for solar facilities with a generating capacity of less than 50 MW varies by project size:

- Projects between 25 and 50 MW require preparation of an Environmental Assessment Worksheet (EAW) by the Environmental Quality Board (EQB).
- Projects between 5 and 25 MW are subject to a discretionary EAW at the request of the applicant, responsible government unit, or through a citizen petition process.\(^6\)
- Facilities under 5 MW are exempt from any state environmental review.
- Additionally, an EAW is required for land conversion projects that convert more than 80 acres of agricultural, native prairie, forest, or naturally vegetated land.\(^7\)

Recognizing that Minnesota is entering a period of unprecedented solar growth and development, the Department convened the Solar Siting and Environmental Review Working Group (Working Group) to discuss and identify issues and opportunities related to reviewing, permitting, and siting new solar facilities.

2 Working Group Composition

The Department worked with a small but broad stakeholder group of advocates, developers, local governments, state agencies, and utilities to participate in the Working Group:

- Barr Engineering
- Ecos Energy
- Fresh Energy
- Geronimo Energy
- Invenergy
- Izaak Walton League
- Minnesota Association of Townships
- Minnesota Department of Agriculture
- Minnesota Department of Commerce
- Minnesota Department of Natural Resources
- Minnesota Environmental Quality Board
- Minnesota Public Utilities Commission
- Murray County
- Stearns County
- Sun Edison
- SunShare
- Wind on the Wires
- Westwood Professional Services

\(^6\) Minnesota Rules 4410.4500; 4410.4600 Subp. 3.
\(^7\) Ibid. 4410.1100
3  Process

The Working Group met six times between April 2014 and January 2015. Participants focused on the following questions:

- At what level of government and at what threshold of committed or anticipated generating capacity in a given geographic area should solar development be regulated?
- For projects not regulated by the Minnesota Power Plant Siting Act (PPSA), what is the appropriate means or process to conduct an environmental review and how should the cumulative effects be addressed?
- Are amendments to the PPSA, other state laws and/or rules necessary to better address the environmental issues specific to solar power?
- Are new rules and/or standards specific to solar power necessary to effectively consider environmental issues?

At the initial meeting, Invenergy provided a presentation regarding the construction of the Grand Ridge Project, a 20 MW PV project in Illinois. The Working Group also heard from a panel of solar developers. These presentations provided useful background for participants.

Over the course of the meetings, participants discussed a variety of issues related to solar facilities:

- The existing permitting and environmental review process.
- The need for general background material for members of the public as well as officials and staff at various levels of government who are likely to review permit applications for solar facilities.
- The likely characteristics of solar installations in Minnesota in the near future.
- The anticipated impacts related to solar facilities.

4  Recommendations

Following discussion of issues and impacts related to solar facilities, the Working Group developed the following recommendations in response to the focus questions:

- At what level of government and at what threshold of committed or anticipated generating capacity in a given geographic area should solar development be regulated?

  - Participants agreed there is a state interest in permitting solar facilities below the current 50 MW threshold specified in the PPSA (Minnesota Statute 216E). Participants also agreed that a local permitting option should exist for local governments that have ordinances addressing solar facilities. The Working Group reached consensus on the following thresholds:
Solar Siting and Environmental Review Working Group
Final Report

- State permitting, and associated environmental review, for solar facilities greater than 10 MW.
- A local permit review option for solar projects between 10 MW and 25 MW if local governments have ordinances that address solar facilities.
- No state permitting requirements for solar facilities less than 10 MW.

For projects not regulated by the PPSA, what is the appropriate means or process to conduct an environmental review and how should the cumulative effects be addressed?

- Lowering the state permitting threshold for solar facilities to 10 MW would result in environmental review conducted as part of the PUC permitting process as outlined by the PPSA. For projects between 10 and 25 MW seeking local review, the local government with jurisdiction would develop an EA for the project.
- An EAW is discretionary for projects between 5 and 10 MW.

Are amendments to the PPSA, other state laws and/or rules necessary to better address the environmental issues specific to solar power?

- Although the Working Group did not develop specific legislative language related to a threshold for permitting solar facilities, there was general agreement that proposed changes at this time should be made within the PPSA, rather than developing a separate statute for solar facilities or incorporating solar facilities into the Minnesota Statute 216F, which addresses Wind Generation Facilities.

Are new rules and/or standards specific to solar power necessary to effectively consider environmental issues?

- Participants did not identify a need for a statute specific to solar power.

4.1 Additional Recommendations

In addition to the recommendations detailed above, the Working Group identified a need for information providing an overview of solar energy generation including:

- Definitions and descriptions;
- Discussion of characteristic of different size installations
- Overview of probable impacts;
- Best practices for permitting, if available; and
- Background on policy and market forces influencing the increase in solar.
Appendix A

Working Group Participants
The following groups and individuals participated in the Solar Siting and Environmental Review Working Group:

- Barr Engineering – John Wachtler
- Ecos Energy – Steve Broyer, Chris Little
- Fresh Energy – Ross Abbey, Erin Stojan Ruccolo
- Geronimo Energy – Jeremy Duehr, Betsy Engelking, Nathan Franzen
- Invenergy – Joel Schroeder
- Izaak Walton League – Eric Jensen
- Minnesota Association of Townships – Eugene Dupault, Gary Pedersen
- Minnesota Department of Agriculture – Becky Balk, Bob Patton
- Minnesota Department of Commerce – David Birkholz, Bill Grant, Alison Groebner, Kim Havey, Deborah Pile
- Minnesota Department of Natural Resources – Kevin Mixon
- Minnesota Environmental Quality Board – Kate Frantz, Anna Hendrickson, Caroline Magnuson
- Minnesota Public Utilities Commission – Tricia DeBleeckere, Scott Ek, Cesar Panait
- Murray County – Jean Christoffels
- Stearns County – Angie Berg
- Sun Edison – Dan Rogers
- SunShare – Ross Abbey, Will Cooksey
- Wind on the Wires – Christopher Finke, Beth Soholt
- Westwood Professional Services – Eric Hansen, Jack Hayes, Mallory Lindgren
- Xcel Energy – Ani Backa, Grania McKiernan, Jim Pearson

Staffing for the Working group was provided by Andrew Levi and Suzanne Steinhauer of the Department of Commerce.
Appendix B

Meeting Notes
Solar Siting and Environmental Review Working Group

Meeting Summary

April 15, 2014

Attendees

Angie Berg (Stearns County); Jean Christoffels (Murray county); Tricia DeBleeckere (PUC); Jeremy Duehr (Geronimo); Kate Frantz (EQB); Bill Grant (Commerce); Alison Groebner (Commerce), Kim Havey (Commerce); Jack Hays (Westwood); Anna Henderson (EQB); Eric Jensen (Izaak Walton League); Mallory Lindgren (Westwood); Bob Patton (Department of Agriculture); Jim Pearson (Xcel); Gary Pedersen (MN Association of Townships – by phone); Erin Stojan Ruccolo (Fresh Energy); Beth Soholt (Wind on the Wires)

Meeting Discussion

After introductory remarks from Bill Grant and participant introductions, Commerce staff asked participants to identify key issues in determining appropriate level of siting and environmental review. In addition to identifying issues, participants had a number of questions about the development and construction of solar generating facilities and how solar developments may differ from other types of power generation facilities.

Questions about Solar Development

- Different Solar Technologies - the consensus among group members was that most of the near term solar development will use photovoltaic (PV) technology, but different technologies may emerge as the market evolves. Impacts would also be expected to vary to some degree depending upon the solar technology (e.g. reflection from concentrating solar facilities in the western states does create possible hazards to aircraft and annoyance to residents or people travelling through or near the project, in contrast the dark PV panels would not be expected to create this type of hazard or annoyance)
- Decommissioning and disposal – what is the lifespan of a solar project? How deep are foundations?
- Question about natural breaks in size (MW)
  - Distribution level interconnection (<5-10 MW range)
  - Transmission level interconnection (> 10 MW range)
- What is a project – questions about geographically dispersed projects by the same developer
- Eminent Domain – do solar developers have that?
- Aesthetic impacts – what do the facilities look like? Is reflection or glare an issue?
• Do solar projects provide an opportunity for multiple uses (e.g. low-growing crops, animal grazing)?
• How are potential sites prioritized for development?
• What factors are relevant to solar development?
• Greenfield vs brownfield development – what are opportunities and costs?

There was general agreement among the participants that a presentation on solar development and construction would provide useful background and context to assist in identifying issues related to siting and environmental review.

**Land Use Issues**

• How would a proposed solar project fit into a comprehensive plan?
• Different standards for different land use categories
• How much land would be converted? What is the current land use?
• Potential conflict with proposed developments and Metropolitan Agricultural Preserves (Minn. Stat. 473H, 7-county metro area) and the Agricultural Land Preservation Program (Minn. Stat. 40A, greater Minnesota)
• Cities & zoning authority
• Orderly annexation plans and agreements – how would solar development fit in with areas identified as potential urban development areas?
• Associated infrastructure (e.g. undergrounding of transmission/distribution)
• Understanding that planning resources and experience vary by locale

**Social and Environmental Issues**

• Wildlife Impacts
• Stormwater runoff and erosion control
• Water quality
• Impact on animal agriculture (e.g. loss of land currently used for manure application)
• Fiscal impacts to local governments (Revenue/taxes/payments in lieu of taxes)
• Cultural impacts related to the sense of place
• Aesthetics and public safety related to reflection from the installation
• Impacts from associated infrastructure or other development (e.g. transmission, distribution, roads)

**Potential Thresholds for Environmental Review**

• Area of the project
• Project Size (MW)
• Land Use
• Level of Commission Involvement
• Disturbance of prime ag land or soil quality
• Phased or Connected Actions - Projects that are in different locations or developed over a longer timeframe may be considered to be phased or connected actions under environmental review rules

Other Issues

• Department of Agriculture role as advisory to the Commission and local government
• Ag preservation policy through state agency policy – 10 acres requires Department of Agriculture review (separate from environmental review)
• Local option for permit decisions
• Respect for private use of land
• Need for a summary of solar legislation

Working Group Priorities
Following the discussion of issues, working group participants identified three general priorities for the group to address:

• Solar Siting Guide and Road Map – Development of a resource for developers, local units of government, and members of the public. This guide would address:
  o Understanding what is specific to solar generation compared to other types
  o Local vs. State Thresholds
  o Multiple sites – permitting and environmental review
  o Case study for siting
• Development of Solar Best Practices for Minnesota
  o Siting
  o Decommissioning
  o Life Cycle
• Possible Recommendations for Legislation and Rulemaking – recommendations, if any, are unknown at this time.

Priority Work Products for next meeting
Based on the discussion, participants identified priority work products for the next meeting:

• Phased and connected actions (from EQB)
• Legislative Review
  o Review of 2014 Omnibus Energy Bill
  o Review of 2013 Solar Legislation
• Contact League of Minnesota Cities
• Material on Solar Siting Best Practices
• Begin pulling together existing solar ordinances
• Continue developing a list of related laws/standards potentially related to solar
• Developing Solar/Solar 101 for Photovoltaics
Meeting Discussion:

**Solar Legislation 2013-2014** [Alison Groebner, Minnesota Department of Commerce]

- **Distributed Generation Highlights**
  - 2013 - Changes only apply to investor owned utilities; allow net metering for less than 1 MW, standby charges; meter aggregation. 4 % limit on cumulative distributed generation for each IOU.
  - 2014 - Utilities are required to request certain data from applicants seeking to interconnect.

- **Value of Solar Highlights** - “Alternative Tariff”- Credit for using interconnected Solar PV

- **Solar Energy Standard** - 1.5% solar by 2020 (10 % from installations < 20kW) in addition to 25% renewable by 2025. 10% of the 1.5 from installations.

- **Additional Solar Energy Policy highlights**
  - Solar Incentive Program - Applies to projects < 20kWCommunity Solar Gardens
  - Made in Minnesota
  - On-bill Repayment
  - Property Assessed Clean Energy
  - Financing Terms
  - Supplemental Funding Sources

- **Utility-Scale Solar Regulation (216E)**
- **Definition of “Solar Energy Generating System”**
- **Size Determination - Individual projects in different locations that are built within a 12 month period and exhibit characteristics of being a single development may be considered to be a single project subject to PUC siting if over 50 MW.**
- **Solar projects over 50 MW may pursue permitting through the alternative permitting process.**

- **Certificate of Need Exemption** - Solar/Wind facilities not owned, operated and producing energy for use in Minnesota are exempt from obtaining Certificate of Need.

### Tax Bill highlights

- **Solar Energy Production Tax** - amends existing exemption of solar photovoltaic devices to include “solar energy-generating systems.”
- **Solar Energy Property Classification:**
  - > 1 MW: Classified as 3a (commercial-industrial property) and taxed at a rate of $1.20 / MWh
  - ≤1 MW: classification stays the same as before solar installation; not taxed for solar energy production
- **Tax distribution** - 80% to counties, 20% to cities/townships.
- **Department of Revenue study looking at due Feb. 2015**

### Solar 101 [Joel Schroeder - Invenergy]

Joel provided general background on PV installations and illustrated the construction process with a video of construction of the 20 MW Grand Ridge PV project in Illinois.

- **Posts are direct-embedded** – no concrete foundations unless loose soils require a more secure foundation.
- **Optimal conditions for solar location**
  - Flat, strong soil, consistent slope, close to electoral infrastructure, high solar resource area
  - No shade, cobble rock not desirable
- **Compatibility of solar with other land uses compared to other generation types:** low height, no emissions or dust, limited noise, limited visual disturbance due to overall height.
- **Costs generally increased in brownfield developments compared to greenfield locations**
- **Decommissioning** – expected life of ~ 30 years
  - States/Provinces with decommissioning models: Georgia, California, Texas, Ontario

### Considerations/discussion points:

- **Solar compatibility with other land uses (e.g. quarries, farmland);**
- **Need to avoid shade may require setbacks from property lines, height restrictions on adjacent land uses** – may use payments to neighbors not to build above a certain height.
- **Concern about reaction of farmers, many of whom have been approached about pipelines and wind energy. Who’s representing farmers when it comes to selling/leasing land?**
- **Desire among developers for a well-developed, consistent set of rules to follow.**
• What would help local governments designate areas for solar through a comprehensive plan or other policy?
• Development of Model Ordinances – after some discussion, there was general agreement that Stearns County ordinance or CR planning guidance already serve to provide the basis for a model ordinance.

Priority Work Products for next meeting [Monday, July 7th]
Based on the discussion, participants identified priority work products for the next meeting:

• Fact Sheet about Solar
• Solar Siting Best Practices
• Overview of Solar drivers (policy and economics) from both the government (state and federal) and developers that combine to create solar growth
Solar Siting and Environmental Review Working Group

Meeting Summary

July 7, 2014

Attendees

Angie Berg (Stearns County); Jean Christoffels (Murray County); Jim Pearson (Xcel); Caroline Magnuson (EQB); Kate Frantz (EQB); Nathan Franzen (Geronimo); Erin Stojan Ruccolo (Fresh Energy); Beth Soholt (Wind on the Waves); Dan Rogers (Sun Edison); Bill Grant (Commerce); Deborah Pile (Commerce); Alison Groebner (Commerce); Suzanne Steinhauer (Commerce);

Meeting Discussion:

Potential 2015 Legislative Action:

The group’s major focus at this meeting was a discussion of potential legislative actions for the upcoming 2015 legislative session. Prior to the meeting, Department of Commerce staff distributed a draft discussion document outlining five categories of legislative action. After discussion, participants were asked to vote on the categories to determine which category of alternatives should be moved forward for further development and discussion. Results of voting were as follows:

- Exempt Solar: 0 (1)
- New Solar Statute: 8 (13)
- Include Solar with Wind: 1 (2)
- Amend PPSA: 6 (7)
- Status Quo: 6 (7)

There was agreement among participants that there is a state interest in permitting of solar generation facilities at some size. Although there was not consensus on the appropriate size threshold, there was agreement that exempting all levels of solar development from state permitting was not desirable.

There was some discussion about moving solar legislation to Section 216F (The Wind Statute), to group what might be termed “non-traditional” or “alternative” power generation

1 First number represents votes of meeting participants; number in parenthesis includes votes from meeting and verbal “votes” from follow-up calls. Each entity participating in the working group (e.g. EQB, Department of Agriculture, Wind on the Wires) received 3 votes to gauge the level of support for the different alternatives
together. The general consensus of the group was that solar generation and wind generation are sufficiently different that grouping them together may be problematic.

There was some support for keeping with the “status quo option.” Although this may not cover everything related to solar, we can’t perfectly anticipate what potential problems are and a “wait and see” approach may allow for more targeted fixes as problems arise.

The group discussed potential legislative changes, but with uncertainty as to whether changes would best be placed in the PPSA or in a new solar statute.

Participants expressed an interest in providing more certainty about permitting in the 5 – 50 MW window, currently below the state permitting under the PPSA.

Significant discussion about what is the appropriate size for state permitting:

- 5 MW – electric generating facilities under this size are exempt from environmental review requirements under environmental review rules;
- 10 MW – tipping point at which solar facilities typically require a transmission interconnect rather than distribution;
- 25 MW – Triggers mandatory EAW under environmental review rules

Nationally the trend in solar projects has been moving from larger projects (80 -200 MW) to smaller projects in the 20 – 30 MW range.

There was an acknowledgement among participants that, regardless of the actual threshold set, there will probably be some degree of “right sizing” projects that are approaching a permitting threshold to avoid triggering some type of permit or environmental review. There was no agreement about the number of projects this might affect in the long –term. Earlier precedent (wind size determination and local permitting delegation) indicates that this is more true in the timeframe near these transitions, but does not appear to be an issue with a significant number of projects going forward.

There was also considerable discussion of providing for some local permitting of projects, in places where local governments have the interest and resources to do the permitting. Participants wanted more exploration of the differences between local delegation (similar to wind permitting) and a local review option (used in power plant siting).

There was also discussion about what size threshold would be appropriate for delegation or local review (5 – 25 MW?).

Commerce staff asked if there was a need to change the definition of a “Solar Energy Generation System” or add additional clarification as to the types of solar generation that are covered. The group’s consensus was that there was no need at this time to change the definition and that any changes should wait until there is an issue identified.
There was also some discussion about whether there is there a state interest in energy output of solar facilities, and what type of data is necessary to ensure state policy goals are being met.

Participants also wanted to see cost and timeline estimates for state permitting.

**Working Group Report Outline**
Participants discussed the proposed report outline prepared by EERA staff. In general, participants believed that the outline captured the issues that the group has discussed.

There was some discussion as to the intended audience for the report and about the meaning of the term “utility scale” in the proposed outline. Participants identified a need for a user-friendly overview of solar that would briefly discuss the various “buckets” or thresholds for solar. There was discussion of a general breakdown of installation sizes in the following categories: residential rooftop, commercial rooftop, solar gardens (≤ 1 MW), distributed solar (1-10 MW), large solar (> 10 MW).

Participants recommended that the executive summary of the resulting report be developed in a way that allowed it provide a stand-alone overview of these different installation sizes.
Supplement – Meeting Follow Up
Following the July 7 meeting, Suzanne Steinhauer attempted to contact working group participants that were unable to be at the July 7 meeting to see what their opinions were regarding potential Legislative Actions.

Participants contacted: Kevin Mixon (DNR), Bob Patton (Agriculture), Gary Pedersen (MN Association of Townships), Chris Little (Ecos Energy), Eric Jensen (Izaak Walton League)

Working Group participants contacted after the July 7 meeting expressed:

- Agreement that there is a state interest in permitting of solar facilities, but uncertainty about just where the interest kicks in in terms of size;
- A desire for a predictable process in review and permitting of solar facilities;
- A desire to see more consistency among local governments in permitting and ordinances;
- A desire to ensure local input in permitting decisions;
- If delegation is pursued, a desire to make that option available to townships that have planning and zoning.
Attendees

Eric Hansen (Westwood); Dan Rogers (Sun Edison); Angie Berg (Stearns County); Caroline Magnuson (EQB); Eric Jensen (Izaac Walton League); Scott Ek (PUC); Nathan Franzen (Geronimo); Beth Soholt (Wind on the Wires); Jean Christoffels (Murray County); Erin Stojan Ruccolo (Fresh Energy); Kevin Mixon (DNR); Bill Grant (Commerce); Alison Groebner (Commerce); Kim Havey (Commerce); Chris Little (Ecos); Jack Hays (Westwood); Jim Pearson (Xcel); Bob Patton (MN Dept of Agriculture); Caroline Magnuson (EQB); Cezar Panait (PUC); Anna Hendrickson (EQB); Suzanne Steinhauer (Commerce);

Meeting Discussion:
The group’s focus at this meeting was a discussion of potential legislative actions for the upcoming 2015 legislative session. Following the discussion at the July 7 meeting Department of Commerce staff prepared and distributed discussion drafts of potential legislation:

- a stand-alone solar statute
- potential amendments to the Power Plant Siting Act (PPSA) incorporating solar-specific changes, and
- a copy of the PPSA incorporating 2014 amendments.

Department staff reviewed the proposals and opened discussion on potential approaches to permitting and related issues.

Participants discussed whether permits should cover only the construction and restoration phase, as with site and route permits under the PPSA, or whether the permits should be for some longer length of time, such as the wind permits which are for 30 years. There was considerable discussion about the intersection between the length of a power purchase agreement, the lifespan of a solar project, potential for repowering constructed projects, and the dynamic nature of planning and land use changes.

After discussion of the proposals, participants voted on the preferred approach to permitting, state permitting threshold, and option for local permitting of solar facilities, and the permit term.
There was no clear consensus from the working group as to an approach after the last meeting.

- **Statutory Change** – Status Quo (6 votes); Solar Stand-Alone Statute (2 votes); PPSA amendment (2 votes)
- **Permitting Process** – 2 review standards (5 votes); single review procedure for all projects (0 votes)
- **Permitting Threshold** – 50 MW (5 votes); Combination of MW and acreage (4 votes); 10 MW (2 votes); 5 MW (1 vote)
- **Local Permitting** – Local Review Option (7 votes); Local Assumption of Permitting (2 votes)
- **Term of Permit** – Construction and Restoration (9 votes); Construction, Operation, & Maintenance (1 vote)

Participants supported the concept of 2 review standards (a standard and alternative process) for differentiating projects at some level. Participants also supported a permit that covered the construction and restoration of the project – as do permits for transmission lines and power plants, rather than a permit that covers the operation phase of a project as a wind permit does.

In other areas, however, separating the voting by issue resulted in conflicting messages – more people supported some change in the permitting threshold and allowing some mechanism for local control, even though the majority voted for no change in the current PPSA statute.

Following the voting and the interest in exploring a permitting threshold that combined generation size and acreage, there was some discussion but no consensus about what the acreage threshold would be.

Participants expressed an interest in better understanding of the impacts resulting from solar projects. Participants also thought that there would be benefit to developing a Model Solar Ordinance.
Solar Siting and Environmental Review Working Group  
Meeting Summary  
September 30, 2014

Attendees
Kevin Mixon (DNR); Will Cooksey (SunShare); Dan Rogers (Sun Edison); Angie Berg (Stearns County); Caroline Magnuson (EQB); Betsy Engelking (Geronimo); Ross Abbey (SunShare); Anna Hendrickson (EQB); Bill Grant (Commerce); Deb Pile (Commerce); Bob Patton (MN Dept of Agriculture); Jean Christoffels (Murray County); Eric Hansen (Westwood); Jim Pearson (Xcel Energy); Eugene Dupault (MN Association of Townships); Kim Havey (Commerce); Christopher Finke (Wind on the Wires); Suzanne Steinhauer (Commerce); Andrew Levi (Commerce)

Meeting Discussion
The group’s focus at the meeting was identifying the respective roles of state and local governments for permitting solar facilities. After a discussion of advantages and challenges with both state and local approaches to permitting, the group discussed potential avenues for permitting, and thresholds as they might relate to the array of options.

There was considerable discussion regarding the advantages and challenges of both state and local permitting. The group did not rank individual issues. In general, group discussion highlighted on the State’s relative advantages in balancing competing interests and applying consistency and predictability to the permitting process and local government’s ability to better engage local publics and understand local interests and concerns. More specifically:

- **State/Advantages**
  - Ensure state policies are followed to ensure the orderly implementation of solar siting to meet the solar standard as set by the state legislature.
  - Support the cost effective and efficient review of solar projects consistently across jurisdictions.
  - Balance competing priorities regarding the public interest.
  - Analyze cumulative impacts.
  - Preserve significant state resources.
  - Develop and maintain the knowledge resources and needed.

- **State/Challenges**
  - No direct experience permitting a solar facility – this will change with time.
Permitting process may be more time consuming and expensive compared to local permitting.
- Lack of understanding of local concerns or resources of significance.

- Local/Advantages
  - Provide better consistency with local comprehensive plans.
  - Provide choices regarding the level of permitting (e.g. permitted vs. conditional use) required to site a solar facility.
  - Engage in more active and direct communication with local constituents, potential to create increased public buy-in and project acceptance.
  - Develop focused on-the-ground mitigation measures to reduce impacts.
  - Preserve significant local resources.
  - Permitting is generally faster at a local level than at the state level.

- Local/Challenges
  - Inability to provide permitting consistency and predictability across the state.
  - Inability to address cumulative impacts across the state.
  - May be difficult to dedicate the necessary resources to develop and adapt to permitting solar facilities.
  - Possible disconnect between state needs and local concerns.

Overall options discussed were as follows:

- Permitting
  - State only process.
  - Two-tiered process involving local zoning and permitting.
  - Is this simply an RGU question?
  - Economic or business model that takes into account permitting costs.
  - Advisory task force process to include local interests.
  - Local governments developing land conversion thresholds.

- Thresholds
  - Distribution vs transmission level projects.
  - The utility type, e.g., local, co-op, etc.
  - The projects size (MW or acreage), land usage, length, purpose, or interconnection type.
  - Various environmental triggers.
  - Links to other process, such as EAW or MISO reviews.

**Consensus Points**

After discussion, the group reached consensus on the following:

- There are too many differences between solar facilities and wind facilities to combine them in the same statute.
• Because a great deal is unknown regarding solar permitting the group could not view the issue from the position of “what is wrong with the permitting process now.”
• A stand-alone statute is unnecessary, and solar permitting – at this time – can be addressed through changes to the PPSA.
• Both state and local governments have an interest in permitting solar facilities at some level below 50 MW.

Reaching consensus that both state and local governments have an interest in permitting solar facilities below 50 MW, the group then discussed how these facilities should be permitted, and what thresholds should be used to trigger a permit. Many options were discussed, but the group reached consensus on the following thresholds:

• State permit for solar projects equal to 10 MW or greater. This threshold is linked to the transmission interconnection process through the Midwestern Independent System Operator (MISO).
• Local permitting for solar projects 10 MW or less.
• A local review option for solar projects between 10MW to 25 MW if local governments have ordinances addressing solar facilities.

Future Discussion Points
• Who decides on the local review option - the local government or the applicant?
• Is state or local planning for solar needed?
  o development of solar overlays in county zoning ordinances (could identify either preferred zones or exclusion zones), or
  o local thresholds for land conversion
• Is there a way to address concerns with willing sellers and local zoning preferences/planned development?
• How can the State assist local governments, e.g., model ordinance?
• How to best address cumulative impacts?
• Any recommendations for rule changes?

Follow-up
• Ensure MW figures are correct based on MISO and EQB rules.
Solar Siting and Environmental Review Working Group

Meeting Summary

January 9, 2015

Attendees

Will Cooksey (SunShare); Betsy Engelking (Geronimo); Ross Abbey (SunShare); Bill Grant (Commerce); Deb Pile (Commerce); Cesar Panait (PUC); Jim Pearson (Xcel Energy); Kim Havey (Commerce); Suzanne Steinhauer (Commerce); Andrew Levi (Commerce)

Attending by Phone: Kevin Mixon (DNR); Jean Christoffels (Murray County); Beth Soholt (Wind on the Wires); Dan Rogers (Sun Edison);

Meeting Discussion

The group’s focus at the meeting was on the draft report provided by Department Staff prior to the meeting. Participants agreed that the information in the report was good, and properly reflected the group’s work. Participants also felt that the draft report lacked identification of next steps and legislative guidance.

The Department has a placeholder for legislative changes related to solar permitting at the Governor’s office, with specific language to be developed. The Department anticipates that the language would reflect what was heard from the group:

- a desire to keep solar in with the Power Plant Siting Act (Minn. Stat. 216E).
- a lower permit threshold for solar (10 MW).
- an option for local governments to assume permitting for projects in the 10-25 MW range.

Department staff didn’t believe that the final report should include specific legislative language, as the group did not endorse a specific proposal.

Participants generally discussed what might happen if the solar changes were not part of the Administration’s legislative proposals. Participants agreed that there were likely to be a number of new solar projects to be permitted and sited within the next year, and there was a sense that participants would like to have greater clarity on siting and permitting of solar facilities. Three was general agreement that, given the broad range of working group participants, the group’s recommendations could move forward legislatively through other avenues.
There was some discussion about the way in which local permitting for wind projects evolved, and how that may be a model for local permitting of solar facilities. The Wind Statue (Minn. Stat. 216F) directs the Commission to develop minimum standards, including setbacks. The Department anticipates that the Commission would do this by opening a docket on general permit standards for solar (as it did for wind in Docket Number E,G-999/M-06-1102) to take public comments, which it would consider in making its order in the matter.

The standards developed by the Commission provide the basic standards to be implemented by the Commission and by local governments who assume permitting authority. Local governments can establish more restrictive standards and the Commission is directed to consider any more restrictive standards established by the local unit of government. If the Commission elects not to apply the more restrictive local standards, it must find that there is good cause not to apply the more restrictive standards.

Xcel Energy informed the group that they have received many interconnection requests for solar facilities of 1 MW. There was discussion by the group that it would be helpful for local governments to know whether or not these smaller projects (1MW) were inter-related. Participants recommended that applicants seeking local permits for solar facilities be required to provide a size determination from the Department in their application to the local unit of government, as they do for wind projects under Minn. Stat. 216F.011, subd. 3c.

There was some discussion of what information the Department could provide to assist local governments and members of the public. It is anticipated that permit standards would be developed through the Commission’s docket and the final order that comes out of that proceeding.

**Follow-up**

- Commerce will let participants know about its legislative proposals prior to introduction;
Date: May 20, 2015; Revised October 6, 2015

To: Aurora Distributed Solar, LLC

From: Joyce Pickle, Western EcoSystems Technology, Inc.

Subject: Wildlife Corridor Assessment – Aurora Distributed Solar Project

Aurora Distributed Solar, LLC (Aurora) has proposed to construct distributed photovoltaic solar energy generating systems and associated facilities totaling 100 megawatts alternating current nameplate capacity, to be located at up to 21 facilities (together, the Project) within 15 counties across Minnesota. On July 9th, 2014, Aurora submitted an Application for a Site Permit for the Project to the Public Utilities Commission (MPUC) under the Power Plant Siting Act. On June 30, 2015 the MPUC issued a Site Permit as amended for Construction and Operation of a Distributed Photovoltaic Solar Energy Generating System Consisting of Multiple Sites; one requirement of the Site Permit (Section 7.1) is to submit Biological and Natural Resource Inventories for the facilities. As part of the Biological and Natural Resource Inventories for the facilities, Aurora requested that Western EcoSystems Technology, Inc. (WEST) identify known wildlife corridors in the vicinity of the proposed facilities; this memorandum documents the assessment that WEST performed.

Wildlife corridors are generally defined as strips of habitat (grassland, riparian, wooded) that connect larger patches of natural habitat that would otherwise be isolated in a matrix of developed or agricultural land covers. To be useful for wildlife movement, the corridors must be wide enough and vegetated enough to provide cover, be relatively unbroken by fences, roads, homesteads and other disturbances, and connect two or more larger patches of habitat. WEST examined the 21 facilities included in the Site Permit for potential wildlife corridors. For each facility, WEST reviewed recent aerial imagery, data contained in Aurora’s site permit application, as amended, and Stantec’s Wetland Delineation and Natural Communities Survey Reports. The proposed fencelines and access roads included in the Facility Development Areas for each facility were assessed, and any potential wildlife corridor that met the above definition was identified. The results of WEST’s assessment are included in the attached appendix.

1 Revised in October to reflect final 21 facilities and the date of the final Site Permit issuance.
Appendix – Wildlife Corridor Assessments for the 21 Facilities in the Aurora Distributed Solar Project
Albany Facility

Examination of the Albany Facility Development Area indicates that the land cover consists of agriculture (tilled, mowed or pasture), with an isolated patch of trees, and one intermittent stream/ditch that has no associated riparian vegetation. The Albany Facility is also surrounded by agricultural land with isolated patches of woodland and grassland habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or near the Albany Facility. No wildlife corridors were identified at the Albany Facility Development Area.
Annandale Facility

Examination of the Annandale Facility Development Area indicates that the land cover consists of tilled agriculture, with three palustrine emergent/scrub-shrub wetlands. Although two of the delineated wetlands are connected to a larger wetland complex adjacent to the south edge of the Annandale Facility, the portions of the wetlands within the proposed fenced area are small peninsulas surrounded by tilled fields, placing a fence across these features would not cut off access to any other connected habitat within or across the proposed fenceline, and would not affect wildlife's ability to use the wetland complex south of the facility. The Annandale Facility is also generally surrounded by agricultural land with isolated patches of woodland and wetland habitat. There is a relatively larger, contiguous wetland complex across Klever Ave. to the east of the Annandale Facility; it is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located at the Annandale Facility. No wildlife corridors were identified at the Annandale Facility Development Area.
Atwater Facility

Examination of the Atwater Facility Development Area indicates that the land cover consists of tilled agriculture with an isolated wetland in the middle of the tilled field. The Atwater Facility is surrounded by agricultural and developed residential land with isolated patches of wooded and wetland habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or near the Atwater Facility. No wildlife corridors were identified at the Atwater Facility Development Area.
Brooten Facility

Examination of the Brooten Facility Development Area indicates that the land cover consists of an agricultural hayfield, with one delineated wetland at the eastern edge of the Facility Development Area. According to Stantec’s report, the wetland is planted and mowed for hay most years and would therefore not provide wildlife habitat. The Brooten Facility is generally surrounded by agricultural and rural residential areas with isolated patches of wooded habitat. There is a relatively large, contiguous wetland complex north of the Brooten Facility that extends for miles in a southeast to northwest swath; it is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located at the Brooten Facility. Construction of the Brooten Facility would not affect wildlife’s ability to use corridor. No wildlife corridors were identified at the Brooten Facility Development Area.
Chisago Facility

Examination of the Chisago Facility Development Area indicates that the land cover consists of agricultural fields (cultivated or fallow), with the two fields separated by a treerow of red pine. The northern border of the Facility Development Area consists of a deciduous woodland community made up of red oak, bur oak, pin cherry, buckthorn, box elder and red maple. The treerow and portions of the deciduous wooded area are within the fenceline and would be removed as part of development of the Chisago Facility. Neither of these wooded features would be considered significant wildlife habitat, as the treerow is not connected to any other larger habitats, and the deciduous woodland is separated from a larger corridor of wooded and riparian habitat by Lincoln Road. The Chisago Facility is generally surrounded by agricultural and developed residential areas with isolated patches of wooded habitat. There is a relatively large, contiguous wooded riparian complex east of the Chisago Facility associated with the Sunrise River; it is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located at the Chisago Facility. The wooded stream located across Lincoln Road from the Chisago Facility is a tributary to the Sunrise River and may also be used as a wildlife corridor, although it is narrower and transected by multiple road crossings and therefore would likely be used less frequently than the main Sunrise River corridor. Construction of the Chisago Facility would not affect wildlife’s ability to use either the Sunrise River or its tributary as travel corridors.
Dodge Center Facility

Examination of the Dodge Center Facility Development Area indicates that the land cover consists of tilled agriculture, with a wooded wetland in the southwestern corner, and a line of upland trees on the southern boundary. The upland treeline on the south side of the Facility Development Area consists of butternut, white oak and chokecherry and the wooded wetland is dominated by American elm. The wooded wetland and upland trees would be outside of the proposed fenceline for the Dodge Center Facility. The Dodge Center Facility is also generally surrounded by agricultural and rural residential land with isolated patches of wooded and wetland habitat. There is a relatively larger, somewhat contiguous riparian complex to the west of the Dodge Center Facility, associated with Dodge Center Creek. Although this riparian corridor is transected multiple times by highways and county roads and is therefore likely not a prime wildlife corridor, it is more likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located within the Dodge Center Facility’s proposed fenceline. Although the wooded wetland adjacent to the proposed fenceline is connected to the riparian corridor, the proposed facility would not affect wildlife’s ability to move through the corridor. No wildlife corridors were identified within the Dodge Center Facility fenceline.
Eastwood Facility

Examination of the Eastwood Facility Development Area indicates that the land cover consists of tilled agriculture, with a wooded upland community in the southwestern corner, and a small wetland near the gate to the fenced facility. The Eastwood Facility is also generally surrounded by agricultural and rural residential land with isolated patches of woodland and wetland habitat. There is a relatively larger wetland complex to the northwest of the Eastwood Facility, with associated wetlands adjacent to the proposed fenceline. It is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located within the Eastwood Facility. The upland trees located in the southwest corner are an isolated peninsula adjacent to the larger wooded/wetland complex, and removal of those trees would not affect wildlife’s ability to move through the corridor.
Fiesta City Facility

Examination of the Fiesta City Facility Development Area indicates that the land cover consists of tilled agriculture with vegetated tile inlet on the eastern side of the Facility. The Fiesta City Facility is surrounded by agricultural and developed land with isolated patches of wooded and wetland habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or near the Fiesta City Facility. No wildlife corridors were identified at the Fiesta City Facility Development Area.
Examination of the Hastings Facility Development Area indicates that the land cover consists of tilled agriculture with planted tree rows of hackberry, box elder and slippery elm on the eastern edge and a portion of the western edge; the site is located adjacent to a planted prairie community which is located to the east. The proposed fenceline would not affect the planted prairie community or the eastern treeline; it would affect a few trees on the western edge, but these are sparse and not connected to other habitat and therefore would not be considered a wildlife corridor. The Hastings Facility is surrounded by agricultural and rural residential land with isolated patches of wooded and wetland habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or adjacent to the Hastings Facility. The Mississippi and St. Croix Rivers are located within one mile to the south and east of the Hastings Facility; it is likely that wildlife in the general area would use these rivers and associated wooded riparian areas as corridors rather than the land cover located within the Hastings Facility. No wildlife corridors were identified at the Hastings Facility Development Area.
Lake Emily Facility

Examination of the Lake Emily Facility Development Area indicates that the land cover consists of tilled agriculture. The Lake Emily Facility is also generally surrounded by agricultural land with isolated patches of woodland and wetland habitat. There is a relatively large, somewhat contiguous forested/riparian complex to the west of the Lake Emily Facility, associated with the Minnesota River; one narrow area of this wooded complex is located approximately 600 feet north of the Lake Emily Facility at the closest proximity, and would not be affected by the proposed fenceline. Although the wooded corridor associated with the Minnesota River is transected multiple times by highways and county roads, wildlife in the general area would use this habitat as a corridor rather than the land cover located within the Lake Emily Facility’s proposed fenceline. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or adjacent to the Lake Emily Facility. No wildlife corridors were identified at the Lake Emily Facility Development Area.
Lake Pulaski Facility

Examination of the Lake Pulaski Facility Development Area indicates that the land cover consists of tilled agriculture, with a wooded wetland in the northwestern corner consisting of buckthorn, box elder, and American elm, and a line of upland shrubs on the southern boundary. The Lake Pulaski Facility is generally surrounded by agricultural and rural residential land with isolated patches of woodland, lakes and wetland habitat. The portion of the wooded wetland within the proposed fenced area is a peninsula surrounded by tilled fields, and placing a fence across this feature would not cut off access to any other connected habitat within or across the proposed fenceline, and would not affect wildlife’s ability to use the wetland complex west and north of the facility. Similarly, the Facility would not affect wildlife’s ability to move through the wooded habitat that surrounds the lake and wetland habitats to the east and north of the Facility.
Lawrence Creek Facility

Examination of the Lawrence Creek Facility Development Area indicates that the land cover consists of tilled agriculture, with several wetlands and drainageways. The Lawrence Creek Facility is also generally surrounded by agricultural and rural residential land with isolated patches of woodland and wetland habitat. The proposed fenceline would avoid the wetland on the west side of the Lawrence Creek Facility Development Area. Although the wetland areas within proposed fenceline on the east side of the Facility are connected to a somewhat larger wetland, the proposed facility would not affect wildlife’s ability to move through that area outside of the fence. Furthermore, there are larger, contiguous forested/riparian complexes to the east and south of the Lawrence Creek Facility, associated with the St. Croix River and Lawrence Creek, and wildlife in the general area would be expected to use this habitat rather than the land cover located within the Lawrence Creek Facility’s proposed fenceline or the immediate vicinity.
Lester Prairie Facility

Examination of the Lester Prairie Facility Development Area indicates that the land cover consists of tilled agriculture with an isolated wetland in the middle of the tilled field. The Lester Prairie Facility is surrounded by agricultural and developed residential and commercial land with isolated patches of wooded habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or near the Lester Prairie Facility. No wildlife corridors were identified at the Lester Prairie Facility Development Area.
Mayhew Facility

Examination of the Mayhew Facility Development Area indicates that the land cover consists of a tilled agricultural field, with a farmstead and associated isolated trees located in the middle of the Facility Development Area. The Mayhew Facility is generally surrounded by agricultural and rural residential areas with isolated patches of wooded habitat. There is a relatively larger, somewhat contiguous wetland complex east of the Mayhew Facility that extends in a southwest to northeast swath; it is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located at the Mayhew Facility. No wildlife corridors were identified at the Mayhew Facility Development Area.
Montrose Facility

Examination of the Montrose Facility Development Area indicates that the land cover consists of a tilled agricultural field, with a pasture located in the middle of the Facility Development Area; the pasture community consists of Timothy, dandelion, Kentucky bluegrass and clover. The Montrose Facility is generally surrounded by agricultural and rural residential areas with isolated patches of wooded habitat. There is a relatively larger, contiguous wetland complex southeast of the Montrose Facility associated with the Woodland State Wildlife Management Area; it is likely that wildlife in the general area would use this habitat rather than the land cover located at the Montrose Facility. No wildlife corridors were identified at the Montrose Facility Development Area.
Paynesville Facility

Examination of the Paynesville Facility Development Area indicates that the land cover consists of tilled agriculture and hayfield, with several wetlands and drainageways. The Paynesville Facility is generally surrounded by agricultural and residential and commercial developments with patches of woodland and wetland habitat. Although the wetland areas within the proposed fenceline on the east side of the Facility are connected to a larger wetland, the proposed facility would not affect wildlife’s ability to move through that area outside of the fence. Furthermore, there are larger, contiguous forested/riparian complexes to the east and south of the Paynesville Facility, associated with the North Fork of the Crow River, and wildlife in the general area would be expected to use this habitat as a corridor rather than the land cover located within the Paynesville Facility’s proposed fenceline, which consists of cropfields and relatively poor quality wetlands that are transected by roads.
Pine Island Facility

Examination of the Pine Island Facility Development Area indicates that the land cover consists of tilled agriculture, with a wooded line of upland trees on the southern boundary. The upland treeline on the south side of the Facility Development Area consists primarily of elder, and would be outside of the proposed fenceline for the Pine Island Facility. The Pine Island Facility is also generally surrounded by agricultural and rural residential land with isolated patches of woodland and wetland habitat. There is a relatively larger, contiguous forested/riparian complex to the south of the Pine Island Facility, associated with the Middle Fork of the Zumbro River; additionally, a wooded corridor associated with the North Branch of the Zumbro River is located north of the Pine Island Facility. It is likely that wildlife in the general area would use these habitats as corridors rather than the land cover located within the Pine Island Facility’s proposed fenceline. No wildlife corridors were identified within the Pine Island Facility Development Area.
Scandia Facility

Examination of the Scandia Facility Development Area indicates that the land cover consists of a majority of planted native grass community, dominated by switchgrass, Indian grass, big bluestem, little bluestem, wild bergamot, smooth brome and Kentucky bluegrass with some tilled agriculture. The Scandia Facility is also generally surrounded by agricultural and rural residential land with isolated patches of woodland, grassland and wetland habitat. Although the planted grassland area within proposed fenceline is connected to a larger overall planted grassland parcel, the planted grassland parcel is isolated in the agricultural landscape, and the proposed facility would not affect wildlife’s ability to use the area outside of the fence. Furthermore, there are larger, contiguous forested/riparian complexes to the east and south of the Scandia Facility, associated with the St. Croix River, and wildlife in the general area would be expected to use this habitat as corridors rather than the land cover located within the Scandia Facility’s proposed fenceline. No wildlife corridors were identified at the Scandia Facility Development Area.
Waseca Facility

Examination of the Waseca Facility Development Area indicates that the land cover consists of tilled agriculture, with a small isolated group of trees consisting of cottonwood, box elder and buckthorn located in the southeastern portion of the proposed fenced area. The Waseca Facility is also surrounded by agricultural and developed residential land with isolated patches of wooded habitat. The lack of connected habitats within and adjacent to the facility indicate that wildlife corridors are not present in or near the Waseca Facility. No wildlife corridors were identified at the Waseca Facility Development Area.
West Faribault Facility

Examination of the West Faribault Facility Development Area indicates that the land cover consists of tilled agriculture, with a deciduous forest community in the northeast portion of the Development Area. The wooded community consists primarily of buckthorn, with some box elder, American elm and black walnut; this community would be outside of the proposed fenceline for the West Faribault Facility. The West Faribault Facility is generally surrounded by agricultural and rural residential land with isolated patches of woodland habitat; within one mile to the east is Interstate 35 and developed residential areas within Faribault’s municipal boundaries. While the access road to the facility may result in removing a narrow corridor of trees in the wooded area east of the fenceline, the wooded community is an isolated patch not connected to other natural communities, so would not be considered a wildlife corridor. Furthermore, there is a relatively larger, riparian/wetland complex to the north and west of the West Faribault Facility, associated with the Cannon River; it is likely that wildlife in the general area would use this habitat as a corridor rather than the land cover located within the West Faribault Facility’s proposed fenceline. No wildlife corridors were identified within the West Faribault Facility Development Area.
West Waconia Facility

Examination of the West Waconia Facility Development Area indicates that the land cover consists of tilled agriculture, with two small wetlands on the northern and southern borders. The wetland associated with the road ditch along State Highway 5 on the northern border would be outside of the fenceline; a portion of the wetland within the southern portion of the Development Area would be within the fenceline for the West Waconia Facility. The West Waconia Facility is generally surrounded by agricultural and rural residential land with isolated patches of woodland and wetland habitat. The wetland within the south side of the proposed fenced area is a small peninsula surrounded by tilled fields which is likely hydrologically connected to Young America Lake. However, the wetland is already separated from the lake by 118th Street, and placing a fence along the north side of 118th Street would not cut off access to any other connected habitat within or across the proposed fenceline, and would not affect wildlife’s ability to use the wetland/lake complex south of the facility. There is also a relatively larger, somewhat contiguous forested/wetland/lake complex to the east of the West Waconia Facility, associated with Rice Lake. It is likely that wildlife in the general area would use this habitat or the habitat associated with Young America Lake rather than the land cover located within the West Waconia Facility’s proposed fenceline. No wildlife corridors were identified within the West Waconia Facility Development Area.