Aurora Distributed Solar Project Environmental Assessment

In the Matter of the Site Permit Application for the 100 MW Aurora Distributed Solar Project at Multiple Facilities in Minnesota

Minnesota Public Utilities Commission Docket E6928/GS-14-515

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Minnesota Department of Commerce
Energy Environmental Review and Analysis

Responsible Government Unit

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Abstract

Aurora Distributed Solar, LLC (Aurora) submitted an application to the Minnesota Public Utilities Commission (Commission) for a Site Permit to construct 100 MW of distributed photovoltaic (PV) solar generation at up to 24 locations in 16 counties. The proposed power plant locations range in nameplate capacity from 1.5 to 10 megawatts (MW). Preliminary estimates of developed area range from approximately 13 to 108 acres per facility.

The project is located in Benton, Blue Earth, Carver, Chippewa, Chisago, Dodge, Goodhue, Kandiyohi, Le Sueur, McLeod, Pipestone, Rice, Stearns, Waseca, Washington and Wright counties.

Aurora submitted its Site Permit Application to the Commission on July 9, 2014. The Site Permit Application was accepted as complete by the Commission on September 24, 2014. The docket number for the Site Permit proceedings is E6928/GS-14-515.

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. Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting the environmental review for site permit applications submitted to the Commission (Minn. Rules 7850). Accordingly, EERA staff has prepared this environmental assessment (EA) for the Aurora Distributed 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 December 5, 2014.

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 eDockets system: https://www.edockets.state.mn.us/EFiling/search.jsp (enter the year "14" and the number "515").

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 permit application will be presented to the Commission for a final decision. A decision on a site permit for the Aurora Distributed Solar Project is anticipated by May 2015.

Acronyms, Abbreviations and Definitions

ALJ	Administrative Law Judge
Area of Site Control	the land under Aurora's control at each facility
BMP	Best Management Practice
Commission	Minnesota Public Utilities Commission
dBA	A-weighted sound level recorded in units of decibels
DNR	Minnesota Department of Natural Resources
EA	Environmental Assessment
ECS	Ecological Classification System
EERA	Department of Commerce Energy Environmental Review and Analysis
EMF	electromagnetic field
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
kV	kilovolt
mG	milligauss
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NAC	noise area classification
NEMA	National Electric Manufacturers Association
NLCD	National Land Cover Database
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
POI	Point of Interconnection
Preliminary Development Area	area where Aurora anticipates the components of the PV facility will be located
PWI	Public Waters Inventory
SHPO	State Historic Preservation Office
SPCC	Spill Control and Countermeasure

SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

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APPENDICES

Appendix A: EA Scoping Decision
Appendix B: Site Permit Template
Appendix C: Aurora Responses to EERA Environmental Review Questions
Appendix D: Preliminary Site Plans

1.0 Introduction

Aurora Distributed Solar, LLC (Aurora) has made an application to the Minnesota Public Utilities Commission (Commission) for a site permit for the proposed 100 MW Aurora Distributed Solar Project. The permit application was made pursuant to Minn. Statutes Section 216E and Minnesota Rules Chapter 7850.

Aurora proposes to construct 100 MW of photovoltaic (PV) solar generation at up to 24 locations in 16 counties. The proposed power plant locations range in nameplate capacity from 1.5 to 10 megawatts (MW). Preliminary estimates of developed area range from approximately 13 to 108 acres. The project is proposed to be located in Benton, Blue Earth, Carver, Chippewa, Chisago, Dodge, Goodhue, Kandiyohi, Le Sueur, McLeod, Pipestone, Rice, Stearns, Waseca, Washington, and Wright counties.

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

This environmental assessment (EA) addresses the issues noted in Minnesota Rule 7850.3700, subpart 4, and those identified in the Department's scoping decision for this project (Appendix A), and is organized as follows:

Section 1.0	Introduction	The introduction provides an overview of this document and of the proposed project.
Section 2.0	Regulatory Framework	Section 2.0 describes the regulatory framework associated with the project.
Section 3.0	Proposed Project	Section 3.0 describes the project as proposed by Aurora, including PV Arrays, roads and the electrical system.
Section 4.0	Alternative Sites	Section 4.0 describes sites considered and rejected, and any alternative sites that were developed through the EA scoping process.
Section 5.0	Potential Impacts of Proposed Project	Section 5.0 details the potential impacts of the proposed 100 MW project to human and natural environments and identifies measures that could be implemented to avoid, minimize, or mitigate potential adverse impacts

Section 6.0	Potential Impacts by Facility	Section 6.0 details the potential impacts of the individual facilities to human and natural environments and identifies measures that could be implemented to avoid, minimize, or mitigate potential adverse impacts.
Section 7.0	Application of Siting Factors	Section 7.0 applies the information and data available in the record to date to those factors described in Minnesota Rule 7850.4100.

1.1 Project Description

Aurora proposes to construct a combination of PV solar energy conversion system (solar arrays, roads, electrical collection and interconnection system) totaling 100 Megawatts (MW) at up to 24 locations in Benton, Blue Earth, Carver, Chippewa, Chisago, Dodge, Goodhue, Kandiyohi, Le Sueur, McLeod, Pipestone, Rice, Stearns, Waseca, Washington, and Wright counties. Proposed facility locations are shown in Figure 1. Table 1 provides summary information of the proposed facilities based on preliminary project design. The final project design may result in changes to the anticipated size of individual facilities, either in MW output or development acreage.

1.2 Project Purpose

Aurora proposes to construct the project to provide distributed solar energy to meet Xcel Energy's needs for additional capacity in the 2017 to 2019 timeframe. As a result of a competitive resource acquisition process to select resources to meet Xcel Energy's identified need, the Commission directed Xcel Energy to negotiate a draft power purchase agreement with the Project.

1.3 Sources of Information

Much of the information used in this EA is derived from documents prepared by Aurora, including the Site Permit Application (Application), Facility Fact Sheets and responses to questions from EERA staff. In addition to material provided by Aurora, information from scoping comments and from EERA's GIS analysis of the facilities and their surrounding areas was used to prepare this document.

Figure 1: Aurora Distributed Solar Project Proposed Facility Locations

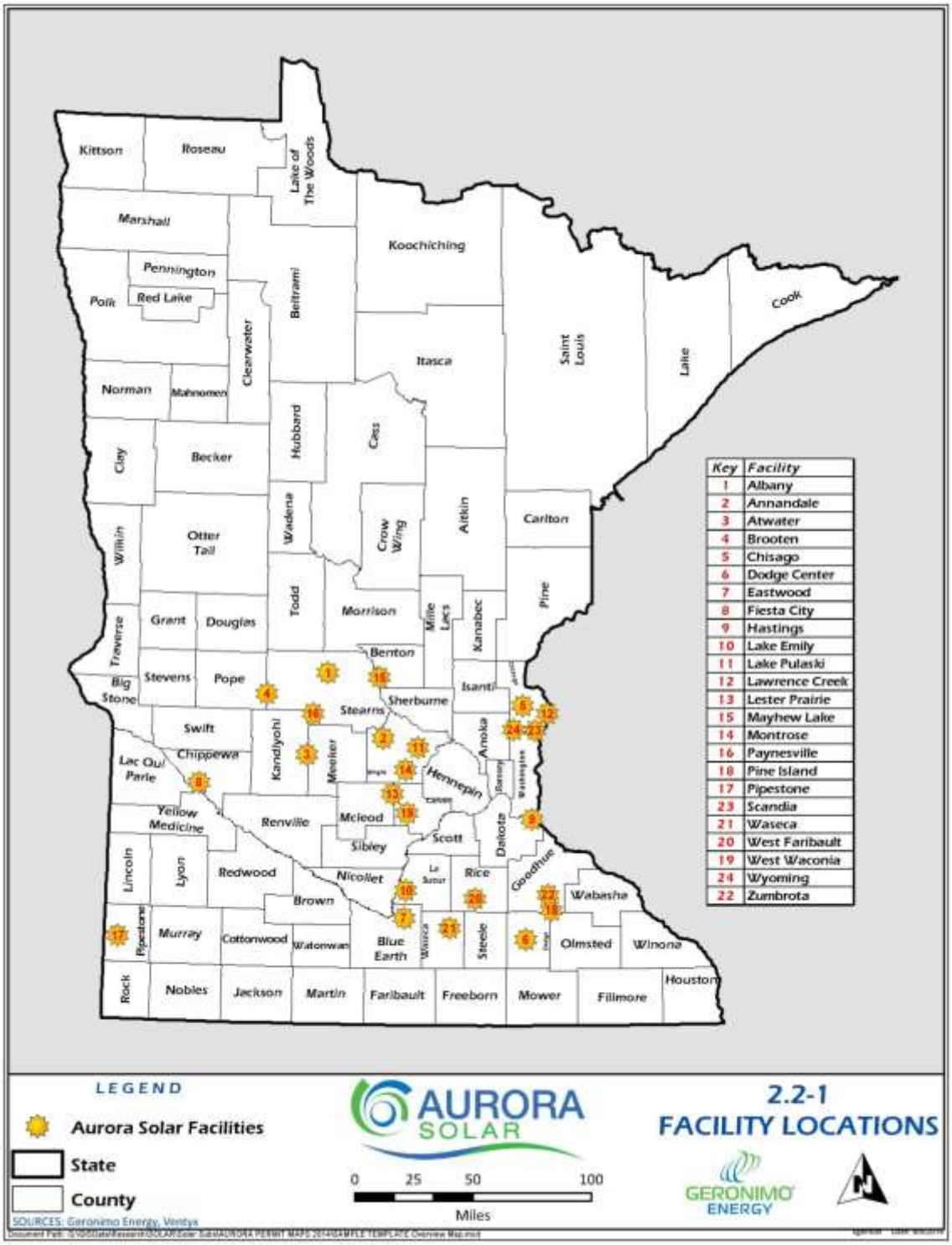

Table 1. Project Locations

Facility	County	Township/Range/Section	Facility Land Control (acres)	Preliminary Development Area (acres)	Anticipated MW-AC
Albany	Stearns	Sections 8 & 17, T 125N, R 31W	230.6	107.4	10.0
Annandale	Wright	Section 32, T 121N, R 27W	70.6	70.6	6.0
Atwater	Kandiyohi	Section 1, T 119N, R 33W	40.1	36.3	4.0
Brooten	Stearns	Section 31, T 124N, R 35W	13.0	13.0	1.5
Chisago	Chisago	Section 12, T 34N, R 21W	62.4	60.6	7.5
Dodge Center	Dodge	Section 32, T 107N, R 17W	68.5	60.0	6.5
Eastwood	Blue Earth	Section 14, T 108N, R 66W	49.7	49.7	5.5
Fiesta City	Chippewa	Section 9, T 117N, R 40 W	25.6	25.6	2.5
Hastings	Washington	Section 8, T 26N, R 20W	40.6	40.6	5.0
Lake Emily	Le Sueur	Section 24, T 110N, R 26W	46.9	42.4	5.0
Lake Pulaski	Wright	Section 15, T 120N, R 25W	75.8	63.2	8.5
Lawrence Creek	Chisago	Section 27, T 34N, R 19W	74.3	39.4	4.0
Lester Prairie	McLeod	Section 25, T 117N, R 27W	29.9	26.0	3.5
Mayhew Lake	Benton	Section 12, T 36N, R 31W	36.0	21.8	4.0
Montrose	Wright	Section 2, T 118N, R 26W	37.7	34.8	4.0
Paynesville	Stearns	Section 4, 8 & 9, T 122N, R 32W	223.6	108.4	10.0
Pine Island	Goodhue	Section 31, T109N, R 15W	46.9	42.2	4.0
Pipestone	Pipestone	Section 11, T106N, R 46W	15.8	14.7	2.0
Scandia	Chisago	Section 35, T 33N, R 20W	24.4	23.3	2.5
Waseca	Waseca	Section 12, T 17N, R 23W	89.2	85.2	10.0
West Faribault	Rice	Section 2, T 109N, R 21W	85.5	59.4	5.5
West Waconia*	Carver	Section 1, T 115N, R 26W	75.7	78.1	8.5
Wyoming	Chisago	Section 32, T 33N, R 21W	67.3	62.0	7.0
Zumbrota	Goodhue	Section 25, T 110N, R 16W	35.6	31.9	3.5

* Preliminary Development Area boundary is larger than the Facility Land Control boundary in this particular instance to accommodate possible interconnection in the public right-of-way on the north side of Highway 5/25.

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 (Minn. Statute 216B.243). While the proposed project meets the definition of a large energy facility requiring a Certificate of Need, under Minn. Statutes Section 216B.2421, subd. 2, under Minn. Stat. Section 216B.2422, subd. 5(b), the proposed project is exempt from Certificate of Need requirement because it was selected by the Commission through a competitive resource approval process to meet Xcel Energy's electricity generation needs.[1]

2.2 Site Permit

Minn. Statutes Section 216E.03, subd. 1, provides that no person may construct a large electric power generating plant without a site permit from the Commission. Under Minnesota Statutes Section 216E.01, subd. 5, 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. The proposed project is a large electric power generating plant and therefore a site permit is required prior to construction.

On July 9, 2014 Aurora submitted the site permit application for the proposed Aurora Distributed Solar Project pursuant to the provisions of the alternative permitting process outlined in Minnesota Rules 7850.2900. The alternative permitting process includes environmental review and public hearings.

A copy of the site permit application, along with other relevant documents, can be reviewed at the Department's web page at:
http://mn.gov/commerce/energyfacilities/Docket.html?Id=33924.

The Department, through EERA staff, is responsible for evaluating the site permit application and administering the environmental review process. The Commission is responsible for selecting the project site and issuing the site permit.

[1] Commission, *Order Directing Xcel to Negotiate Draft Agreements*, eDocket, Document ID 20145-99797-01 .

2.3 Environmental Review

Environmental review under the alternative permitting process includes public information/scoping meetings and the preparation of an environmental review document, the EA (Minnesota Rule 7850.3700). The EA is a written document that describes the human and environmental impacts of the power plant project (and selected alternative sites) and methods to mitigate such impacts.

The Deputy Commissioner of the Department of Commerce (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 August 22, 2014, Commission staff sent notice of the place, date and times of the Public Information and Scoping meeting to those persons on the General List maintained by the Commission, the agency technical representatives list and the project contact list.[2] Notice of the public meeting was also published in the local newspapers.[3]

Commission staff and EERA staff jointly held six public information and scoping meetings at locations proximate to the 24 potential facility locations identified by Aurora. Table 2 provides a summary of the public meetings.

Table 2: Public Information and Scoping Meeting Locations

City	Meeting Location	Date and Time	Approximate Attendance
Montrose	Montrose Community Center	Tuesday, September 9, 2014 11:00am – 2:00pm	12
Lindstrom	Chisago Lakes High School Performance Arts Center	Tuesday, September 9, 2014 6:00pm – 9:00pm	10
Marshall	YMCA	Wednesday, September 10, 2014 11:00am – 2:00pm	4
St. Paul	Public Utilities Commission	Tuesday September 16, 2014 11:00am – 2:00pm	2
Paynesville	Paynesville High School - Auditorium	Tuesday, September 16, 2014 6:00pm – 9:00pm	6
Faribault	Washington Recreation Center	Wednesday, September 17, 2014 11:00am – 2:00pm	7

The purpose of the meetings was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest alternatives

[2] Commission, *Notice of Public Information and Scoping Meeting*, August 22, 2014, eDocket Document ID. 20148-102463-01
[3] Aurora, *Affidavit of Publication*. October 22, 2014. eDocket Document ID. 201410-104056-01

and impacts that should be considered during preparation of the EA. A court reporter was present at all of the meetings to document oral statements.[4]

In addition to the mailed and published notices of the public information and scoping meetings, EERA staff surveyed 67 local governmental units (cities, townships, counties) and the 7 regional development commissions where proposed facility locations were proposed.[5] EERA staff received responses from 30 governmental units.[6]

43 written comments were received by the end of the scoping comment period on September 30, 2014.[7] Scoping comments addressed a variety of topics including: compatibility with local zoning and planning: input of local governments into siting; appearance and materials used to fence the facilities; impacts of the proposed facilities on property values of adjacent properties; impacts to wildlife, specifically to birds; overall appearance of the solar installations and the potential for glare; noise during construction and operation of the facilities; impacts to agriculture; impacts to surface waters and stormwater runoff; and impacts to wetlands.

The Minnesota Department of Natural Resources (DNR) identified issues related to vegetation management, rare and unique natural resources and wildlife to be included in the EA.[8]

The Minnesota Department of Transportation (MnDOT) clarified that MnDOT does not consider a solar generating project to be a public utility for transportation purposes and consequently would not allow Aurora to place connecting lines along trunk highways, although electric lines are permitted to cross trunk highways. MnDOT also identified that several proposed locations abut state trunk highways and would raise concerns about the placement of access roads, storm water retention pond drainage and noxious weed control.[9]

The Minnesota Department of Agriculture requested that the EA identify the potential duration of the land-use conversion from agricultural land at the proposed locations, information on agricultural suitability and productivity of soils, methods or locations that would minimize agricultural impacts, trends for loss of agricultural lands, and impacts of agricultural land conversion to local economies.[10]

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[4] Oral Comments Received During Scoping, eDocket Document ID. 201410-103536-01, 103536-02, 201410-103536-03, 201410-103536-04, 201410-103536-05, 201410-103536-06
[5] EERA *Letter to Local Governments* August 29, 2014, eDocket Document ID: 20148-102675-01
[6] Local Government Scoping Comments, eDocket Document ID: 201410-103823-01, 201410-103823-02
[7] Scoping Comments, eDocket Document ID: 20147-101783-01, 20148-101994-01, 20148-102165-01, 20151-106839-01
[8] Agency Scoping Comments, eDocket Document ID: 201410-103539-03
[9] Ibid.
[10] Ibid.

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 November 24, 2014, after considering what action, if any, 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 December 5, 2014.[11] 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 Nielson and is scheduled to be held at the dates and locations specified in Table 3.

Table 3: Aurora Distributed Solar Hearing Dates and Locations

Date and Time	City	Hearing Location
Monday, February 9, 2015 11 a.m.	Chisago City	Chisago City Community Center 10825 Lake Boulevard
Tuesday, February 10, 2015 11 a.m.	Pipestone	Pipestone Performing Arts Center 104 E. Main St.
Tuesday, February 10, 2015 6 p.m.	Montevideo	Montevideo Community Center 550 South 1st St.,
Wednesday, February 11, 2015 11 a.m. – 2 p.m.	Faribault	Buckham Public Library 11 Division St. E.
Thursday, February 12, 2015 11 a.m. – 2 p.m.	Montrose	Montrose Community Center 200 Center Ave. S
Thursday, February 12, 2015 6 p.m. – 9 p.m.	Paynesville	Paynesville High School – Seminar Room 795 Old Highway 23

The hearing was noticed separately from the EA, and details can be found online at http://mn.gov/commerce/energyfacilities/Docket.html?Id=33924. Interested persons may comment on the EA at the public hearing. Persons may testify at the hearing without being first sworn under oath. ALJ Nielson will ensure that the record created at the hearing is preserved and will provide the Commission with a report setting forth findings, conclusions

[11] Department of Commerce, *Scoping Decision*, December 5, 2015, eDocket ID: 201412-105192-01

and recommendations on the merits of the proposed project applying the siting criteria set forth in statute and rule.[12]

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 permit 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 permits contain conditions specifying siting, construction and operation standards; a site permit template prepared for the Project by Commission staff is attached in Appendix B.

There are a number of potential impacts associated with power plants that must be taken into account on any large electric power generating plant project. Minnesota Rule 7850.4100, A through N, identifies 14 factors that the Commission must consider when designating a site for a large electric power generating plant:

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;*

[12] Commission, *Order Accepting Site Permit Application as Complete, Extending Time for Final Decision, and Referring Application to the Office of Administrative Hearings*. September 24, 2014, eDocket ID: 20149-103265-01

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.

Some factors identified in Minnesota Rule 7850.4100 are related to the routing of high-voltage transmission lines, and not power plant sites. The proposed project does not include any high voltage transmission lines, and therefore these factors are not considered applicable to the proposed Project:

- Factor H: Use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries; and
- Factor J: Use of existing transportation, pipeline and electrical transmission systems or rights-of-way.

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.

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.

2.6 Other Permits

The Public Utilities Commission site permit is the only State permit required for construction of a large electric power generating plant, but other permits or approval 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 Aurora to complete this project.

Table 4: Potentially Required Permits

Regulatory Authority	Permit/Approval
Federal Permits and Approvals	
U.S. Army Corps of Engineers (USACE)	Wetland Delineation Approvals
	Jurisdictional Determination
	Federal Clean Water Act Section 404 and Section 10 Permit(s)
	Federal Section 106 National Historic Preservation Act Review – will occur if Project triggers a federal nexus such as USACE individual permit (USACE is anticipated to be the Lead Federal Agency)
U.S. Fish and Wildlife Service	Review for Threatened and Endangered Species –

Regulatory Authority	Permit/Approval
	informal coordination
Environmental Protection Agency (Region 5) (EPA) (in coordination with the Minnesota Pollution Control Agency (MPCA))	Spill Prevention Control and Countermeasure (SPCC) Plan
U.S. Department of Agriculture	Form AD-1006 Farmland Conversion Impact Rating – will occur if Project triggers a federal nexus such as USACE individual permit
	Conservation / Grassland / Wetland Easement and Reserve Program releases and consents
	Farm Services Agency Mortgage Subordination & Associated Environmental Review
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self Cert. (EWG)
	Market-Based Rate Authorization
	Waiver of Open Access Transmission Tariff (OATT), Open Access Same-Time Information System (OASIS), and Standards of Conduct requirements applicable to transmission providers with respect to Seller's ownership of generator interconnection facilities
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)
State of Minnesota Permits and Approvals	
Board of Water and Soil Resources	Wetland Conservation Act Approval
Minnesota Department of Labor and Industry	Building Plan Review and Permits
Minnesota Public Utilities Commission	Site Permit for Power Plant Site
	Exemption from Certificate of Need for Power Plant
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification
	National Pollutant Discharge Elimination System Permit (NPDES) – MPCA General Stormwater Permit for Construction Activity – one per facility
	Very Small Quantity Generator (VSQG) License – Hazardous Waste Collection Program
	Aboveground Storage Tank (AST) Notification Form
Minnesota Department of Health	Environmental Bore Hole (EBH)
	Water Supply Well Notification
	Plumbing Plan Review
Minnesota Department of Natural Resources (DNR)	License to Cross Public Land and Water
Minnesota Department of Transportation (MnDOT)	Utility Permits on Trunk Highway Right-of-way
	Overweight Permit for State Highways – for transport of transformers, inverters
	Access Driveway Permits for MnDOT Roads
Local Permits and Approvals	
Watershed Districts	Stormwater, drainage, floodplain permits
Counties	Right-of-way permits, road access permits, driveway permits for access roads and electrical collection system, Wetland Conservation Act Approval, parcel splits, platting

Regulatory Authority	Permit/Approval
Townships	Right-of-way permits, crossing permits, parcel splits, platting
Municipalities	Road access permits, and driveway permits for access roads and electrical collect system, parcel splits, platting

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 alternatives not specifically identified in the scoping decision
- The manner in which landowners are compensated for the sites

3 Proposed Project

The project is proposed to be located at up to 24 sites in Benton, Blue Earth, Carver, Chippewa, Chisago, Dodge, Goodhue, Kandiyohi, Le Sueur, McLeod, Pipestone, Rice, Stearns, Waseca, Washington, and Wright counties. Figure 1 illustrates the proposed facility locations. Figures depicting each facility are found in Chapter 6 and more detailed depictions of preliminary design for each facility if found in Appendix D.

3.1 Project Components

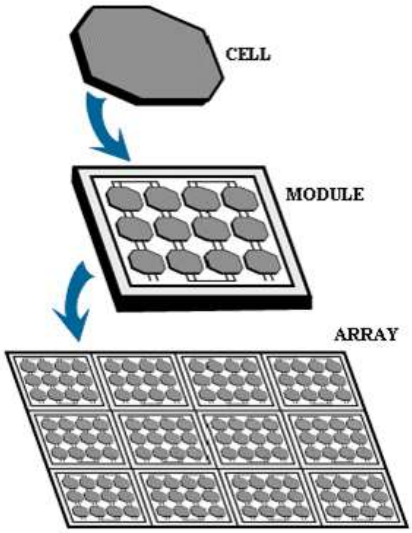
Each facility will be comprised of PV modules mounted on linear axis tracking systems and centralized inverters. In addition to the modules grouped into arrays, each facility will also include electrical cables and conduit, electrical cabinets, step-up transformers, SCADA systems and metering equipment, an operations and maintenance (O&M) area, and roads providing access to the equipment. A perimeter fence will surround the project components with access to the facility through a central gate.

3.1.1 PV Arrays

Each facility will include PV modules of 4 to 6.5 feet long and 2 to 3.5 feet wide mounted on a linear single-axis tracking system. The modules will be grouped into arrays.

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. Grouped solar panels are referred to as a solar array. This progression is depicted in Figure 2.

Figure 2: PV Array[13]

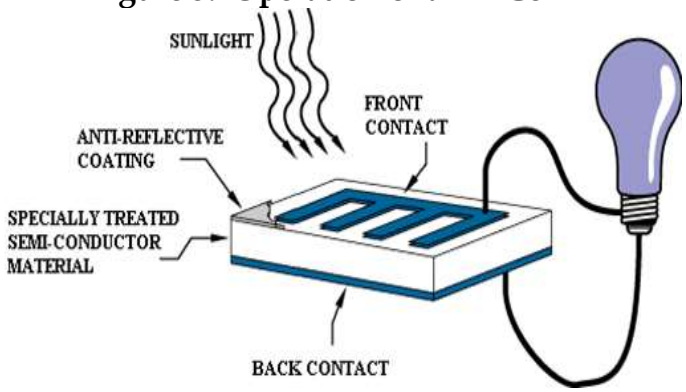


PV systems convert both direct and indirect solar energy (direct and scattered sunlight) to electrical energy by capitalizing on nature's inherent desire to keep electrical charges in balance.[14] At the most basic level, electrical current is the flow of electrons through a conductor. When solar radiation 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 3.

[13] National Aeronautics and Space Administration. 2011. *How Do Photovoltaics Work?* http://science.nasa.gov/science-news/science-at-nasa/2002/solarcells/

[14] US Department of Energy, Office of Energy Efficiency and Renewable Energy. 2013. *Photovoltaic Technology Basics*. http://energy.gov/eere/energybasics/articles/photovoltaic-technology-basics; National Aeronautics and Space Administration, 2011

Figure 3: Operation of a PV Cell[15]



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%.[16] 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. Aurora 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 each facility earthen or 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: preliminary road configuration is depicted in the preliminary facility layout drawings show in Appendix D.

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[15] National Aeronautics and Space Administration, 2011
[16] Appleyard, D. *Solar Trackers: Facing the Sun*. 2009.
http://www.renewableenergyworld.com/rea/news/article/2009/06/solar-trackers-facing-the-sun

Each facility will be accessed from the public road network; some are through existing drives, others will require the establishment of a new access point. Anticipated access plans are described in each facility description in Section 6. 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.[17]

3.1.3 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 three feet deep and one to two feet wide) or, in some limited circumstances aboveground conduit.

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. Aurora anticipates that each panel block will require one to four 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. Depending upon final equipment selection, each inverter would be approximately 10 to 12 feet tall and the equipment enclosure, if used, will be up to approximately 45 feet long by 10 feet wide by 10 feet tall. After the inverter has converted the electricity to AC, a transformer steps up the electricity from low-voltage to medium voltage (up to 34.5 kilovolts [kV]). Each inverter pad will also include one or more transformers to which the inverters will feed electricity.

The electricity will be taken from the facility into the electrical grid via a gen-tie line. Xcel Energy determines the location of the point of interconnection (POI) where the Aurora facility infrastructure meets the Xcel Energy infrastructure at each facility. The POI will be within Aurora's area of site control, typically within the fenceline surrounding the facility components, although in some cases the POI may be outside the fenceline while still within the area of site control. Aurora is responsible for all equipment on the facility side of the POI. Xcel Energy is responsible for designing the infrastructure needed on the utility side between each Aurora facility and the local Xcel Energy substation. Xcel Energy is also responsible for permitting, constructing, operating and maintaining the infrastructure on the utility side of the POI.

Aurora has not yet received detailed design information from Xcel Energy on any electrical connections. At this time Aurora anticipates that the gen-tie line will be built underground to the point of interconnection (POI) with Xcel Energy. However, in some limited circumstances there may be a utility overhead extension at the dead end of the gen-tie line.

[17] Aurora, *Aurora Distributed Solar Project Application for a Site Permit*. July 7, 2014, eDocket ID, 20147-101312-02 (Hereinafter, "Application"), at p. 25

3.1.4 Operations and Maintenance Area

Aurora may establish an Operations and Maintenance (O&M) area at each facility, or may consolidate maintenance activities at one facility to serve multiple facilities in an area. An offsite centralized warehouse may also be used to house strategic spare parts. Once array installation is complete, the primary staging area will be reduced in size to accommodate the O&M area. Design of the O&M area may differ somewhat between facilities. All O&M areas will have a flat gravel or grass area for parking and receiving. Some facilities may also include a pre-engineered metal container or shed for material storage. These structures are anticipated to be approximately 10 feet by 20 feet and 17 feet high at its peak. Aurora may install a well and septic system at some, but not all O&M facilities.

Aurora may install an above-ground storage tank at one or more facilities to store fuel for maintenance equipment.

Lights will be installed on temporary 18-foot 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 downlit to minimize impacts to adjacent land uses.

3.2 Project Construction

Aurora anticipates that construction of some facilities may begin in late 2015, with all facilities online by the end of 2016. Aurora estimates that construction at each facility will last approximately four to eight months,[18] with construction of the entire Project lasting approximately one year.[19] Construction duration at each facility is largely a function of the facility size and coordination between facilities (Table 5).

Table 5: Construction Timeline for Individual Facilities[20]

Task	Duration	Key Predecessor
Site preparation, grubbing and clearing	2 days per acre	Construction begins
Laydown area and temporary job site trailers established	7 days	Construction begins
Civil construction	10 days per acre (may vary according to terrain)	Laydown area and temporary job site trailers established
PV mounting posts	5 days/MW	Site preparation, grubbing and clearing
Underground collection system	4 days/MW	Site preparation, grubbing and clearing

[18] Application, at p. 26
[19] Application, at p. 8
[20] Application, at p. 28

Task	Duration	Key Predecessor
Electrical enclosure/inverter	15 days/unit	Laydown area and temporary job site trailers established
Tracker installation	3 days/MW	PV mounting posts
PV module installation	3 days/MW	Tracker installation
Interconnection tie within facility boundary	10 days/facility	Laydown area and temporary job site trailers established
Testing	20 days/facility	Interconnection tie

3.2.1 Site Preparation

Once necessary permits are obtained, Aurora 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 a staging/laydown area.[21] Aurora estimates that the site preparation, including grubbing and clearing, will last approximately two days per acre, or up to approximately 50 days, depending upon the site.[22]

In order to provide a level surface for solar arrays Aurora anticipates grading at 20 of the facilities: Albany, Annandale, Atwater, Chisago, Dodge Center, Fiesta City, Lake Emily, Lake Pulaski, Lawrence Creek, Lester Prairie, Mayhew Lake, Montrose, Paynesville, Scandia, Waseca, West Faribault, Waconia, Wyoming and Zumbrota. Grading areas range from zero (no grading) to 62.8 acres per facility; acreages by site are discussed in Section 6 and shown in the figures for each facility in Section 6 and in Appendix D.

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 at each facility was determined through assessment of the current grade, the direction of the grade and the desire to maximize useable space for the solar arrays. To the extent feasible, Aurora will design the facilities to ensure that the surface does not face north in order to maximize power production yields.[23]

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. Aurora will attempt to design the site so as not to require either the import or export of earthen materials. Aurora anticipates spreading any excess soils across the facility or, if necessary, exporting cut materials to an offsite location in accordance with local regulations.

[21] Application, at p. 25
[22] Aurora, Response to EERA Environmental Review Question 2b, December 4, 2014 (Appendix C).
[23] Aurora, Aurora, Response to EERA Environmental Review Question 14, January 16, 2014 (Appendix C)

Aurora does not anticipate the use of general fill during construction, but may import structural fill at some facilities for roadways or, in limited cases, foundations.[24]

Early in the construction process a staging and laydown area will be established within the facility boundary. The staging area will be used to receive and store delivery of construction materials and may house a temporary onsite construction office. In some cases, a central laydown area may serve a group of facilities.[25]

3.2.2 Construction of Solar Energy System and Ancillary Facilities

Following site preparation, solar arrays will be constructed in blocks ranging in size from 0.5 MW to 2.0 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. Aurora anticipates that a typical block will be between 500 kW and 2 MW of nameplate capacity, ranging in size between 3 and 14 acres.[26]

PV panels will be installed on a single-axis tracking system. Aurora 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 will 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.

Aurora 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, Aurora will restore and re-vegetate disturbed areas.

[24] Aurora, Aurora, Response to EERA Environmental Review Question Q16, January 6, 2015 (Appendix C)
[25] Application at p. 26
[26] SPA at p. xx; Aurora, Aurora, Response to EERA Environmental Review Question 5a (Appendix C)

3.3 Post-Construction Restoration

As construction is completed on each facility, 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 dresses 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 and disturbed areas will be reseeded and re-vegetated consistent with a project-specific re-vegetation and restoration plan. 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). Aurora anticipates that the post-construction clean-up and site restoration activities will last approximately two to four weeks per facility.

3.4 Project Operation and Maintenance

The expected service life of the proposed facilities is 25 to 40 years.[27] The generating facilities will be remotely operated through a real-time control system for most operations functions. All monitored data will be managed by Aurora or contracted out to a qualified subcontractor. Onsite operation will be performed from time to time as required for certain resets and troubleshooting activities. Operations personnel will monitor the performance of the Project facilities through a regular (weekly or monthly) review of data from each facility's onsite meteorological station (energy produced, alarms, faults, etc.).

Aurora estimates that the Project will require up to 19 full-time permanent equivalent positions to operate and maintain the facilities. O&M offices will not be located at all facility locations; rather the staff will visit the facilities on a regular basis.

All maintenance activities will be performed by qualified personnel. 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;

[2727] SPA, at p. 29

- 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; and
- General facility inspection: visual inspection for the presence of animals, integrity of the fencing, nests, noise check for abnormal sounds.

Aurora 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 incorporates the degradation or loss of efficiency (also referred to as derating/degradation) of the components that is expected over time. Once construction is complete, the individual solar facilities will see one to two trucks on site periodically, at intervals associated with the maintenance schedule during normal operations (Table 6).

Table 6: Operations and Maintenance Tasks and Frequency[28]

Component and Task	Anticipated Frequency
Photovoltaic Field	
PV modules visual check	Every two months
Wirings and junction boxes visual check	Quarterly
PV strings measurement of the insulation	Quarterly
PV strings and string boxes faults	Weekly
PV panels washing	No regular washing planned, (only as site-specific conditions warrant)
Grass cutting (if necessary at site)	Once in Spring, once in Summer
Electric boards	
Case visual check	Twice Yearly
Fuses check	Twice Yearly
Surge arresters check	Twice Yearly
Torque check	Twice Yearly
DC voltage and current check	Twice Yearly
Grounding check	Twice Yearly
Inverter	
Case visual inspection	Every two months
Air intake and filters inspections	Every two months
Conversion stop for lack of voltage	Twice Yearly
AC voltage and current check	Twice Yearly
Conversion efficiency inspection	Twice Yearly
Datalogger memory download	Twice Yearly
Fuses check	Twice Yearly
Grounding Check	Twice Yearly
Torque check	Twice Yearly
Support Structures	
Visual check	Twice Yearly
PV module torque check on random sample	Twice Yearly

[28] SPA, p. 31

3.5 Project Costs

Aurora has estimated that the installation of the Aurora Project as proposed will cost approximately $247 million, or $2.47 million per MW AC. Once operational, Aurora anticipates annual operating costs to be in the range of $45,000 to $60,000 per MW AC, or $4.5 to $6.0 million.[29] Operating costs include labor, materials, and property taxes.[30]

3.6 Decommissioning and Repowering

Aurora anticipates the useful life of each facility will be approximately 25 to 40 years.[31] Aurora's 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.[32]

The equipment itself can typically continue to function up to 40 years or more. Panels, for example may produce energy for several decades past the initial 20-year power purchase agreement. The useful life will ultimately be determined by the economics of the project that take into account the factors listed above.

At the end of the Project's useful life Aurora will determine whether to decommission each facility, consistent with the terms of the Site Permit, or to seek repowering of the facility. Aurora will consider a number of criteria in deciding whether or not to decommission or extend/repower a facility include the following:[33]

- Extension of an existing power purchase agreement 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 10 of the Site Permit Template requires that Aurora prepare a *Decommissioning* Plan prior to operation of the Project. The *Decommissioning Plan* should document Aurora's

[29] Application, at p. 19; Appendix C
[30] Application, at p. 19
[31] Application, at p. 29
[32] Appendix C
[33] Appendix C

plan for decommissioning of the Project and restoration of the site, estimated cost of decommissioning, and a description of how Aurora will ensure that the financial funds necessary to decommission the Project are available.

Aurora estimates that decommissioning tasks will take two to three weeks per facility to complete. After removal components will be examined and either recycled or disposed of appropriately. Aurora has provided the following breakdown of decommissioning tasks:

- Modules are inspected for physical damage, tested for functionality, and removed from racking. Functioning modules are packed and stored for reuse (functioning modules may produce power for another 25 years or more). Non-functioning modules are packed and palletized and sent to the manufacturer or a third party for recycling or other appropriate disposal method;
- Racking is uninstalled, sorted, and sent to metal recycling facility;
- Steel poles removed and sent to a recycling facility. Post holes are backfilled;
- Aboveground wire is sent to facility for proper disposal and recycling. Belowground wire is abandoned in place at depths greater than four feet;
- Aboveground conduit is disassembled onsite and sent to recycling facility;
- Junction boxes, combiner boxes, external disconnect boxes, etc., are sent to electronics recycler;
- Inverter is sent to manufacturer and/or electronics recycler. Functioning parts can be reused. Holes are filled;
- Concrete pad(s) are sent to concrete recycler. Holes are filled;
- Fence is sent to metal recycling facility;
- Computers, monitors, hard drives, and other components are sent to electronics recycler; and
- Functioning parts can be reused.

After all equipment is removed, the facility will be restored. Holes created by poles, concrete pads, and other equipment will be filled in with soil to existing conditions and seeded.

Aurora plans to establish an escrow account with the landowner to cover the costs of decommissioning each facility. The facility lease provides for an escrow account to secure Aurora's obligations to remove the facilities upon the end of the PV system's useful life or at the end of the lease term. Under the conditions of the lease, the escrow shall be held, administered, and disbursed by a qualified escrow agent mutually agreeable to the parties, such as a title company or bank.[34]

[34] Application, at pp. 32-33

4 Alternative Sites

In developing the Project, Aurora considered constructing a single 100 MW solar facility, but rejected that alternative in favor of the perceived advantages of a distributed solar generation project. In its proposal submitted in the 2013 Competitive Resource Bid Geronimo identified 31 potential locations for solar facilities. As development of the Project continued, Aurora selected the proposed 24 facilities to move forward as part of the proposed Project.[35]

The Aurora project is unique in several ways that potentially limit the range of alternative sites for the proposed project:

- Aurora does not have the right of eminent domain and must reach agreement with a willing landowner;
- Aurora has proposed use of PV) installations that follow the movement of the sun from through the day by using a tracking system. These types of installations require an amount of land that is relatively large compared to thermal energy generation; and
- The Aurora project has been designed to feed into Xcel Energy substations at a distribution level interconnect. Prior to submission of its proposal in the Competitive Resource Bid, Aurora identified Xcel Energy substations with available capacity and has applied to Xcel Energy for interconnection to the identified substations.

As discussed in Section 2.3, as part of the scoping process individuals, local governmental units, state and federal agencies and other organizations were provided the opportunity to request that specific alternative sites be included in the scope of the EA. Given the particular requirements of the Aurora project, EERA staff tried to solicit information on alternative sites by providing guidance to commenters as shown in Question 4 of the questionnaire sent to local governments:

> *Are there specific alternative locations for the proposed project or modification to the footprint of a proposed location that you believe should be evaluated in the Environmental Assessment prepared for this project? If proposing a specific alternative location, please consider some of the factors Aurora used in identifying the facility locations proposed in their application: (a) a landowner willing to sell or lease the parcel to Aurora; (b) an agricultural or undeveloped parcel with no known environmental constraints (e.g. wetlands, a Scientific and Natural Area) located within approximately 2 miles of an Xcel Energy substation; and (c) 7-10 acres of relatively flat terrain per megawatt of photovoltaic installation, with a minimum size of 13 acres.*[36]

[35] Application, at p. 19
[36] EERA, *Letter to Local Governments* August 29, 2014, eDocket Document ID: 20148-102675-01

While several commenters expressed a desire for individual facilities to be sited in different locations, only one specific alternative site was identified for one facility.[37] Despite the lack of specific site alternatives, many commenters identified issues they believe should preclude construction of certain proposed facilities. Several of the local governments responding the survey indicated that the solar development proposed may be better suited to other unspecified areas in the general vicinity of the proposed location.[38]

No landowners came forward during the scoping process to offer their land as an alternative site. Absent that information, EERA staff is unable to identify landowners who may be willing to make their land available to Aurora.

In developing alternative routes or route segments to transmission lines, EERA staff often works with commenters to identify and map potential routes that avoid or minimize anticipated impacts to be evaluated in comparison to the proposed route in an environmental review document. With the Aurora project, EERA staff did not believe it was appropriate to identify specific alternative sites for at least two reasons:

- Unlike transmission routes which would potentially limit the use a strip of property for the landowner, a solar facility would potentially remove up to 100 acres from the existing land use for several decades. Without the identification of a willing landowner, showing such an area on a map could understandably alarm some landowners; and
- As Aurora does not have the power of eminent domain, EERA staff did not believe that analysis of an alternative site where there is no indication of a willing landowner would assist the Commission in determining the best site for the proposed facility.

Given the difficulty in identifying alternative sites for evaluation this EA only addresses the human and environmental impacts associated with the facility locations identified in Aurora's Site Permit Application.

EERA staff used ARC GIS software to better visualize how each facility compares to a study area surrounding the Xcel Substation where the energy would be delivered. The study area

[37] One comment proposed moving the Chisago facility to the nearby Carlos Avery WMA.
[38] Oral Comments Received During Scoping, eDocket Document ID. 201410-103536-01, 103536-02, 201410-103536-03, 201410-103536-04, 201410-103536-05, 201410-103536-06; Local Government Scoping Comments, eDocket Document ID: 201410-103823-01, 201410-103823-0220147-101783-01, 20148-101994-01, 20148-102165-01, 20151-106839-01. Agency Scoping Comments, eDocket Document ID: 201410-103539-03; *EERA Comments to Commission on Site Alternatives*, October 14, 2014, eDocket ID: 201410-103827-01

represents Minnesota land within 2.5 miles around each Xcel Substation.[39] The facility descriptions in Section 6 show the location of each facility within the study area, showing land cover, prime farmland and areas that, because of land use, land ownership or environmental constraints may be considered undesirable for development of solar facilities. EERA staff identified the following categories as generally undesirable for development of solar facilities:

- Public Lands including Scientific and Natural Areas (SNAs), Wildlife Management Areas (WMAs) and Waterfowl Production Areas (WPAs)'
- National Wetland Inventory (NWI) wetlands; and
- Areas classified as open water, developed, forest and wetland in the National Land Cover Database (NLCD).

It is important to note that siting of solar facilities is not necessarily precluded in these areas. Identification of these "Generally Incompatible Areas" is intended to serve as a very high level screening tool to better visualize how the proposed facility locations compare with the study area generally.

The analysis of the approximately 19.6 square mile study area for each facility does not identify any specific alternative sites for consideration in this proceeding, but is intended to inform the record as to the relative merits of particular facility locations.

[39] The potential development area is limited to Minnesota. The Hastings and Lawrence Creek facilities, because of their proximity to Wisconsin, have a slightly smaller potential development area.

5 Potential Impacts of the Proposed Project

The construction of a large electric power generating plant involves both short and long-term impacts. An impact is a change in the status of the existing environment as a direct or indirect result of the proposed action. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and occur later or are further removed in distance, but are still reasonably foreseeable.

Impacts may be negative or positive and temporary or permanent or long-lasting. Short-term impacts are generally associated with the construction phase of the project and can include vegetation damage, soil compaction, and noise from construction activities. Long-term impacts can exist for the life of the project and include land changes, increases in local employment, traffic impacts during operation of a facility and changes to the local tax base. Measures that would be implemented to reduce, minimize, or eliminate potential impacts are discussed under the appropriate topic and highlighted as necessary in this section.

Because of the distributed nature of the Project, the EA discusses potential impacts for the Project as a whole in this section as well as for each proposed facility in Section 6.

The following terms are used in discussion of the potential impacts:

- Preliminary development area means the area where Aurora anticipates the components of the PV facility will be located; and
- Area of site control means the land under Aurora's control at each facility.

It may be possible to mitigate potential impacts by adjusting proposed facility size or layout, using different construction methods or implementing any number of post-construction practices. The Commission can require site permit applicants to use specific techniques to mitigate impacts or require certain mitigation thresholds or standards to be met through permit conditions.

5.1 Description of Environmental Setting

The 24 facilities are located in 16 counties in Minnesota. Descriptions for each facility, including the existing land use and environment is included in the facility descriptions in Section 6.

This section provides some an overview of the natural setting of the facilities prior to agricultural clearing. The Minnesota Department of Natural Resources and the U.S. Forest Service have jointly developed an Ecological Classification System (ECS) for ecological

mapping and landscape classification in Minnesota.[40] **Table 7** shows the location of the proposed facilities within the Minnesota ECS.

Table 7: Ecological Classification of Proposed Facilities

ECS Section	Facilities
Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province	Albany, Annandale, Chisago, Dodge Center, Eastwood, Hastings, Lake Emily, Lake Pulaski, Lester Prairie, Montrose, Scandia, Waseca, West Faribault, West Waconia, Wyoming
North-Central Glaciated Plains Section of the Prairie Parkland Province	Atwater, Brooten, Fiesta City, Paynesville, Pipestone
Western Superior Uplands Section of the Laurentian Mixed Forest Province	Lawrence Creek, Mayhew Lake
Paleozoic Plateau of the Eastern Broadleaf Forest Province	Pine Island, Zumbrota

The ECS is useful for understanding native plant communities and their distribution. The facility locations, however, are in areas where native vegetation has been disturbed and replaced with cultivated crops or pasture to a great extent. Although trees are present within some locations, they tend to be in shelterbelts or around homesteads and generally near the edge of the preliminary development areas.

EERA staff used the National Land Cover Database (NLCD) to provide overview of vegetative cover at the facility locations and in an area of comparison around each facility. The NLCD uses satellite imagery to display land cover across the United States. NLCD uses 16 classes of land cover. Table 8 provides the NLCD definitions for the land cover classifications used in this document.[41]

[40] Minnesota Department of Natural Resources, Ecological Classification System: Ecological Land Classification Hierarchy, *http://www.dnr.state.mn.us/ecs/index.html*

[41] United States Geological Service. *The National Map: Land Cover*. http://nationalmap.gov/landcover.html and National Land Cover Database 2011: Product Legend http://www.mrlc.gov/nlcd11_leg.php

Table 8: Land Cover Classifications

Classification	Definition
Open Water	All areas of open water, generally with less than 25% cover or vegetation or soil
Developed, Open Space	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.
Developed, Low Intensity	Includes 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.
Developed, Medium Intensity	Includes 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.
Developed, High Intensity	Includes 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.
Barren Land (Rock/Sand/Clay)	Barren areas of bedrock, desert pavement, scarps, 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.
Deciduous Forest	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.
Evergreen Forest	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 maintain their leaves all year. Canopy is never without green foliage.
Mixed Forest	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.
Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Grassland/Herbaceous	Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
Pasture/Hay	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.
Cultivated Crops	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 actively tilled.
Woody Wetlands	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.
Emergent Herbaceous Wetlands	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.

Table 9 provides a summary of NLCD land cover for the project as a whole. Land cover for each facility is presented in Section 6.

Table 9: Aurora Distributed Solar - Land Cover

Land Cover Classification		Facility Control Area		Preliminary Development Area	
		Acres	Percent	Acres	Percent
Open Water		--	-	-	-
Developed	Open Space	42.5	2.7%	23.1	1.9%
	Low Intensity	16.3	1.0%	12.3	1.0%
	Medium Intensity	2.2	0.1%	0.76	0.1%
	High Intensity	-	-	-	-
Barren Land		-	-	-	-
Deciduous Forest		74.0	4.7%	23.2	1.9%
Evergreen Forest		4.2	0.3%	0.86	0.1%
Mixed Forest		-	-	-	-
Shrub/Scrub		-	-	-	-
Grassland Herbaceous		19.8	1. 3%	9.41	0.8%
Pasture/Hay		269.2	17.2%	125.6	10.5%
Cultivated Crops		1,119.6	71.5%	997.7	83.4%
Woody Wetlands		6.7	0.4%	2.19	0.2%
Emergent Herbaceous Wetlands		11.3	0.7%	1.30	0.1%
Totals		1,565.7	100.0%	1,196.4	100.0%

5.2 Effects on Human Settlement

Construction and operation of new generation 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.

5.2.1 Socioeconomic

In general, the proposed facilities are located in rural areas or on the edges of cities. Table 10 provides an overview of population characteristics in communities where facilities are proposed.

Table 10: Population Characteristics

Facility	Jurisdiction (City or Township)	Population				Median Household Income
		2010 Census	2013 Estimate	% Minority	% Below Poverty	
Benton County		38,451	38,756	5.5%	14.5%	$52,200
Mayhew Lake	Sauk Rapids Township	584	442	1.7%	2.5%	$74,375
Blue Earth County		64,103	64,504	7.2%	19.2%	$49,935
Eastwood	Mankato Township	1,969	1,798	4.1%	3.3%	$83,250
Carver County		91,042	92,770	7.2%	5.0%	$83,773
West Waconia	Young America Township	715	703	1.5%	1.8%	$87,344
Chippewa County		12,441	12,272	6.5%	10.6%	$49,434
Fiesta City	Sparta Township	748	760	3.5%	3.8%	$70,313
Chisago County		53,887	53,691	4.2%	7.5%	$67,157
Chisago	Lent Township	3,091	3,068	3.2%	6.1%	$80,104
Lawrence Creek	Shafer Township	1,048	1,119	4.2%	8.4%	$67,500
Scandia	Franconia Township	1,085	1,902	2.8%	10.9%	$77,125
Wyoming	City of Wyoming	7,791	7,758	3.4%	5.7%	$75,786
Dodge County		20,087	20,159	3.9%	7.4%	$69,301
Dodge Center	Wasioja Township	914	957	4.2%	3.6%	$68,813
Goodhue County		46,183	46,259	5.4%	9.9%	$56,836
Pine Island	City of Pine Island	3,263	3,440	3.4%	8.9%	$62,828
Zumbrota	City of Zumbrota	3,252	3,284	4.2%	12.4%	$46,507
	Minneola Township	629	775	2.7%	1.2%	$80,000
Kandiyohi County		42,239	42,265	7.2%	13.6%	$50,149
Atwater	Gennessee Township	413	426	1.2%	8.2%	$68,750
Le Sueur County		27,703	27,758	4.5%	8.8%	$58,922
Lake Emily	Kasota Township	1,581	1,596	1.2%	6.0%	$72,692
McLeod County		36,651	36,321	4.1%	8.5%	$55,170
Lester Prairie	Winstead Township	968	874	1.0%	3.4%	$69,063
Pipestone County		9,596	9,470	6.5%	10.7%	$46,019
Pipestone	Pipestone City	4,317	4,247	9.8%	15.1%	$42,909
	Sweet Township	324	357	3.1%	2.0%	$59,167
Stearns County		150,642	151,053	8.2%	13.1%	$54,551
Albany	Albany Township	980	903	1.6%	7.1%	$65,982
Brooten	City of Brooten	743	646	1.3%	14.7%	$34,625
Paynesville	Paynesville Township	1,421	1,282	1.4%	3.1%	$66,518
Rice County		64,142	64,585	10.7%	11.6%	$59,915
West Faribault	Warsaw Township	1,320	1,394	2.3%	7.8%	$63,750
Waseca County		19,136	19,046	6.3%	9.4%	$53,657
Waseca	Saint Mary Township	460	397	0.7%	6.8%	$63,125
Washington County		238,136	241,315	12.2%	5.7%	$81,540
Hastings	Denmark Township	1,737	1,684	4.5%	3.6%	$100,703
Wright County		124,700	126,142	5.0%	6.5%	$71,598
Annandale	Corinna Township	2,322	2,218	2.0%	4.4%	$71,313
Lake Pulaski	Buffalo Township	1,804	1,967	1.4%	2.4%	$81,484
Montrose	Woodland Township	1,082	973	3.4%	3.3%	$63,250

None of the proposed facilities is located in areas of disproportionately high minority populations or low-income populations.

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. Aurora anticipates that approximately 296 jobs will be directly created during the construction phase of the Project.[42] Aurora anticipates that each site will require an average of six unique construction jobs, plus 3.3 jobs per installed MW, for a total construction-related workforce of between 11 and 39 workers per site.[43] In addition to the construction jobs directly related to the Project, Aurora estimates approximately 466 construction-related jobs (e.g. engineering, design, sales, marketing, accounting, etc.) will be required to bring the Project online.[44]

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, Aurora anticipates that 19 permanent full-time equivalent positions will be required to operate and maintain the facilities.[45]

Aurora will pay property taxes on the facilities to local governments in accordance with state and county law. Property tax revenue will vary by facility due to variations in facility acreage, property classifications and mill rates. 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[46]. Based on Aurora's estimated annual electricity production of approximately 200,000 MWh, the Project would produce approximately $240,000 annually.

For the most part, the proposed facilities are currently used for agricultural purposes. In aggregate, the Aurora Distributed Solar Project will result in up to approximately 1,120 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

[42] Application, at p. 47. Appendix C
[43] Application, at p. 27
[44] Application, at p. 47Appendix C
[45] Application, at p. 47
[46] Minnesota Statutes, 272.0295

the change in land use would result in a relatively small annual loss of overall crop production in the surrounding communities (0.026 percent of the approximately 4.3 million acres of agricultural land in the affected counties) and in in the state generally. Aurora will compensate landowners for the land used for the facilities, either through lease payments or purchase of the land.[47]

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 may fall on the landowner.

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.

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

Section 10 of the *Permit Site Template* addresses decommissioning and site restoration. Section 10.1 of the *Permit Site Template* would require Aurora to file a *Decommissioning Plan* with the Commission prior to operation. Section 10.2 of the *Permit Site Template* would establish Aurora as the responsible party for carrying out decommissioning task and sets out minimum standards for restoration and Section 10.3 of the *Permit Site Template* addresses abandoned solar installations.

5.2.2 Land Use and Zoning

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

The Aurora 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*

[47] SPA, at p. 47

> *preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.*

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

Most of the facilities are located in areas zoned as agricultural or transitional areas between agricultural and urban areas. Some facilities (Annandale, Eastwood, Mayhew Lake, Montrose, Pipestone and Zumbrota) are located in orderly annexation areas.

Most of the facility locations are zoned by the county, although some fall under city (Brooten and Wyoming), some fall under township authority (Chisago, Annandale) and some are in areas planned for growth (typically designated as orderly annexation areas) where changes in land use, such as that proposed by the Aurora facilities, require annexation into a neighboring city before the change can be effected.

Some jurisdictions, Chisago, Stearns, and Kandiyohi counties, 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 from property boundaries. Many local ordinances preclude construction of solar facilities within designated shoreland protection areas. Many jurisdictions do have solar ordinances directed to preserving solar access and providing standards for smaller solar installations that are accessory uses for homes or businesses.

Potential Impacts

The development of the facility would change the land use 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. In some cases, this has the potential to re-direct development away from the facility. In other cases, the facility may serve as a useful role in ensuring a productive use of the land until the location is ripe for a more intense land use.

In cases where facilities are located in areas where extension of water, sewer, or other urban services are planned, the planned expansion would most likely bypass the parcel on which the facility is located. Although the facility could be restored at the end of its useful life to allow development served by the utility extension, the city would still need to pay for the infrastructure that bypasses the facility and will remain untapped for at least 25 years.

Mitigative Measures

Many counties have designated shoreland protection areas that require setbacks from the ordinary high water level of surface waters. The Site Permit could require compliance with local shoreland ordinances.

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

5.2.3 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, a PV facility is expected to have would have no emissions and 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 of wind turbines, the visual impact at ground level, or within a neighboring building, would be 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 Aurora Distributed Solar Project would involve 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.

5.2.4 Public Services and Transportation

Public services in the form of fire, law enforcement and emergency services are provided by the counties, municipalities and townships where the proposed facilities are located.

The existing public road system that services and provides access to the proposed facilities is generally located along section lines and is managed by state and local government units,

Telephone and electric services are delivered by electric utilities, and distribution and transmission lines are typically located along public roads.

Water and sewer services are provided in some areas by municipalities, while at many of the locations water is provided through a private well and sanitary services are provided through private septic systems at rural residences sewer, fire, and police services.

Some of the facilities are located in areas where private wells and septic systems are used at rural residences. The Minnesota Department of Health County Well Index identifies one well within the preliminary development area for the Scandia Facility and one well within the facility land control area of the Lawrence Creek facility.

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.

Aurora does not anticipate that facilities will be served by city water or sewer. Aurora may install wells and septic systems at some facilities to provide sanitary services and water for maintenance.

In areas where the proposed facilities are located near growing municipalities, construction of a facility may disrupt the orderly expansion of city utilities and require services to be routed around the PV facility. This type of "leapfrog" development can be costly to cities, and disruptive to plans for orderly expansion.

Limited, short-term temporary impacts to electrical service may occur when Xcel Energy interconnects the facilities to Xcel Energy's distribution system.

As none of the facilities is crossed by a railroad, there will be no impact to rail traffic. Potential impacts to air traffic are discussed in Section 5.2.8.

Each facility will be accessed from the public road network. In some cases the Aurora facility will be able to use an existing road access point, while in others the facility will require establishment of a new access point from the existing roadway network. Other than the establishment of facility access, no upgrades or changes to existing roadway systems are necessary for construction or operation of the Project.[48]

[48] Application, at p. 25

Aurora will use existing roadways to deliver construction materials and personnel to facility construction sites. Light-duty trucks would travel to the facility daily during the course of construction. Aurora estimates that for every two MW of installed capacity there will be between 25 and 35 trucks delivering materials to a facility over the course of construction.[49] No impacts to roads would be expected during the operation of the facilities, as minimal traffic would occur during regular maintenance.

Mitigative Measures

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

Aurora will seek appropriate state and local permits for wells or septic systems installed as part of any facility.

New drives or access roads would require approval by appropriate local or state highway departments.

5.2.5 Displacement

Because of the land requirements, solar facilities are generally sited away homes or business. In some cases, however, construction of solar facilities may require displacement of existing homes or businesses to allow for the efficient use of land.

Potential Impacts

Aurora anticipates that construction of the Project would result in the removal of one home at the Mayhew Lake facility. The landowner rents the home. If the home is occupied when construction begins, the renter would be displaced, and would need to seek new housing.

Construction of the Paynesville facility would result in the removal of the remains of an abandoned farmstead. Because the home is not considered habitable (see Figure 66) removal of the structure is not considered to be displacement.

Mitigative Measures

Aurora has committed to providing sufficient notice of the project schedule with the landowner to allow for notice to the renters.[50] As the removal of the home is part of a voluntary agreement between Aurora and the landowner, no additional measures are identified to mitigate the displacement.

[49] Application, at p. 27
[50] Application, at p. 40

5.2.6 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 9 shows the Minnesota Pollution Control Agency (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.

Typical noise sensitive receptors include residences, churches, and schools. Current average noise levels in these areas are typically in the 30 to 40 dBA range and are considered acceptable 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 in the project area.

Table 11: MPCA Daytime and Nighttime Noise Limits

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

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 personnel to and from the work area. Aurora anticipates that construction activities will occur between the hours of 6 a.m. and 7 p.m. on Monday through Saturday,

with the potential for limited low-noise activities on Sundays.[51] The MPCA nighttime noise limits would apply to the first hour of construction activities.

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. Noise will depend upon the inverter model selected. Although Aurora has not selected an inverter at this time, manufacturer's data from the models under consideration shows a 50 dBA (the most stringent MPCA standard) noise level would be perceptible at a range of 30 to 224 feet from the inverter.[52]

Preliminary facility design indicates that the closest home would be approximately 180 feet from any solar array. Because the inverters would be located within the solar arrays, noise impacts during operation of the facility are not anticipated at residences and other.

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.

Aurora anticipates that most maintenance activities will be performed during the day, although it may be preferable to perform some maintenance activities after the sun is down in order to limit impacts to energy production. Maintenance activities that may potentially create noise will be performed during the day in order to minimize noise impacts to nearby residents.

Noise from the electric collection system and gen-tie lines is not expected to be perceptible.

Mitigative Measures

Section 8.8 of the Site Permit Template would require Aurora to limit construction and routing maintenance activities to daytime working hours as defined in Minnesota Rule 7030.0200.

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.

5.2.7 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

[51] Application, at p. 44
[52] Application, at p. 43

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.

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 1,200 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. Existing solar facilities near Oronoco Minnesota and Lambton County, Ontario are shown in Figures 4 and 5.

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 to facilities. Some facilities are located near existing homes and residential areas.

Figure 4: 517 kV Solar Facility - Oronoco MN[53]

[53] Aurora Distributed Solar

Figure 5: 80 Acre Solar Farm, Lambton County Ontario[54]

A limited amount of tree-clearing is anticipated at some facilities. The gen-tie line that connects the facility to the interconnection substation is anticipated to be underground to the edge of Aurora's area of land control in most cases. At the point of interconnection, the gen-tie line will be owned by Xcel Energy. The gen-tie line between the point of transfer and the substation may be either underground or overhead, depending upon specific site conditions. Any overhead gen-tie lines will be similar in appearance to the distribution lines in the existing landscape.

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.

Each facility will be enclosed by an 8-foot security fence (a seven-foot chain link fence topped by another foot of barbed wire).

[54] Aurora Distributed Solar

Lights will be installed on temporary 18-foot 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 downlit to minimize impacts to adjacent land uses. Aurora 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 sites where solar facilities are in keeping with the existing landscape, not immediately adjacent to homes or shielded from view by terrain or existing vegetation.

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. Aurora is developing landscaping plans for certain, as yet unidentified, facilities and has committed to filing the plans with the Commission when finalized.

Xcel Energy will seek local permits for the portion of the gen-tie line between the facility and the Xcel substation. Design of those lines will be consistent with local standards for low-voltage distribution lines.

5.2.8 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.

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 ensure that leaching of the materials, in particular lead used in the soldering of individual cells onto a module[55].

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.

[55] Oregon Department of Transportation, *Health and Safety Concerns of Photovoltaic Panels*, http://www.oregon.gov/ODOT/HWY/OIPP/docs/life-cyclehealthandsafetyconcerns.pdf

Compared to other solar technologies such as Concentrating Solar Power, PV installations such as those proposed by Aurora are unlikely to create hazards to aircraft.[56] Aurora conducted the Federal Aviation Administration's (FAA) Notice Criteria screening tool on the eight facilities within three nautical miles of FAA-registered airports (Brooten, Dodge Center, Fiesta City, Lake Pulaski, Lester Prairie, Pipestone, Waseca, and West Faribault) to determine if further aeronautical study or FAA filing is needed. Following the results of the screening tool, FAA determined that no further review of seven of the facilities (Brooten, Dodge Center, Lake Pulaski, Lester Prairie, Pipestone, Waseca, and West Faribault) was required. FAA recommended further study of the Fiesta City facility; potential impacts are discussed in Section 6.8.

Electric and Magnetic Fields

Voltage transmitted through any conductor produces both an electric field and a magnetic field in the area surrounding the wire. 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 Aurora Project will not require construction of high voltage transmission lines, but will transfer electricity produced at each facility to the local distribution substation through a low-voltage gen-tie line with a maximum capacity of 34.5 kilovolts (kV). The gen-tie lines are anticipated to be constructed underground within the facilities and may be either underground or overhead at the point of interconnection, generally at a facility's fence line, where electricity is transferred to Xcel Energy.

Voltage on any wire (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.

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 ground are designated by the difference in voltage between two points (usually 1 meter). Maximum conductor voltage is defined as the nominal voltage plus five percent. In low-voltage distribution lines of the type anticipated in this project, the maximum operating voltage would be 15 kV for a 13.8 kV line and 36 kV for a 34.5 kV line. Underground construction does provide a shield from electric fields. Based on material from other dockets before the

56 DOE & BLM. Solar Energy Development Environmental Considerations. http://solareis.anl.gov/guide/solar/pv/index.cfm

Commission, electric fields would be very low, perhaps 0.15 kV/M near the centerline, rapidly disappearing to zero for overhead lines and zero for any portion of the line constructed underground.[57]

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.

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as milligauss (mG) and is dependent upon the current flowing through the conductor. In other proceedings before the Commission magnetic fields were estimated at up to 18.8 mG for 13.8 and 34.5 kV distribution line under typical operating conditions (171 Amps).[58]

Mitigative Measures

Section 10 of the Site Permit Template requires that Aurora prepare a *Decommissioning Plan.*

Section 11.4.1 of the Site Permit Template requires 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 8.20 of the Permit Site Template requires Aurora to prepare *an Emergency Response Plan* prior to Project construction. The *Emergency Response Plan* will identify procedures to be followed in the event of an emergency during construction. Because contact information for emergency officials and the location of hospitals would vary by facility, information for each facility should be included in the *Emergency Response Plan.*

Based upon current scientific evidence, no adverse impacts from electric or magnetic fields associated with the Project's gen-tie lines are anticipated.

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[57] Department of Commerce, *Environmental Report: Hollydale 115 kV Transmission Project.* February 2013, eDocket ID: 20132-83588-01
[58] Ibid, at p. 60

5.2.9 Recreation

Outdoor recreational opportunities in the area include hiking, biking, camping, boating, hunting, fishing, wildlife viewing, hiking, cross country skiing, snowmobiling. The location of recreational resources relative to individual facilities is discussed in Section 6.

There are no federal, county or state parks within or adjacent to any of the proposed facilities. Several facilities are within one-half mile of county or local parks, including the Pipestone Facility (Westview Park and middle/high school ball fields); Waseca Facility (a city Nature Area and Loon Lake Park), the West Faribault Facility (Spring Greenway), and the Wyoming Facility (Banta Park).

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 WMAs within any of the Project facilities; the Paynesville Facility is located directly west of the Spirit Lake WMA. Five other Project facilities are within one mile of WMAs: the Chisago Facility (Carlos Avery WMA), the Hastings Facility (Rutstrum WMA), the Lake Emily Facility (Ottawa WMA), the Montrose Facility (Malardi Lake WMA), and the Pipestone Facility (Pipestone Indian WMA).

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 any 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 any of the proposed facility locations. WPAs are located just south of the Annandale facility and within one mile of the Pipestone facility.

The Mayhew Lake Facility parcel is located on a private parcel located within the Sauk Rapids-Rice Goose Refuge. Goose Refuges provide habitat and protection for geese, but hunting of other waterfowl is allowed on public lands within the refuge boundaries[59] Refuge Goose Refuge boundaries. The Pipestone Facility is located on a private parcel within the boundaries of the Hiawatha State Game Refuge, where small game hunting is allowed on public parcels. Hunting activities could occur on other parcels within the Refuge boundaries.

There are no National Parks or National Wildlife Refuges identified within one mile of the Project facilities. The Pipestone facility is located approximately half a mile from the southern boundary of the Pipestone National Monument. The Pipestone National Monument

[59] Minnesota Rule, Part 6240.1850 https://www.revisor.leg.state.mn.us/rules/?id=6240.1850&format=pdf

is managed by the National Park Service, and offers an opportunity to explore cultural and natural resources that are unique to the area. The Monument contains active quarry pits where Native Americans continue the traditions of quarrying pipestone. The quarries are surrounded with native tallgrass prairies, and there are trails located within the Monument for the public to explore.[60]

Both the Lawrence Creek and Hastings facilities are located within one mile of the St. Croix National Scenic Riverway. Recreational use of the river includes boaters and rafters.

The Faribo Sno-Go Trail snowmobile trail crosses the preliminary development area of the West Faribault facility. The trail operates through the property with the cooperation of the landowner. The preliminary development areas of several other facilities (Annandale, Lester Prairie, Mayhew Lake, Montrose and Waseca also overlap with snowmobile trails that are located in road ditches.

Potential Impacts

All 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 facilities. Visual impacts may affect individuals utilizing public or private lands within or near the proposed route. Temporary noise impacts could be experienced by individuals using the recreational resources in the area during construction of the facilities.

No impact to hunting activities is anticipated from the Project. The location of the PV facilities could potentially affect hunting activities in close proximity to the extent that they may constrain shooting directions in the immediate vicinity of the structures.

Given distance between both the Lawrence Creek and Hastings facilities and the St. Croix National Scenic Riverway, the wooded bluffs on the banks of the river, and the low visual profile of the facilities, neither facility is anticipated to be visible to recreational users on this river.

Construction of the West Faribault facility would require a re-routing of the Faribo Sno-Go trail in the area of the facility. Other snowmobile trails located in road ditches near the Annandale, Lester Prairie, Mayhew Lake, Montrose and Waseca facilities are not likely to be impacted and realignment of these trails is not anticipated.

Mitigative Measures

Aurora has stated its intention of coordinating with the local Snowmobile Clubs and trail associations, to identify potential conflicts and, where necessary, realignment opportunities.

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[60] National Park Service. Pipestone National Monument: Plan Your Visit
http://www.nps.gov/pipe/planyourvisit/index.htm

Because the snowmobile trails are located on private lands with the agreement of the landowner, nor further mitigation measures are identified.

5.3 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.

5.3.1 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. At least a portion of all the proposed facilities are located on agricultural land based on NLCD classifications.[61]

Table 12: Agricultural Land Cover by County[62]

County	Facility	Acres of Agricultural Land		Percent of County Agricultural Land
		County	Preliminary Development Area	
Benton	Mayhew Lake	183,101.9	20.6	0.011%
Blue Earth	Eastwood	380,704.3	46.2	0.012%
Carver	West Waconia	154,194.4	72.6	0.047%
Chippewa	Fiesta City	317,439.3	25.6	0.008%
Chisago	Chisago	135,576.0	50.4	0.037%
	Lawrence Creek		39.3	0.029%
	Scandia		22.6	0.017%
	Wyoming		56.7	0.042%
	Total - Chisago facilities	**135,576.0**	**169.0**	**0.125%**
Dodge	Dodge Center	232,450.7	50.3	0.022%
Goodhue	Pine Island	304,815.1	41.2	0.014%
	Zumbrota		29.2	0.010%
	Total Goodhue Facilities	**304,815.1**	**70.4**	**0.023%**
Kandiyohi	Atwater	399,099.3	35.4	0.009%
Le Sueur	Lake Emily	224,382.8	42.3	0.019%
McLeod	Lester Prairie	268,111.6	24.1	0.009%
Pipestone	Pipestone	239,807.4	14.5	0.006%

[61] Agricultural land includes NLCD categories "pasture/ hay" and "cultivated crops".
[62] U.S. Geological Survey, 20140331, NLCD 2011 Land Cover (2011 Edition): U.S. Geological Survey, Sioux Falls, SD)

Rice	West Faribault	228,449.1	51.2	0.022%
Stearns	Albany	625,282.6	105.7	0.017%
	Brooten		13.0	0.002%
	Paynesville		97.8	0.016%
	Total Stearns Facilities	**625,282.6**	**216.4**	**0.035%**
Waseca	Waseca	229,910.5	85.2	0.037%
Washington	Hastings	103,188.5	40.5	0.039%
Wright	Annandale	273,474.7	70.6	0.026%
	Lake Pulaski		55.3	0.020%
	Montrose		33.1	0.012%
	Total Wright Facilities	**273,474.7**	**159.0**	**0.058%**
All Counties	**All Facilities**	**4,299,988.2**	**1,123.3**	**0.026%**

Although much of the land in southern Minnesota 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.*[63]

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

[63] U.S. Department of Agriculture, Natural Resources Conservation Service. *National soil survey handbook, title 430-VI*. Available online.. Sec. 657.5 Identification of important farmlands. http://www.soils.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054226#ex1

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.[64]

Table 13 summarizes prime farmland by facility.

Table 13: Prime Farmland by Facility

Analysis Area	Prime Farmland Classification										Total Acres
	All areas prime farmland		Farmland of statewide importance		Not prime farmland		Prime farmland if drained		Other prime farmland[65]		
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	
Albany											
Control	102.2	44.3%	-	-	62.6	27.2%	65.8	28.5%	-	-	230.6
Development	67.7	63.0%	-	-	10.0	9.3%	29.8	27.6%	-	-	107.4
Study Area	5874.0	46.8%	1001.3	8.0%	1851.6	14.8%	3830.1	30.5%	-	-	12,557
Annandale											
Control	9.9	14.0%	37.4	53.0%	-	-	23.4	33.1%	-	-	70.6
Development	9.9	14.0%	37.4	53.0%	-	-	23.4	33.1%	-	-	70.6
Study Area	1543.7	12.3%	4718.0	37.6%	5199.1	41.4%	1093.7	8.7%	-	-	12,555
Atwater											
Control	32.4	80.9%	1.4	3.5%	2.2	5.6%	4.0	10.0%	-	-	40.1
Development	29.3	80.7%	1.0	2.8%	2.0	5.4%	4.0	11.0%	-	-	36.27
Study Area	4074.4	32.4%	3516.3	28.0%	2525.4	20.1%	2442.1	19.5%	-	-	12,558
Brooten											
Control	-	-	6.6	50.9%	6.4	49.1%	-	-	-	-	12.98
Development	-	-	6.6	50.9%	6.4	49.1%	-	-	-	-	12.98
Study Area	496.8	4.0%	7961.5	63.4%	2982.4	23.7%	1120.0	8.9%	-	-	12,561
Chisago County											
Control	-	-	-	-	62.4	100%	-	-	-	-	62.4
Development	-	-	-	-	60.6	100%	-	-	-	-	60.6
Study Area	401.7	3.2%	1519.7	12.1%	10549	84.0%	81.9	0.7%	-	-	12552
Dodge Center											

[64] U.S. Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.soils.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054226#ex1

[65] Other prime farmland includes "*prime farmland if protected from flooding or not frequently flooded during the growing season*" or "*prime farmland if drained and either protected from flooding or not frequently flooded during the growing season.*"

Analysis Area	Prime Farmland Classification										Total Acres
	All areas prime farmland		Farmland of statewide importance		Not prime farmland		Prime farmland if drained		Other prime farmland[65]		
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	
Control	47.1	68.9%	2.0	2.9%	7.2	10.4%	12.2	17.8%	-	-	68.5
Development	44.0	73.3%	2.2	3.7%	2.1	3.4%	11.8	19.6%	-	-	60.0
Study Area	6666.1	53.1%	343.4	2.7%	682.6	5.4%	4860.0	38.7%	-	-	12552
Eastwood											
Control	8.5	17.0%	-	-	-	-	41.2	83.0%	-	-	49.7
Development	8.5	17.0%	-	-	-	-	41.2	83.0%	-	-	49.7
Study Area	2503.6	20.0%	1016.0	8.1%	1853.5	14.8%	7137.6	56.7%	43.2	0.3%	12553
Fiesta City											
Control	16.7	65.2%	3.3	13.0%	-	-	5.6	21.8%	-	-	25.6
Development	16.7	65.2%	3.3	13.0%	-	-	5.6	21.8%	-	-	25.6
Study Area	5727.9	45.6%	780.6	6.2%	2255.6	18.0%	1758.7	14.0%	2043.5	16.3%	12566
Hastings											
Control	40.3	99.3%	0.3	0.7%	-	-	-	-	-	-	40.6
Development	40.4	99.5%	0.2	0.5%	-	-	-	-	-	-	40.6
Study Area	5028.3	40.5%	1098.3	8.8%	5975.0	48.1%	79.4	0.6%	238.9	1.9%	12419
Lake Emily											
Control	31.3	66.8%	4.8	10.2%	-	-	10.8	23.1%	-	-	46.9
Development	27.7	65.3%	4.3	10.2%	-	-	10.3	24.4%	-	-	42.4
Study Area	3480.7	27.7%	2242.8	17.9%	4298.9	34.2%	2409.9	19.2%	121.5	1.0%	12554
Lake Pulaski											
Control	11.2	14.8%	49.2	64.9%	-	-	15.4	20.3%	-	-	75.8
Development	10.2	16.1%	39.6	62.7%	-	-	13.4	21.2%	-	-	63.2
Study Area	4971.4	39.6%	2389.3	19.0%	2547.3	20.3%	2645.4	21.1%	-	-	12553
Lawrence Creek											
Control	26.8	36.1%	-	-	26.2	35.2%	21.4	28.8%	-	-	74.4
Development	17.6	44.7%	-	-	5.7	14.6%	16.0	40.7%	-	-	39.4
Study Area	3363.9	35.6%	808.3	8.6%	3503.8	37.0%	1775.7	18.8%	-	-	9451
Lester Prairie											
Control	14.2	47.5%	-	-	-	-	15.7	52.5%	-	-	29.9
Development	10.8	41.5%	-	-	-	-	15.2	58.6%	-	-	26.0
Study Area	4632.7	36.9%	1692.9	13.5%	1498.9	11.9%	4729.9	37.7%	-	-	12554
Mayhew Lake											
Control	21.1	58.6%	-	-	12.9	35.8%	2.0	5.7%	-	-	36.0
Development	9.1	41.5%	-	-	11.1	50.9%	1.7	7.6%	-	-	21.8
Study Area	3362.4	26.8%	1809.4	14.4%	4626.8	36.9%	2756.1	22.0%	-	-	12555
Montrose											
Control	19.9	52.8%	0.9	2.3%	-	-	19.9	44.9%	-	-	37.7
Development	17.7	50.9%	0.9	2.5%	-	-	16.2	46.6%	-	-	34.8
Study Area	4056.3	32.3%	2606.1	20.8%	3069.5	24.5%	2746.8	21.9%	75.0	0.6%	12554

Analysis Area	Prime Farmland Classification										Total Acres
	All areas prime farmland		Farmland of statewide importance		Not prime farmland		Prime farmland if drained		Other prime farmland[65]		
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	
Paynesville											
Control	-	-	48.0	21.5%	171.5	76.7%	4.1	1.9%	-	-	223.6
Development	-	-	29.5	27.3%	76.0	70.2%	2.8	2.6%	-	-	108.4
Study Area	1760.2	14.0%	5145.1	41.0%	4516.5	36.0%	1135.9	9.1%	-	-	12558
Pine Island											
Control	18.6	39.6%	0.9	1.9%	0.7	1.5%	22.0	46.9%	4.7	10.1%	46.9
Development	17.5	41.5%	0.5	1.2%	0.0	0.0%	21.1	49.9%	3.1	7.3%	42.2
Study Area	7141.6	56.9%	2323.5	18.5%	2294.8	18.3%	138.2	1.1%	654.3	5.2%	12552
Pipestone											
Control	9.9	63.0%	-	-	0.1	0.6%	5.7	36.4%	-	-	15.8
Development	9.7	67.3%	-	-	-	-	4.8	32.7%	-	-	14.7
Study Area	8589.1	68.3%	9.2	0.1%	740.9	5.9%	3093.2	24.6%	141.8	1.1%	12574
Scandia											
Control	-	-	15.4	63.1%	7.7	31.5%	1.3	5.5%	-	-	24.4
Development	-	-	15.1	64.7%	7.2	30.9%	1.0	4.4%	-	-	23.3
Study Area	3922.1	31.3%	2875.5	22.9%	4447.8	35.5%	1288.7	10.3%	-	-	12534
Waseca											
Control	17.2	19.3%	41.7	46.7%	-	-	30.3	34.0%	-	-	89.3
Development	15.8	18.5%	40.2	47.2%	-	-	29.2	34.2%	-	-	85.2
Study Area	4316.9	34.4%	1278.2	10.2%	2112.0	16.8%	4845.6	38.6%	-	-	12553
West Faribault											
Control	57.0	66.8%	4.6	5.4%	12.0	14.1%	11.8	13.8%	-	-	85.5
Development	41.8	70.3%	2.4	4.0%	5.1	8.5%	10.2	17.2%	-	-	59.4
Study Area	4484.3	35.7%	2829.0	22.5%	4111.7	32.8%	1127.3	9.0%	-	-	12552
West Waconia											
Control	39.2	51.8%	13.5	17.8%	2.4	3.2%	20.6	27.2%	-	-	75.7
Development	40.0	51.3%	13.7	17.5%	2.5	3.2%	21.9	28.0%	-	-	78.1
Study Area	4452.0	35.5%	2982.2	23.8%	2086.6	16.6%	3032.8	24.2%	-	-	12554
Wyoming											
Control	-	-	27.9	41.5%	39.4	58.5%	-	-	-	-	67.3
Development	-	-	23.2	37.4%	38.8	62.6%	-	-	-	-	62.0
Study Area	716.1	5.7%	1910.7	15.2%	9741.6	77.6%	183.8	1.5%	-	-	12552
Zumbrota											
Control	22.4	63.0%	-	-	0.3	0.7%	5.5	15.6%	7.4	20.7%	35.6
Development	20.8	65.1%	-	-	0.0	0.1%	5.5	17.3%	5.6	17.5%	31.9
Study Area	5923.5	47.2%	2828.1	22.5%	2330.9	18.6%	931.8	7.4%	538.2	4.3%	12552
All Facilities											
Control	545.9	34.9%	257.9	16.5%	414.0	26.4%	338.7	21.6%	12.1	0.8%	1565.9
Development	455.2	38.0%	220.1	18.4%	227.5	19.0%	285.1	23.8%	8.7	0.7%	1196.6

Analysis Area	Prime Farmland Classification										Total Acres
	All areas prime farmland		Farmland of statewide importance		Not prime farmland		Prime farmland if drained		Other prime farmland[65]		
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	
Study Area	97490	32.7%	55685	18.7%	85802	28.8%	55245	18.5%	3856	1.3%	298075

The rules governing the siting of power plants provide for up to 0.5 acres of prime farmland be used per MW in most areas unless there is no feasible alternative. Minnesota Rule 7550.4400, Subpart 4:

> *No large electric power generating plant site may be permitted where the developed portion of the plant site, excluding water storage reservoirs and cooling ponds, includes more than 0.5 acres of prime farmland per megawatt of net generating capacity, or where makeup water storage reservoir or cooling pond facilities include more than 0.5 acres of prime farmland per megawatt of net generating capacity, unless there is no feasible and prudent alternative. Economic considerations alone do not justify the use of more prime farmland. "Prime farmland" means those soils that meet the specifications of Code of Federal Regulations 1980, title 7, section 657.5, paragraph (a). These provisions do not apply to areas located 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 under Minnesota Statutes, section 414.0325.*

The Legislature established the Metropolitan Agricultural Preserves Program (Minnesota Statutes 473H) in 1980 to encourage the preservation of agricultural lands within the seven-county metropolitan area for continued production of food and other agricultural commodities.[66]

Potential Impacts

As shown in Table 12, up to 1,120 acres would be removed from agricultural production. In reality, the proposed impact from the Project will be smaller, as not all of the proposed facilities will be constructed. At the end of each facility's useful life, a minimum of 25 years, the facility would be decommissioned and the land could be restored to agricultural use.

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

Construction may damage drainage tile that has been installed to enhance crop production.

[66] Metropolitan Council, *2012 Metropolitan Agricultural Preserves Program Status Report* (March 2013) http://www.metrocouncil.org/METC/files/53/53f6bd9e-da92-40cb-b485-98326c7b18cf.pdf

As shown in Table 13, only 26.4 percent (414 acres) of the total control area and 19 percent (227.5 acres) of the preliminary development area are not classified as prime farmland. The areas of prime farmland that would be removed from agricultural production are significantly smaller than prime farmland in Minnesota as a whole and the counties where the Project is proposed. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to 14 facilities because they are within statutory cities, within two miles of a first, second or third class city, or are in areas designated for orderly annexation: Annandale, Brooten, Chisago, Eastwood, Hastings, Lake Emily, Lake Pulaski, Mayhew Lake, Montrose, Pine Island, Pipestone, West Faribault, Wyoming and Zumbrota.

Mitigative Measures

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

Aurora will implement erosion control best management practices (BMPs). The topsoil will generally be removed and stockpiled where the roads and laydown or graded areas are constructed and then spread back over the disturbed areas.

Section 8.6 of the Site Permit Template would require Aurora to take into account, avoid, repair or replace any drainage tiles broken or damaged during all phases of the Project's life.

Section 8.2 of the Site Permit Template would require Aurora to implement measures to protect and segregate topsoil.

Section 8.3 of the Site Permit Template would require Aurora to implement measures to minimize soil compaction.

5.3.2 Forestry

Although there are forested areas at several of the facility locations, 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.

5.3.3 Tourism

Tourism in the area of the proposed facility locations are largely associated with the recreational activities discussed in Section 5.2.9. Well known tourism destinations are

located near the Lawrence Creek and Pipestone facilities are discussed in Sections 6.12 and 6.18 respectively.

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.

5.3.4 Mining

Although there are multiple gravel pits, rock quarries, commercial aggregate sources and registered prospected sources in the general vicinity of many proposed facilities, there are no active gravel pits or other mineral extraction sites located within or directly adjacent to any of the preliminary development areas.

The northern portion of the area under land control for the Paynesville Facility is located south of a sand or gravel operation, and the Mayhew Lake Facility is located across the street from an inactive quarry.

Potential Impacts

Construction or operation of the proposed facilities would not impact any mining or mineral extraction activities. It is unlikely that construction or operation of the Project would limit the potential to expand existing mining activities as market forces would be expected to create a higher economic return for extraction of aggregate or mineral resources for landowners than would be expected through the agreement with Aurora.

Mitigative Measures

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

5.4 Archaeological and Historic Resources

Aurora requested a records search of Minnesota State Historic Preservation Office (SHPO) records for the areas surrounding the proposed facility locations. Resources and potential impacts are discussed generally here and in greater detail by facility in Section 6.

The SHPO records search identified records within the parcel boundary of the Mayhew Lake facility and within one mile of eight of the 24 facilities (Atwater, Dodge Center, Hastings, Montrose, Pine Island, Pipestone, West Faribault and Zumbrota). .

An archaeological survey of the 24 facilities was conducted in the summer of 2014. The survey identified four archaeological sites, one each at the Eastwood, Mayhew Lake, Lake Emily and Paynesville facilities.[67] SHPO concurred with the recommendation that none of the identified sites are eligible for inclusion in the NRHP.

In addition to the archaeological sites, the survey report noted, but did not evaluate, potentially historic properties at the Mayhew Lake and Albany facilities.

Potential Impacts

Archaeological and historic resources can be impacted by the construction of a PV facility as soil is disturbed.

As discussed further in Section 5.2.9, The Pipestone facility is located approximately half a mile from the southern boundary of the Pipestone National Monument. The Pipestone National Monument is managed by the National Park Service, and offers an opportunity to explore cultural and natural resources that are unique to the area. The Monument contains active quarry pits where Native Americans continue the traditions of quarrying pipestone. The quarries are surrounded with native tallgrass prairies, and there are trails located within the Monument for the public to explore.[68] Because of its proximity to Aurora provided a viewshed analysis to assess the potential for visibility of the facility from the Monument that may impact the experience of a visitor to the Monument. The Monument's Superintendent concurred with Aurora's assessment that the facility would not create visual impacts to visitors to the Monument.[69]

Mitigative Measures

Avoidance of archaeological and historic architectural properties is the preferred mitigative policy for construction of infrastructure projects.

As with any construction project, there remains a potential for impacts to unidentified archaeological properties in previously undisturbed portions of the facilities. Aurora has stated its intent to develop an Unanticipated Discoveries Plan that will detail the process for communicating and action should any previously unknown archaeological resource or human remains be encountered.

Section 7.2 of the Site Permit Template requires Aurora to coordinate with SHPO in the event that new unrecorded sites are discovered during construction. The procedures outlined in Section 7.2 of the Site Permit Template could be formalized in an *Unanticipated*

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[67] Westwood Professional Services, *Phase I and Phase II investigations: Aurora Distributed Solar Project*. August 2014.
[68] National Park Service. *Pipestone National Monument: Plan Your Visit* http://www.nps.gov/pipe/planyourvisit/index.htm
[69] Aurora, *Communication with Pipestone National Monument,* July 22, 2014, eDocket ID: 20148-102084-01

Discoveries Plan to outline the process for resolution should any previously unknown archaeological resource or human remains be encountered.

5.5 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.

5.5.1 Air Quality

Air quality in Minnesota 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.[70]

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 due to 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.

[70] MPCA, *Air Quality in Minnesota: Emerging Trends.* 2009. http://www.pca.state.mn.us/index.php/view-document.html?gid=5658

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

5.5.2 Soils and Groundwater

Some areas with underlying features, such as shallow limestone formations, unconfined or shallow aquifers, or karst conditions are more susceptible to groundwater contamination. Geotechnical surveys at the proposed Hastings facility location identified the presence of limestone and DNR records show a karst feature within 0.5 miles of the proposed Pine Island facility.[71]

Potential Impacts

Construction of the facilities will disturb up to 1,200 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.

Preliminary site design anticipates grading to establish a relatively level, non-north facing slope at 19 of the 24 facilities (Albany, Annandale, Atwater, Chisago, Dodge Center, Fiesta City, Lake Emily, Lake Pulaski, Lawrence Creek, Lester Prairie, Mayhew Lake, Montrose, Paynesville, Scandia, Waseca, West Faribault, West Waconia, Wyoming and Zumbrota).

Aurora anticipates that project foundations, both the direct-embedded piers supporting the PV tracking installations, foundations for inverters and for any Operations and Maintenance facilities, will be installed at a depth of approximately 5 to 12 feet, or above the average depth to groundwater of 17 to 167 feet.[72]

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 8.13 of the Site Permit Template would require Aurora 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

[71] Application, at p. 67
[72] Ibid.

System (NPDES) permit application. Aurora anticipates obtaining a separate NPDES permit for each facility. As part of the SWPPP, Aurora 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 each facility, Aurora will identify BMPs to minimize the potential for soil erosion.

Aurora also plans to prepare a Phase I Environmental Site Assessment at all facilities in order to identify any existing hazardous material contamination. Final facility design will avoid disturbance of contaminated areas.

5.5.3 Surface Water

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

There are no water courses or water basins identified on the DNR PWI within any of the proposed facility locations. PWI surface water features are shown in the figures accompanying each proposed facility location in Section 6. Several of the facility locations are located near surface waters and may be subject to state and local restrictions on shoreland development. Several of the facility locations have nearby PWI watercourses that may require crossing by Xcel Energy's portion of the gen-tie line.

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 due to the facility locations that generally avoid surface water features. 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

Section 8.13 of the Site Permit Template would require Aurora to develop a Soil Erosion and Sediment Control Plan. The plan may be the same as the SWPPP submitted to the MPCA as part of the NPDES permit application. As part of the SWPPP, Aurora will be required to prepare a SPCC Plan to minimize the potential for spills of hazardous materials and their transport to streams and other water bodies. Aurora anticipates obtaining a separate

NPDES permit for each facility. As part of the SWPPP preparation for each facility, Aurora will 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 Site Permit could preclude construction within Shoreland Overlay Districts and require compliance with local shoreland ordinances.

5.5.4 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 in1956. 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.

Aurora conducted wetland delineations at each of the proposed facility locations in the summer of 2014.[73] The delineations classify wetlands based on the Circular 39 classification. Minnesota Statute, Section 103G.005, subdivision 15(a) uses the Circular 39 system for defining wetland types.

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. Nevertheless, NWI wetlands provide a useful starting point for identifying potential wetland areas. NWI wetlands are shown in the figures accompanying the description of individual facilities in Section 6.

Wetlands that are hydrologically connected to the nation's navigable rivers are protected federally under Section 404 of the Clean Water Act. Under the Clean Water Act, Section 401 water quality certification is also required for activities that may result in a discharge to waters of the United States. The MPCA administers Section 401 water quality certification on non-tribal lands in Minnesota. If the USACE authorizes the project under its General Permit/Letter of Permission permitting program, the MPCA waives its Section 401 Water Quality Certification authority. In Minnesota, wetlands are also protected under the Wetland

[73] Appendix C

Conservation Act, which is administered by the Board of Water and Soil Resources (BWSR) and the identified Local Government Unit.

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 stream. In their natural state, floodplains provide for temporary water storage during flooding events.

Potential Impacts

Construction and maintenance of the facilities has the potential to result in long-term and temporary loss of wetlands or wetland function.

Direct impacts would occur if construction activities occur within wetlands. Long-term loss of wetlands would occur if roads and inverters are located within wetlands. Conversion of wetland types would occur where forested wetland areas are cleared. Type 7 (wooded swamp) wetlands were identified at the Albany, Dodge Center, Montrose and Zumbrota locations.

The USACE has informed Aurora that solar array and small structural piers, so long as wetlands are not filled with material other than the piers, are not expected to result in jurisdictional fill of wetland under Section 404 of the Clean Water Act.[74] In contrast, grading, access roads and inverters placed in wetlands or other jurisdictional waters would constitute a permanent impact requiring a permit of concurrence under Section 404 of the Clean Water act and the Wetland Conservation Act.[75]

The field delineations conducted in the summer of 2014 identified wetlands at all but six facility locations. Results of delineations are discussed in the individual facility discussions in Section 6. Based on Aurora's preliminary facility design, there is a potential for wetland impacts at all but the Hastings, Lake Emily, Lester Prairie, Pipestone, Scandia and Waseca facilities. Delineated wetlands are shown on the preliminary facility designs for each facility in Appendix D. Aurora is assessing the delineation results and anticipates modifications to the layouts shown in Appendix D to further avoid and minimize wetland impacts.

During construction, there is also the possibility for indirect impacts to wetlands from sediment as the ground is disturbed by excavation, grading and construction traffic.

Indirect impacts may also occur in locations where a solar array is placed over a wetland, potentially altering the wetland plant community at that location due to shading or use of a low-growing wetland seed mix.

[74] Application, at p. 73
[75] Appendix C

Mitigative Measures

The preferred method for minimizing impacts to wetlands is to avoid disturbance of the wetland through project design. Aurora has stated that it will design the layout of arrays, access roads and facilities to avoid and minimize impacts' to the extent practicable. Aurora continues to modify site plans in response to wetland delineation results to further avoid impacts to wetlands.

Section 5.2 of the Site Permit Template provided by Commission staff in this record 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.[76] Although the field delineations did identify type 3 (shallow marshes) and type 4 (deep marshes) wetlands at the Albany, Eastwood, Lawrence Creek, Montrose, West Waconia and Wyoming locations, all of the wetlands identified in these delineations are smaller than the statutory standard for meeting a public waters wetland. Field delineations did identify a Type 3 wetland of approximately 13.1 acres (as well as two smaller Type 3 wetlands of approximately 3.7 and 6.7 acres) at the Paynesville location.

Construction within wetlands, including grading, access roads, inverters or fenceposts, will require a permit of *de minimus* or exemption concurrence under Section 404 of the Clean Water Act and the Minnesota Wetland Conservation Act. If a wetland impact exceeds the facility's allowable *de minimus* or exemption threshold a wetland replacement plan will be required. Under the rules governing administration of the Wetland Conservation Act (Minnesota Rules 8420) replacement of certain wetlands is not permissible:

> *A replacement plan for activities that involve the modification of a rare natural community as determined by the Department of Natural Resources' natural heritage program must be denied if the local government unit determines that the proposed activities will permanently adversely affect the natural community.*[77]

Section 8.13 of the Site Permit Template provided by Commission staff in this record would require Aurora 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, Aurora 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 streams and other water bodies. Aurora anticipates obtaining a separate NPDES permit for each facility. As part of the SWPPP preparation for each facility, Aurora will identify BMPs to minimize the potential for soil erosion and sedimentation.

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[76] Minnesota Statutes Section 103G.005, https://www.revisor.mn.gov/statutes/?id=103G.005
[77] Minnesota Rules 8420.0515, subpart 3, https://www.revisor.mn.gov/rules/?id=8420.0515

5.5.5 Vegetation

Land cover is summarized for each proposed facility in Section 6. Where applicable, native plant communities are discussed in for facilities where they are located in Section 6. Consistent with the current agricultural use of the facility locations, native plant communities are generally absent from facility locations 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.[78] Aurora has not identified any Reinvest in Minnesota (RIM) or USFWS easements at any of the facility locations.[79]

Potential Impacts

The facility locations have been selected in part to avoid known areas of native plant communities. Construction and operation of the Project would change the vegetative cover of up to 1,200 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 seed mixture. Aurora will select wed-free low-growing seed mixes consistent with each facility's soil type and hydrology.[80]

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.[81] The Minnesota Department of Agriculture's Noxious & Invasive Weed Program assists local governments and landowners with resources for managing noxious and invasive weeds throughout Minnesota.

In some locations, trees may be removed from the development area and possibly the larger facility land control area to reduce shading of the PV arrays. In some locations Aurora may seek agreements with neighboring landowners to conduct limited tree trimming on adjacent parcels if shading of the arrays becomes a concern.

Mitigative Measures

Aurora proposes to minimize impacts to vegetation during siting, construction, and operation of the Project by:

- Avoiding impacts to native plant communities, including native prairie remnants, during siting and design, construction and operations;
- Designing facilities to minimize clearing of trees and shrubs;
- Reseeding disturbed areas low-growing, non-invasive plant species;

[78] Application, at p. 75
[79] Application, at p. 76
[80] Appendix C
[81] Minnesota Statutes Section 18.75 – 18.91, https://www.revisor.mn.gov/statutes/?id=18

- Maintaining facilities with regular mowing to control for invasive plant species;
- Avoiding and minimizing disturbance to wetlands and drainage systems;
- Minimizing the area disturbed during construction of the Project;
- Utilizing BMPs during construction and operations to protect topsoil and minimize soil erosion; and
- Avoiding activities within conservation easements held by public agencies or private organizations to the extent practicable. In the event that impacts do occur, Aurora will work with the landowner, DNR, USFWS or other relevant authority to develop appropriate mitigation.

Section 5.3 of the Site Permit Template requires Aurora to prepare a *Prairie Protection and Management Plan* to identify step taken to avoid impacts to native prairie and mitigate unavoidable impacts.

Section 8.12 of the Site Permit Template submitted by Commission staff in this record requires Aurora to minimize tree removal and inform the Commission f removal of groves of trees or shelter belts prior to removal.

Section 8.14 of the Site Permit Template requires Aurora to develop an *Invasive Species Prevention Plan* to prevent the introduction of invasive species on land disturbed by construction activities.

A vegetation management plan, such as required in Commission permits for High Voltage Transmission Lines, 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.

5.5.6 Wildlife

As discussed in the Vegetation, 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. As no surface waters are present within any of the proposed facility locations, no fish or other aquatic species are present within the facilities.

Potential Impacts

Wildlife that resides within the construction zone will 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.

Once construction begins, 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.

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.[82]

Mitigative Measures

Minimizing the use of overhead transmission lines will minimize impacts to birds.

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 (required in Section 7.1 of the Site Permit Template) include identification of any known wildlife movement corridors.

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 for facilities where there is greatest concern.

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

[82] DNR. *Wildlife Friendly Erosion Control Fact Sheet.* 2013. http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf

5.6 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 DNR Division of Ecological and Water Resources manage 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. The DNR NHIS database was queried by the Aurora to obtain the locations of rare and unique natural species. Records identified for each facility are described in Section 6.

Although no instances of the northern long-eared bat (*Myotis septentrionalis*) were identified at any of the facilities, the species is known to occur in suitable forested habitats throughout Minnesota. In October 2013, the USFWS proposed listing the northern long-eared bat as a federally-endangered species; a decision on the listing is expected in early 2015.

Mitigative Measures

The mitigative measures described for Vegetation and Wildlife in Sections 5.5.5 and 5.5.6 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.

Section 7.1 of the Site Permit Template provided by Commission staff in this record requires field surveys of sensitive biological areas. Information from field surveys is 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.

Aurora has committed to using wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding's turtle. Aurora will provide training to construction workers so they can identify and avoid impacts to Blanding's turtles for those facilities that may be located near the species' habitat.

Development of facilities consistent with USFWS guidance would minimize impacts to the northern long-eared bat.

6 Potential Impacts by Facility

Due to the distributed nature of the Project, the unique size and setting of each facility mean that, to some extent, potential impacts can be expected to vary by facility. Impacts for the Project as a whole, and impacts that do not vary by facility are discussed in Section 5. This section provides additional detail on each facility and discusses the setting of the facility and surrounding area with more specific information on potential impacts and mitigation strategies at each facility.

6.1 Albany

The proposed Albany facility has a capacity of 10 MW AC and is located northwest of the city of Albany in Sections 8 and 17 of Albany Township, southwest of the intersection of 360th Street and 235th Avenue. Aurora anticipates the facility will be accessed through a new access road off of 360th Street. Preliminary plans anticipate a development area of approximately 107 acres within the 231 acres of Aurora's site control. The facility will be connected to Xcel Energy's Albany Substation, located approximately 4,010 feet southeast of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 14) is dominated by agricultural vegetation, both cultivated crops (68 percent) and pasture and hay lands (31 percent). The preliminary development area avoids the developed area of Albany southeast of the facility and the larger wetland areas to the south, but is otherwise comparable to the agricultural land cover that dominates the study area around the Albany Substation (Figure 7).

Table 14: Albany Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	171.6	1.4%
Developed, Open Space	10.0	4.4%	0.9	0.9%	708.5	5.6%
Developed, Low Intensity	-	-	-	-	660.6	5.3%
Developed, Medium Intensity	-	-	-	-	355.6	2.8%
Developed, High Intensity	-	-	-	-	99.1	0.8%
Barren Land	-	-	-	-	4.1	0.0%
Deciduous Forest	5.9	2.6%	-	-	435.0	3.5%
Evergreen Forest	4.2	1.8%	0.86	0.8%	27.5	0.2%
Mixed Forest	-	-	-	-	0.0	0.0%
Shrub/Scrub	-	-	-	-	11.1	0.1%
Grassland Herbaceous	-	-	-	-	126.9	1.0%
Pasture/Hay	116.1	50.3%	32.9	30.6%	4,736.7	37.7%
Cultivated Crops	92.2	40.0%	72.8	67.8%	5,083.8	40.5%
Woody Wetlands	-	-	-	-	32.5	0.3%
Emergent Herbaceous Wetlands	2.1	0.9%	-	-	103.9	0.8%
Totals	**230.6**	**100.0%**	**107.4**	**100.0%**	**12,556.9**	**100.0%**

6.1.1 Effects on Human Settlement

The facility is located in a predominantly agricultural area with scattered rural residences. The facility is currently cultivated and the nearest residence is approximately 190 feet north

of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned as Agricultural 40. Solar farms are a conditional use in the Agricultural 40 zoning classification. The area of site control is designated as Continued Agricultural Use in the *Stearns County Future Land Use Plan*.[83]

The Lake Wobegon Trail, used for biking, hiking, and snowmobiling, is located approximately one-half mile south of the facility along Interstate 94. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Albany facility.

6.1.2 Effects on Land Based Economies

The proposed facility would remove approximately 106 acres of farmland from agricultural use. In addition to the Albany Facility, Aurora's Brooten and Paynesville facilities as well as Geronimo's proposed Paynesville Community Solar Garden are all located in Stearns County. Collectively these four facilities would remove approximately 316 acres of land from agricultural production, or approximately 0.051 percent of Stearns County agricultural land.

Within the preliminary development area, approximately 68 acres (63 percent) are considered to be prime farmland and 30 acres (28 percent) are considered to be prime farmland if drained (Table 13). More than 75 percent of the comparison area in the 2.5 mile buffer around the Albany Substation meets the definition of prime farmland or prime farmland if drained. In order to avoid the developed area around Albany and the wetland complexes to the north and southeast, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 9).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Albany facility.

6.1.3 Effects on Archaeological and Historic Resources

A Century Farm dating to 1885 was identified within Aurora's Area of Site Control, but outside of the preliminary development area. No impacts are anticipated to the potentially historic site and no mitigative measures beyond those described in Section 5.4 are identified for the Albany facility.

[83] Stearns County Comments; Application, at Appendix F

6.1.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. A non-jurisdictional ditch crosses the Albany facility's preliminary development area. Field delineations performed in the summer of 2014 show approximately 14.7 acres of wetlands within the area of site control; 6.07 acres of Type 1 (seasonally flooded basins or floodplains, 0.45 acres of Type 2 (wet meadow), 7.72 acres of Type 3 (shallow marsh), 0.37 acres of Type 4 (deep marsh) and 0.09 acres of Type 7 (wooded swamp).[84]

The preliminary design for the facility anticipates grading of approximately 40.3 acres of the site during construction.[85]

No mitigation measures beyond those described in Section 5.5 are identified for the Albany facility.

6.1.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Albany facility.[86]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Albany facility.

[84] Appendix C
[85] Application, at Appendix F
[86] Application, at p. 81

Figure 6: Albany Project Detail

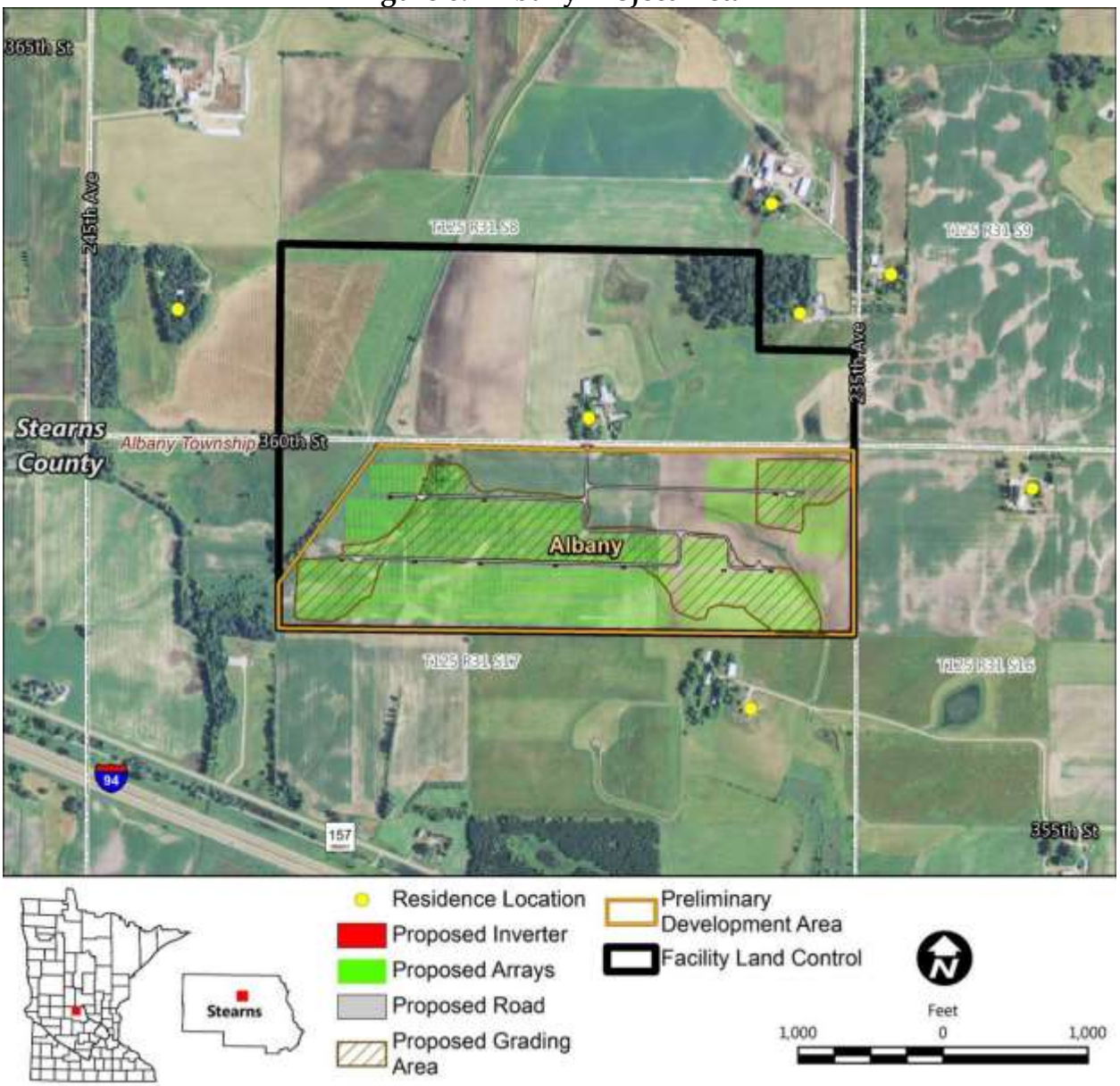


Figure 7: Albany Land Cover Overview

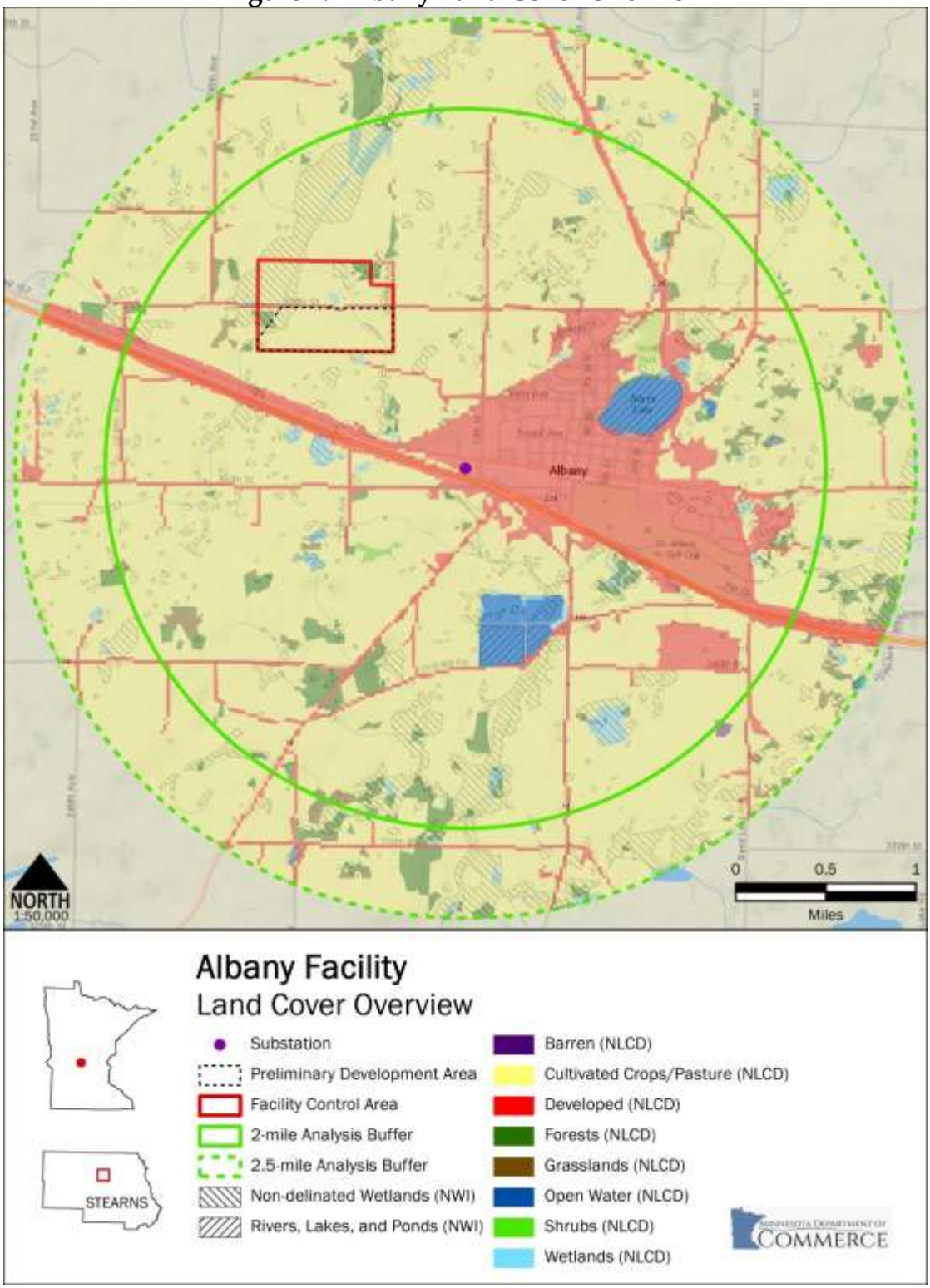


Figure 8: Albany Generally Incompatible Areas

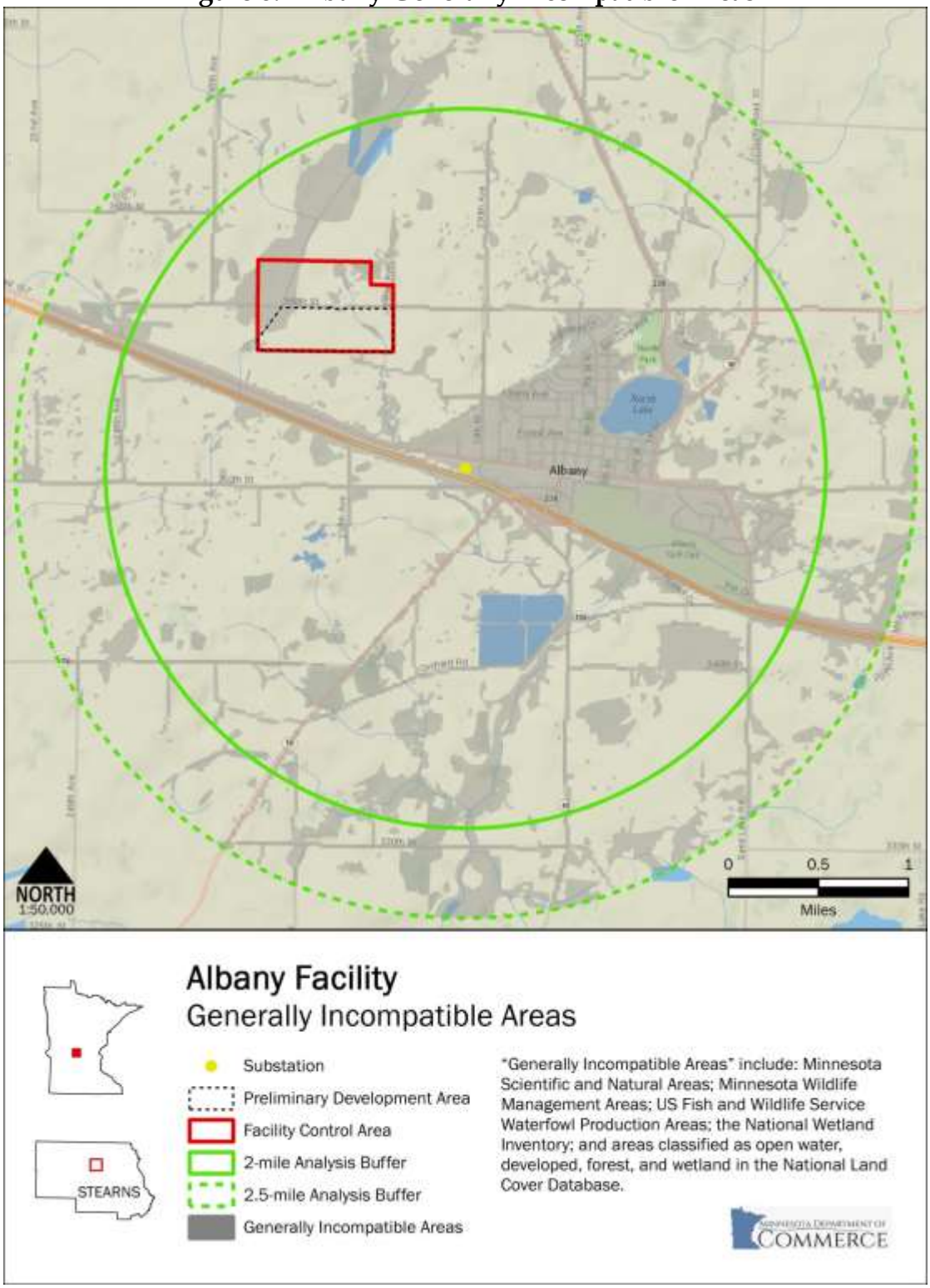
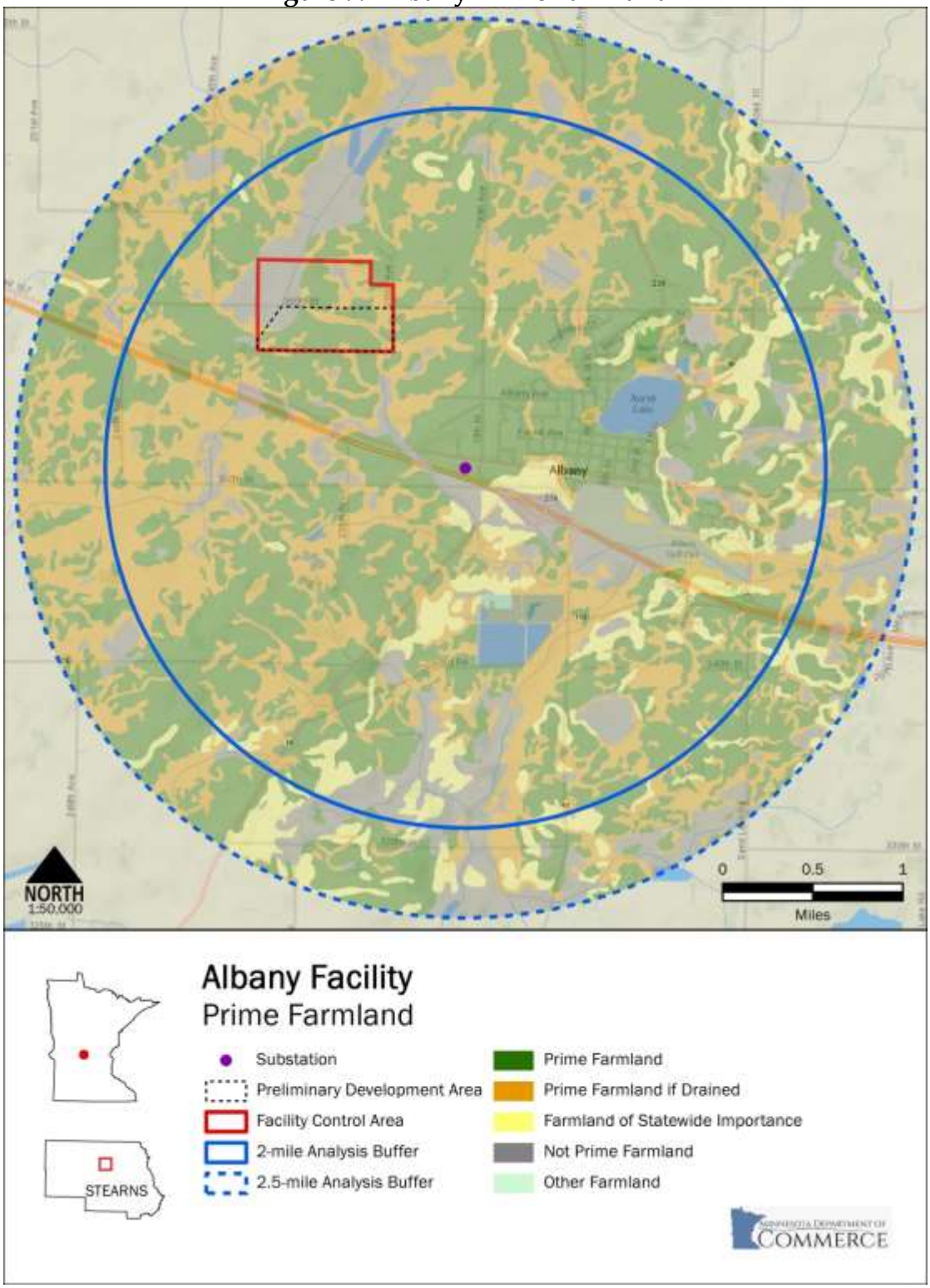


Figure 9: Albany Prime Farmland



6.2 Annandale

The proposed Annandale facility has a capacity of 6 MW AC and is located in Section 32 of Corinna Township in Wright County. The site is located just south of the city of Annandale, southwest of the intersection of South Poplar Lane and Klever Avenue Northwest. Aurora anticipates that access to the facility will be through a new access road constructed off of Klever Avenue Northwest. Preliminary plans anticipate developing all the 71 acres of Aurora's site control. The facility will be connected to Xcel Energy's Annandale Substation, located approximately 2010 feet north of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the facility (Table 15) is comprised almost entirely of cultivated crops. The preliminary development area avoids the developed area of Annandale and the lakes to the north and west of the facility as well as the larger wetland areas located to the south and east in the study area around the Annandale Substation (Figure 11).

Table 15: Annandale Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	1,994.1	15.9%
Developed, Open Space	-	-	-	-	969.6	7.7%
Developed, Low Intensity	-	-	-	-	457.5	3.6%
Developed, Medium Intensity	-	-	-	-	246.3	2.0%
Developed, High Intensity	-	-	-	-	97.8	0.8%
Barren Land	-	-	-	-	2.5	0.0%
Deciduous Forest	0.1	0.1%	0.1	0.1%	1,602.0	12.8%
Evergreen Forest	-	-	-	-	59.0	0.5%
Mixed Forest	-	-	-	-	0.3	-
Shrub/Scrub	-	-	-	-	42.3	0.3%
Grassland Herbaceous	-	-	-	-	412.2	3.3%
Pasture/Hay	-	-	-	-	1,,083.6	8.6%
Cultivated Crops	70.6	99.9%	70.6	99.9%	5035.2	40.1%
Woody Wetlands	-	-	-	-	5.8	0.1%
Emergent Herbaceous Wetlands	-	-	-	-	546.4	4.4%
Totals	**70.64**	**100.0%**	**70.6**	**100.0%**	**12554.6**	**100.0%**

6.2.1 Effects on Human Settlement

The facility is located directly south of the city of Annandale in an agricultural area with scattered rural residences. The preliminary development area is currently cultivated and the

nearest home is located approximately 508 feet north of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

Planning is done by Corinna Township and the site is zoned as General Agricultural. The facility is located in an area subject to an orderly annexation agreement between Corinna Township and the city of Annandale. Annandale has invested in utility extensions and oversizing of trunk lines in order to accommodate future growth in this area.[87] The area of site control is designated as a transition area in the *Wright County Land Use Plan;* the intent of this designation is for annexation to take place before any land use changes.[88] The area of site control is designated as residential in Annandale's Comprehensive Plan.[89]

Wright County zoning does not have a provision for large solar facilities, such as the Annandale facility. The city of Annandale permits Solar Energy Systems and Solar Structures by Conditional Use Permit in certain districts (R-1 One-Family Residential, R-2 One and Two Family Residential and C-1 Central Business District) provided they would not cast shadows and obstruct solar access. All other zoning districts within the city of Annandale prohibit these facilities.

A snowmobile trail crosses the preliminary development area along the South Poplar Lane. The Annandale Waterfowl Production Area is directly south of the proposed facility. Users of the WPA may experience some noise during construction of the facility. No impact to the snowmobile trail is anticipated. The facility would most likely visible to users of both the snowmobile trail and the WPA, but the view of the facility is not expected to significantly affect use of nearby recreational areas.

No mitigation measures beyond those described in Section 5.2 are identified for the Annandale facility.

6.2.2 Effects on Land Based Economies

The proposed facility would remove approximately 71 acres from agricultural use for at least 25 years. Two other proposed Aurora facilities, Lake Pulaski and Montrose are also located in Wright County. Together, the three proposed facilities would remove up to 159 acres from agricultural production for at least 25 years.

Within the preliminary development area, approximately 10 acres (14 percent) are considered to be prime farmland and 23 acres (33 percent) are considered to be prime farmland if drained (Table 11). The prime farmland exclusion in Minnesota Rule

[87] Annandale Comments 20151-106839-01
[88] Wright County Comments
[89] Annandale Comments, see also City of Annandale, *Comprehensive Plan – Land Use* (December 5, 2005) http://www.annandale.mn.us/vertical/sites/%7B8B9EF75D-91A9-44C3-9174-41C4172B85B5%7D/uploads/AnnandaleLandUse2-28-08(1).pdf

7850.4400, Subpart 4 does not apply to the Annandale facility as it is within an orderly annexation area.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Annandale facility.

6.2.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Annandale facility. No mitigation measures beyond those identified in Section 5.4 are identified for the Annandale facility.

6.2.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. There are 1.6 acres of NWI mapped wetlands within the preliminary development area. Field delineations performed in the summer of 2014 show approximately 2.9 acres of Type 6 (shrub swamp) wetlands within the area of land control.[90]

The preliminary design for the facility anticipates grading of approximately 49.3 acres of the site during construction.[91]

No mitigation measures beyond those described in Section 5.5 are identified for the Annandale facility.

6.2.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Annandale facility.[92]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Annandale facility.

[90] Appendix C
[91] Application, at Appendix F
[92] Application, at p. 81

Figure 10: Annandale Project Detail

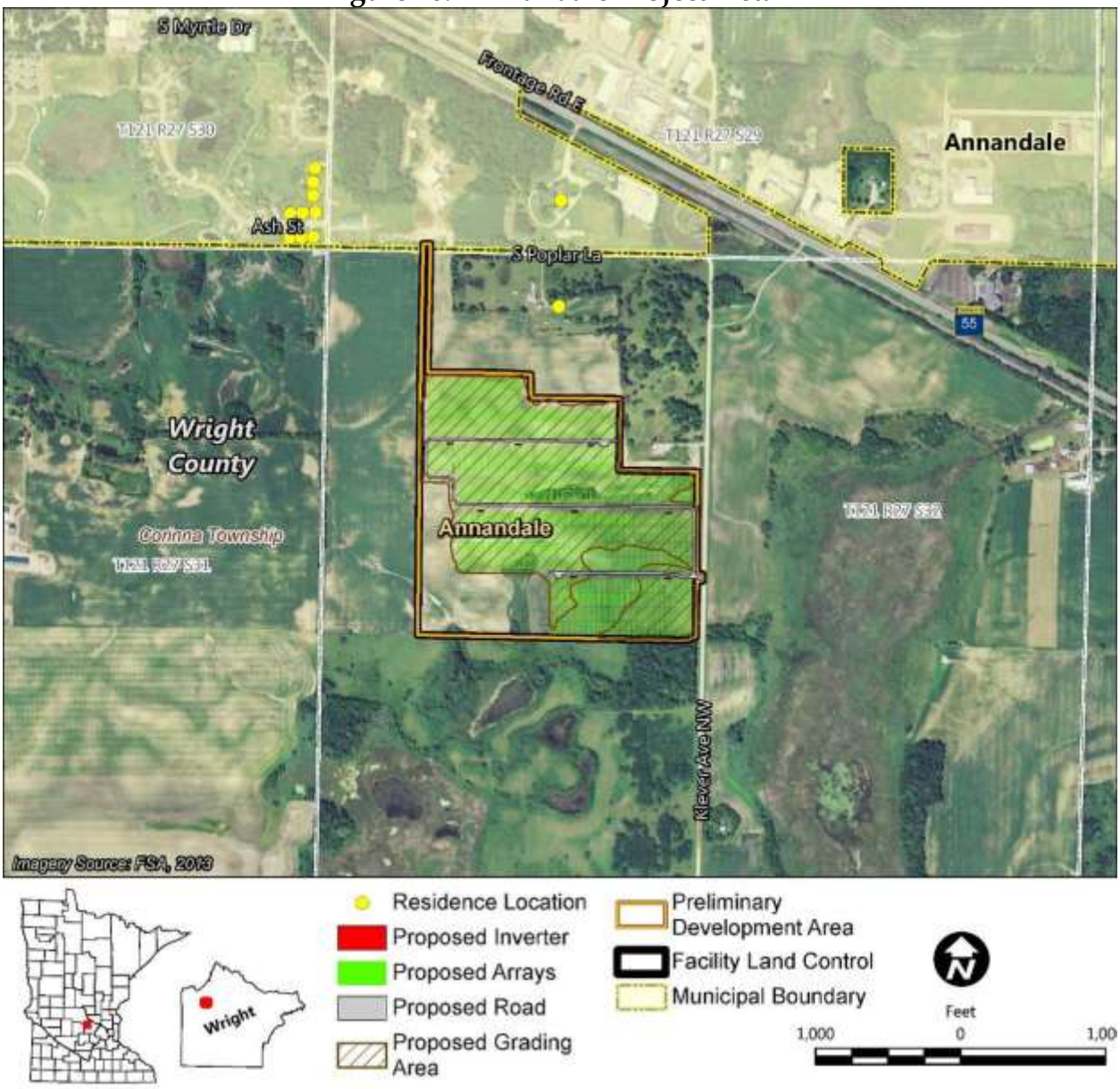


Figure 11: Annandale Land Cover Overview

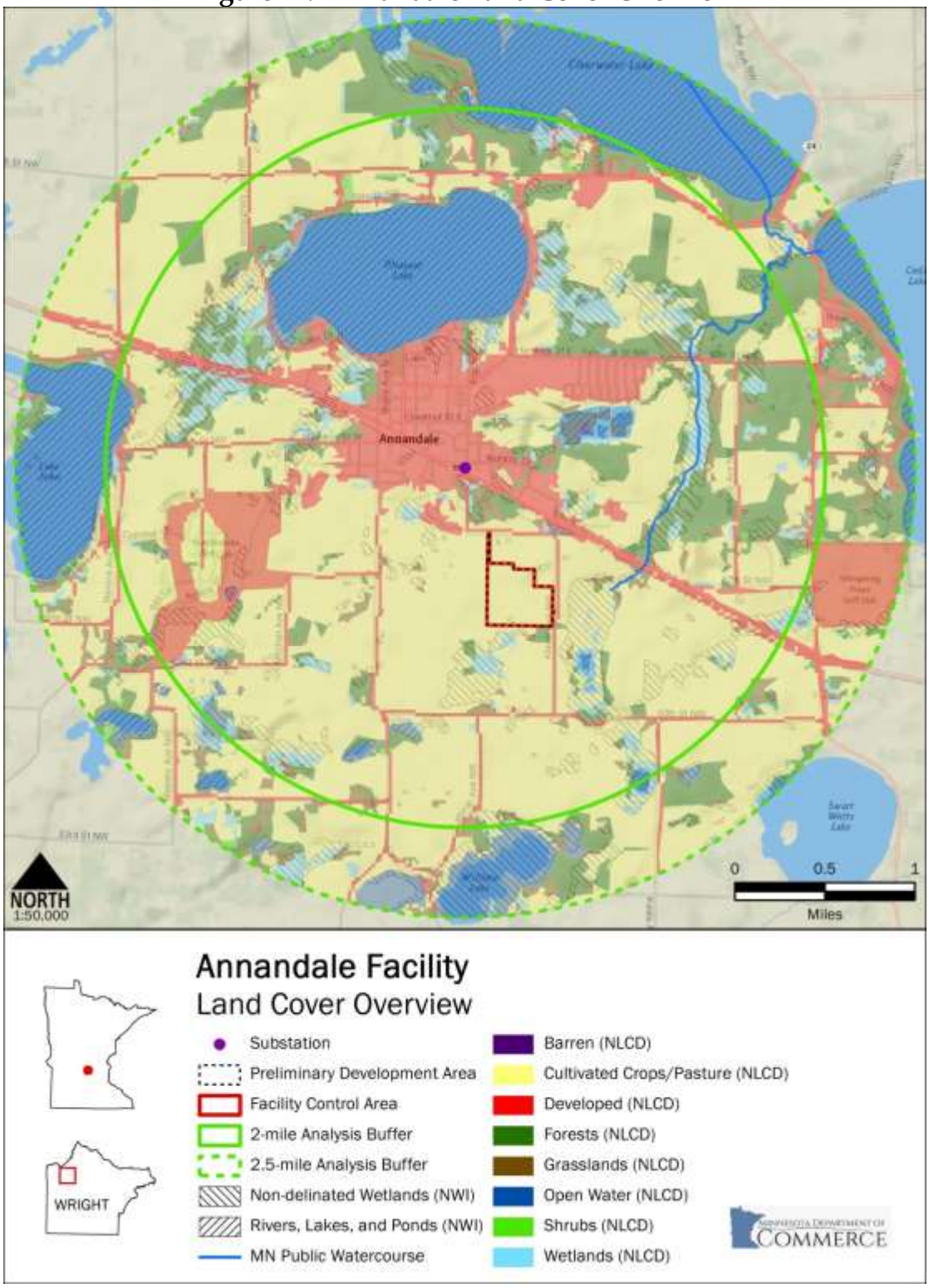


Figure 12: Annandale Generally Incompatible Areas

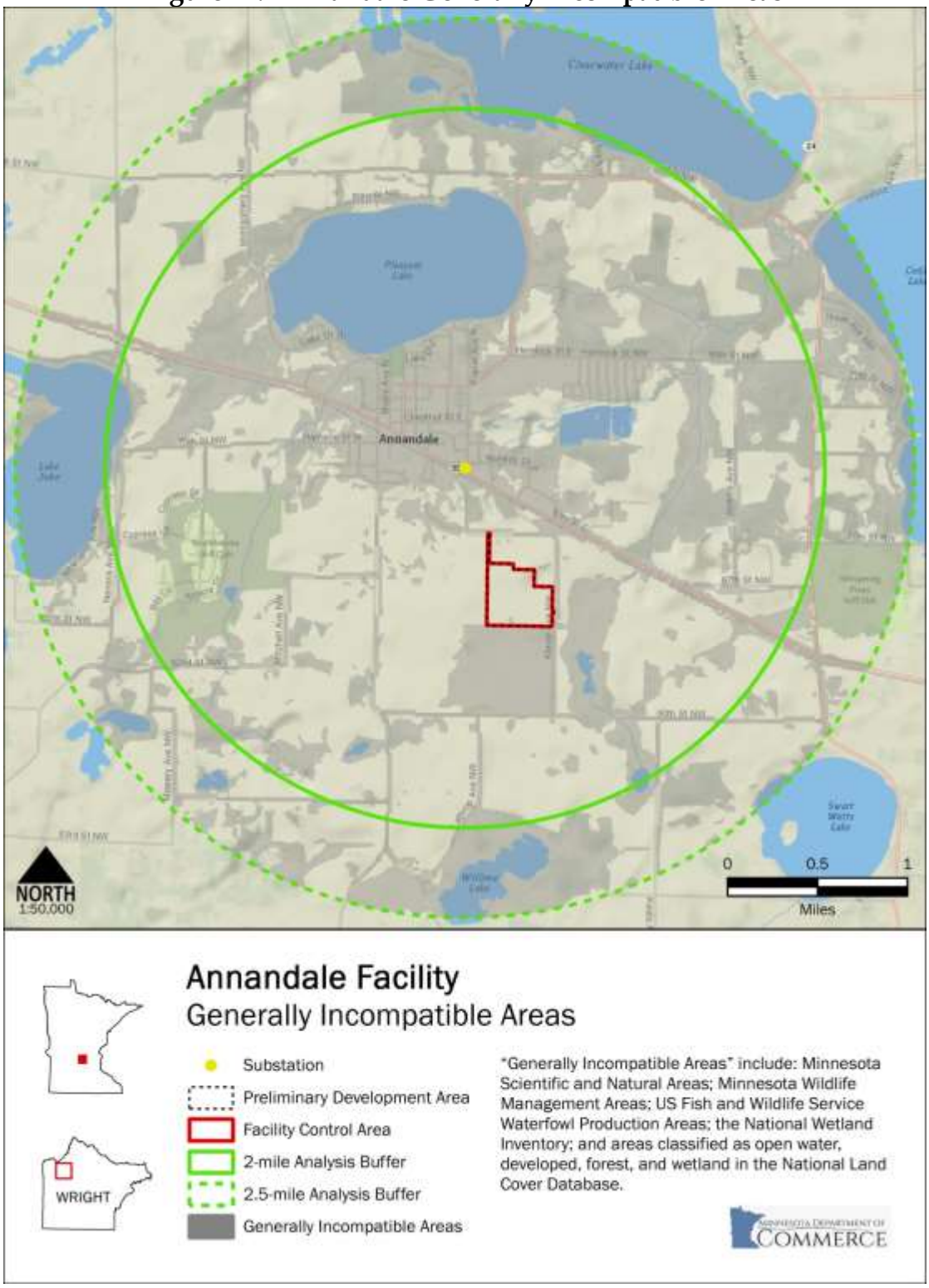
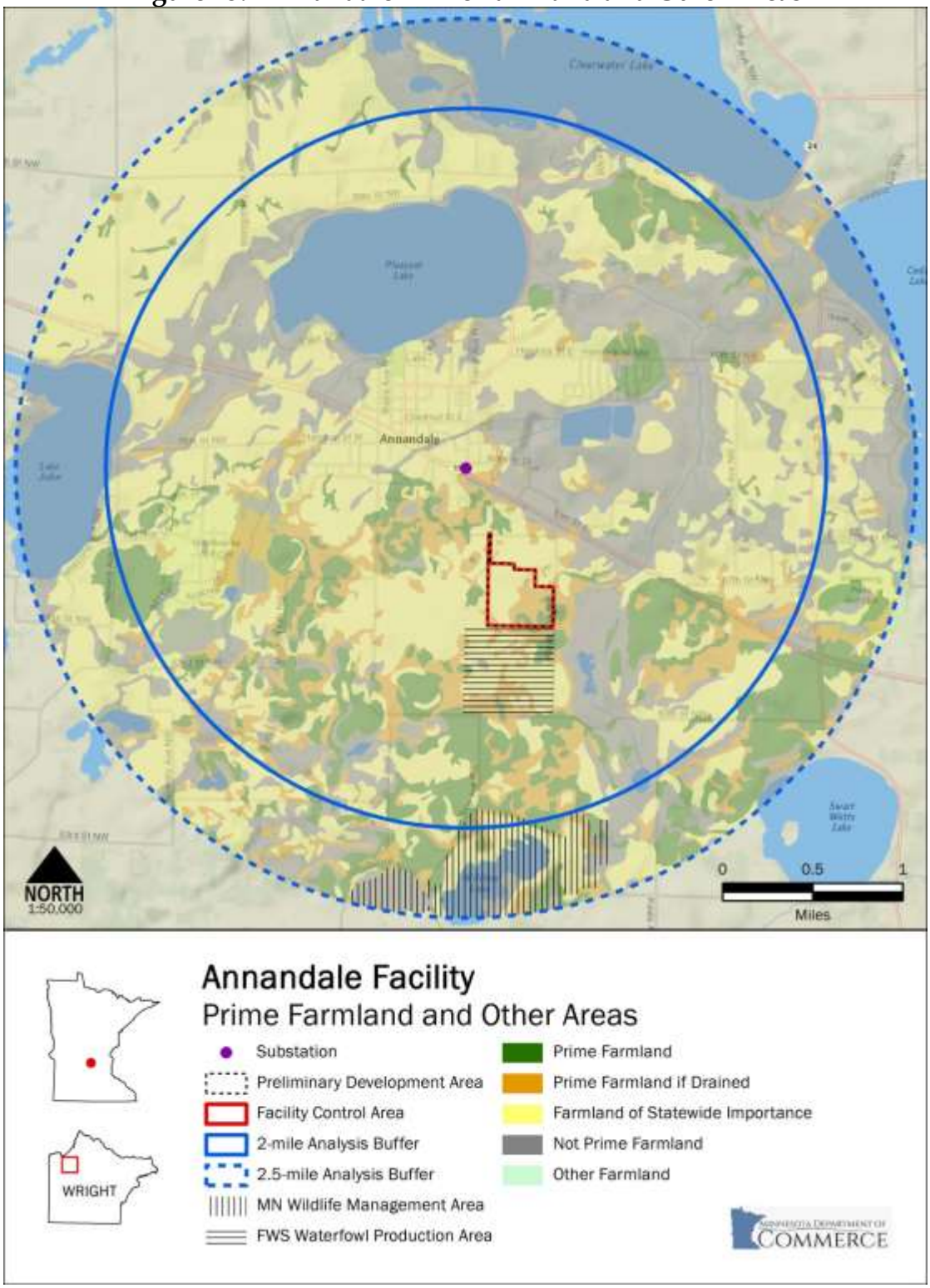


Figure 13: Annandale Prime Farmland and Other Areas



6.3 Atwater

The proposed Atwater facility has a capacity of 4.0 MW AC and is located in Section 1 of Gennessee Township in Kandiyohi County. The site is located north and east of the city of Annandale, northeast of the intersection of US Highway 12 and County Road 2. Aurora anticipates that the facility will be accessed through a newly constructed access road off of Pleasant Avenue East. Preliminary plans anticipate a development area of approximately 36 acres within the 40 acres of Aurora's site control. The facility will be connected to Xcel Energy's Atwater Substation, located approximately 580 feet west of the facility.

The facility is located within the North-Central Glaciated Plains Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 16) is dominated by cultivated crops (98 percent) with a small portion of developed residential cover. The preliminary development area avoids the developed area of Atwater, located generally west and south of the facility, but the dominance of agricultural land cover is comparable to the study area around the Atwater Substation (Figure 15).

Table 16: Atwater Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	643.4	5.12%
Developed, Open Space	0.1	0.2%	-	-	499.5	3.98%
Developed, Low Intensity	3.1	7.7%	0.8	2.1%	406.4	3.24%
Developed, Medium Intensity	0.4	1.0%	0.1	0.2%	232.5	1.9%
Developed, High Intensity	-	-	-	-	30.0	0.2%
Barren Land	-	-	-	-	1.1	0.0%
Deciduous Forest	-	-	-	-	201.0	1.6%
Evergreen Forest	-	-	-	-	11.4	0.1%
Mixed Forest	-	-	-	-	1.2	-
Shrub/Scrub	-	-	-	-	43.0	0.3%
Grassland Herbaceous	-	-	-	-	21.8	0.2%
Pasture/Hay	-	-	-	-	852.9	6.8%
Cultivated Crops	36.6	91.2%	35.4	97.7%	9,426.4	75.1%
Woody Wetlands	-	-	-	-	79.8	0.6%
Emergent Herbaceous Wetlands	-	-	-	-	107.9	0.9%
Totals	**40.1**	**100.0%**	**36.3**	**100.0%**	**12,558.2**	**100.0%**

6.3.1 Effects on Human Settlement

The location is a cultivated parcel at the edge of Atwater, in a transition area between the city and surrounding rural land uses. The nearest home is located approximately 180 feet west of the preliminary development area, in a residential neighborhood located

immediately to the west of the proposed facility. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned by Kandiyohi County as A-1, Agricultural Preservation District. Solar farms are a conditional use in the A-1 zoning classification.[93] The site is not subject to an orderly annexation agreement.

A snowmobile trail is the only identified recreational use located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

The Atwater facility's proximity to the nearby residential neighborhood (see Figure 14) would mean that the aesthetic impacts to nearby housing is likely to be noticeable. Development of a landscaping plan, as identified in Section 5.2.7, could minimize visual impacts to the residential area west of the facility.

6.3.2 Effects on Land Based Economies

The proposed facility would remove approximately 35 acres from agricultural use. EERA staff is not aware of any other solar facilities have been announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Within the preliminary development area, approximately 29 acres (81 percent) are considered to be prime farmland and 4 acres (11 percent) are considered to be prime farmland if drained (Table 13). Approximately 52 percent of the comparison area in the 2.5 mile buffer around the Atwater Substation meets the definition of prime farmland or prime farmland if drained. In order to avoid the developed area around Atwater, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained, although there are areas of farmland of statewide importance located southeast of Atwater (Figure 17).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Atwater facility.

6.3.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Atwater facility. No mitigation measures beyond those described in Section 5.4 are identified for the Atwater facility.

[93] Kandiyohi County Comments

6.3.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 2.8 acres of wetlands within the preliminary development area; 0.39 acres of Type 1 (seasonally flooded basins or floodplains and 2.42 acres of Type 2 (wet meadow).[94]

The preliminary design for the facility anticipates grading of approximately 14.5 acres of the site during construction.[95]

No mitigation measures beyond those described in Section 5.5 are identified for the Atwater facility.

6.3.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Atwater facility[96].

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Atwater facility.

[94] Appendix C
[95] Application, at Appendix F
[96] Application, at p. 81

Figure 14: Atwater Project Detail

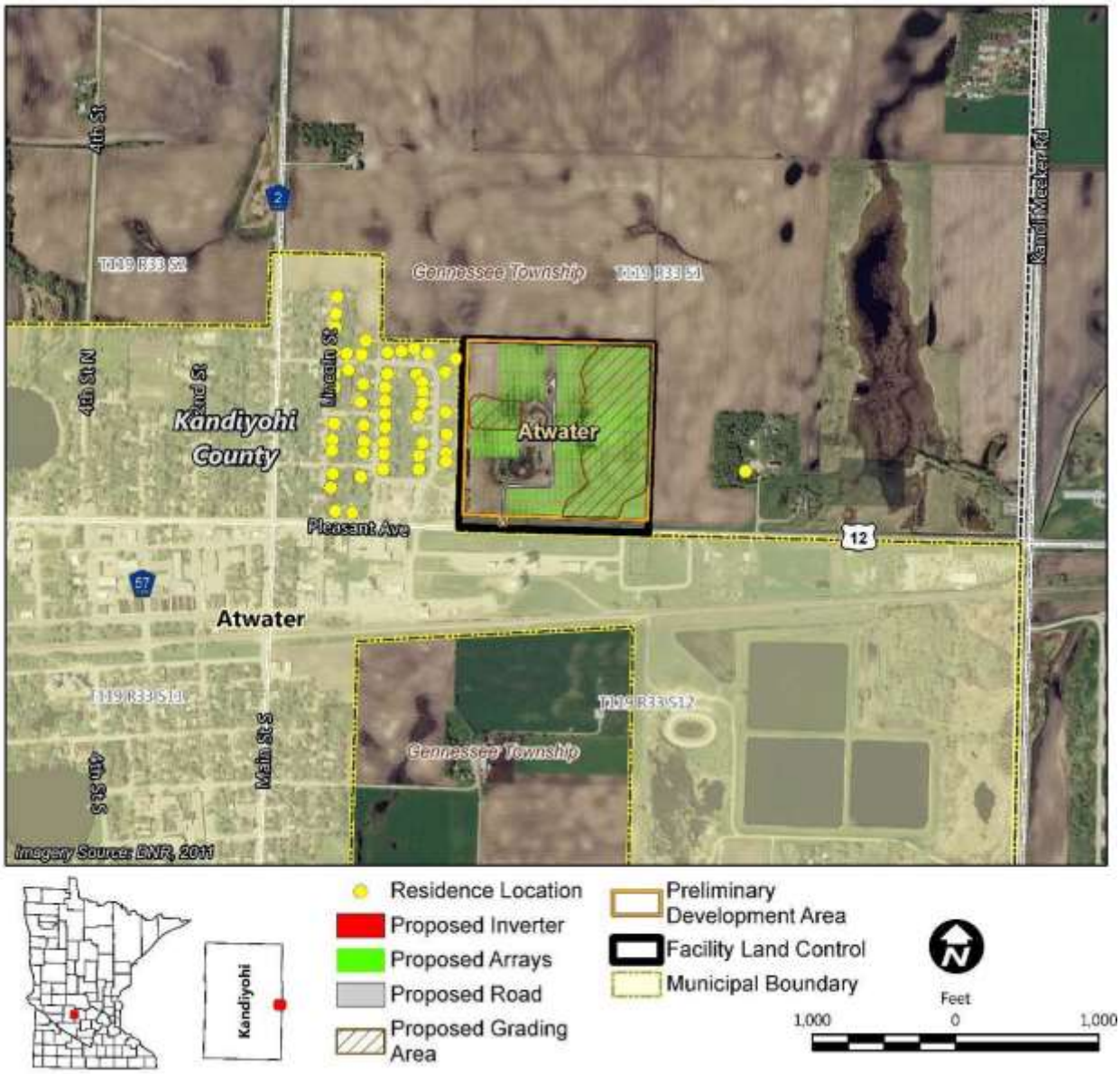


Figure 15: Atwater Land Cover Overview

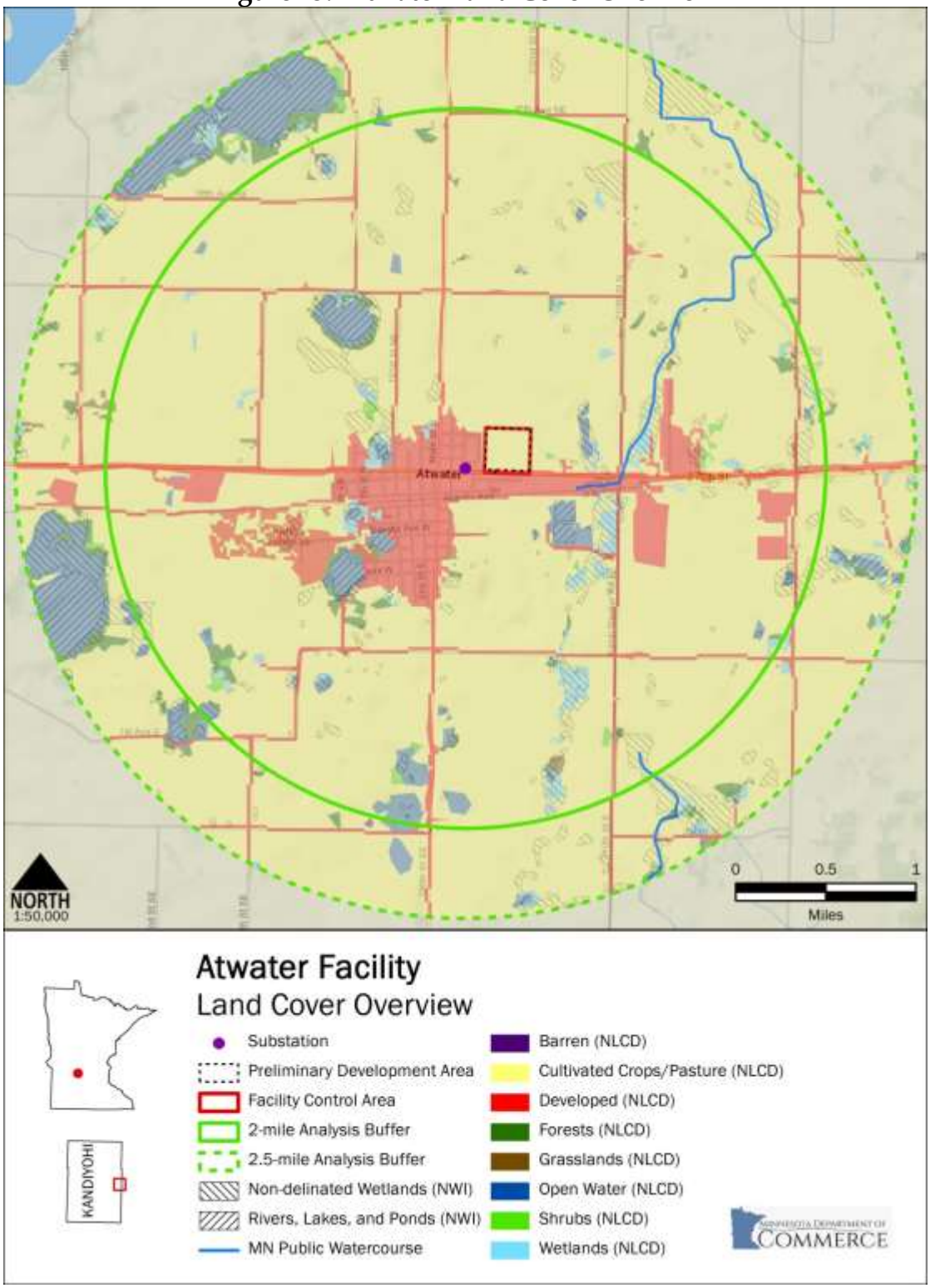


Figure 16: Atwater Generally Incompatible Areas

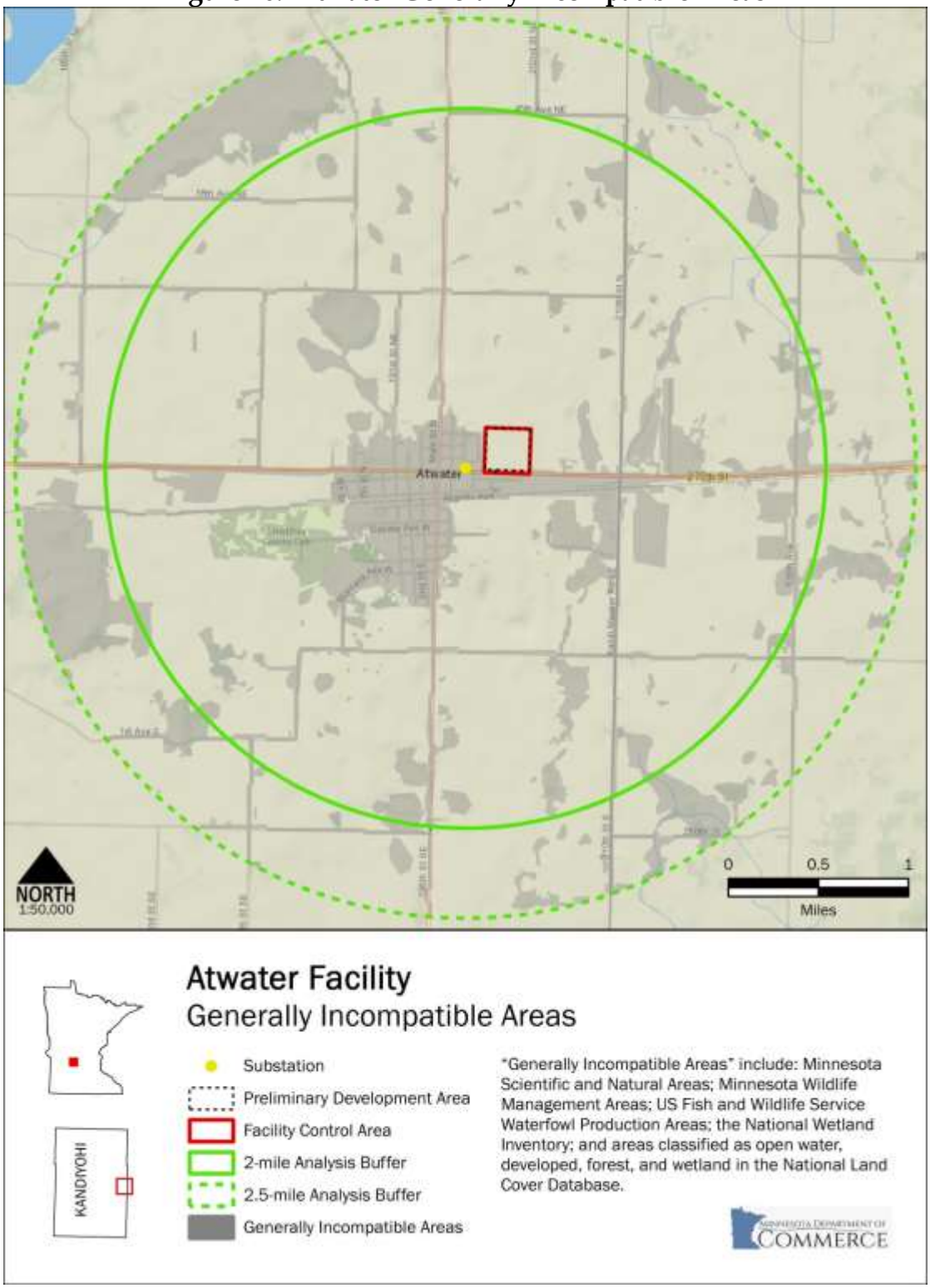
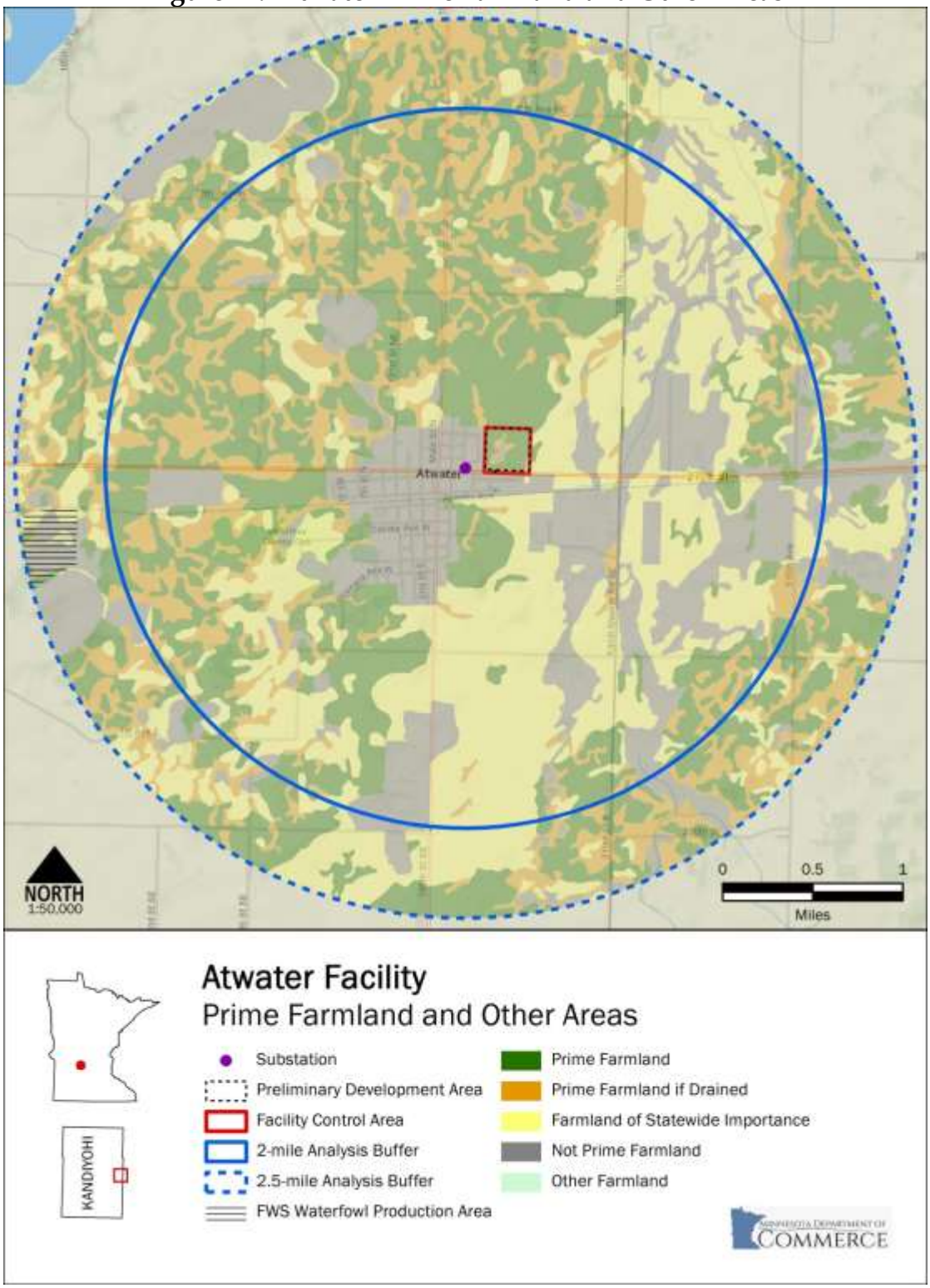


Figure 17: Atwater Prime Farmland and Other Areas



6.4 Brooten

The proposed Brooten facility has a capacity of 1.5 MW AC and is located within the city of Brooten in Stearns County, northeast of the intersection of State Highway 55 and 493rd Avenue. Aurora anticipates that the facility will be accessed through a new drive off of County State Aid Highway 29. Preliminary plans anticipate a development area encompassing all of the approximately 13 acres of Aurora's site control. The facility would deliver power to Xcel Energy's Brooten Substation, located approximately 950 feet south of the facility.

The facility is located within the North-Central Glaciated Plains Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 17) is dominated by agricultural cover, both cultivated crops (79 percent) and pasture and haylands (21 percent). The proposed location avoids the developed area of Brooten that is generally located south of Railway Avenue and the wetland areas generally located to the north and east, but is comparable to the agricultural land cover that dominates the area in the south and west of the study area around the Brooten Substation (Figure 19).

Table 17: Brooten Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	101.8	0.8%
Developed, Open Space	-	-	-	-	622.7	5.0%
Developed, Low Intensity	-	-	-	-	147.1	1.2%
Developed, Medium Intensity	-	-	-	-	89.8	0.7%
Developed, High Intensity	-	-	-	-	18.6	0.2%
Barren Land	-	-	-	-	-	-
Deciduous Forest	-	-	-	-	386.7	3.1%
Evergreen Forest	-	-	-	-	24.9	0.2%
Mixed Forest	-	-	-	-	-	-
Shrub/Scrub	-	-	-	-	23.3	0.2%
Grassland Herbaceous	-	-	-	-	371.1	3.0%
Pasture/Hay	2.7	21.1%	2.7	21.1%	1,276.7	10.2%
Cultivated Crops	10.2	78.9%	10.2	78.9%	8,207.3	65.3%
Woody Wetlands	-	-	-	-	61.0	0.5%
Emergent Herbaceous Wetlands	-	-	-	-	1,229.9	9.8%
Totals	**12.98**	**100.0%**	**13.0**	**100.0%**	**12,560.7**	**100.0%**

6.4.1 Effects on Human Settlement

The facility is located in an agricultural area within the municipal boundaries of Brooten. The facility location was most recently in pasture. The nearest home is located approximately 46 feet west/southwest of the preliminary development area and the nearest home to the solar arrays as conceived in the preliminary design is 415 feet south of the arrays. Construction of the facility will not result in displacement of any homes or businesses. There is a residential area south of the site, but the more developed area of the city is south of the railroad tracks. The facility is located in an area zoned as AG-General Agriculture.

There are no designated recreational trails, county, state or local parks located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Brooten facility.

6.4.2 Effects on Land Based Economies

The proposed facility would remove approximately 13 acres from agricultural use. In addition to the Brooten facility, Aurora is also developing both the Albany and Paynesville facilities in Stearns County as part of the Aurora Distributed Solar Project. Collectively these three facilities would remove approximately 216.44 acres of land from agricultural production, or approximately 0.035 percent of Stearns County agricultural land.

None of the preliminary development area is considered to be either prime farmland or prime farmland if drained (Table 11). The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Brooten facility as it is within the municipal boundaries of the city of Brooten.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Brooten facility.

6.4.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Brooten facility. No mitigation measures beyond those described in Section 5.4 are identified for the Brooten facility.

6.4.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 0.35 acres of wetlands within the

area of land control; 0.11 acres of Type 1 (seasonally flooded basins or floodplains and 0.24 acres of Type 2 (wet meadow).[97]

The preliminary design for the facility does not anticipate any grading of the site during construction.[98]

No mitigation measures beyond those described in Section 5.5 are identified for the Brooten facility.

6.4.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Brooten facility.[99]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Brooten facility.

[97] Appendix C
[98] Application, at Appendix F
[99] Application, at p. 81

Figure 18: Brooten Project Detail

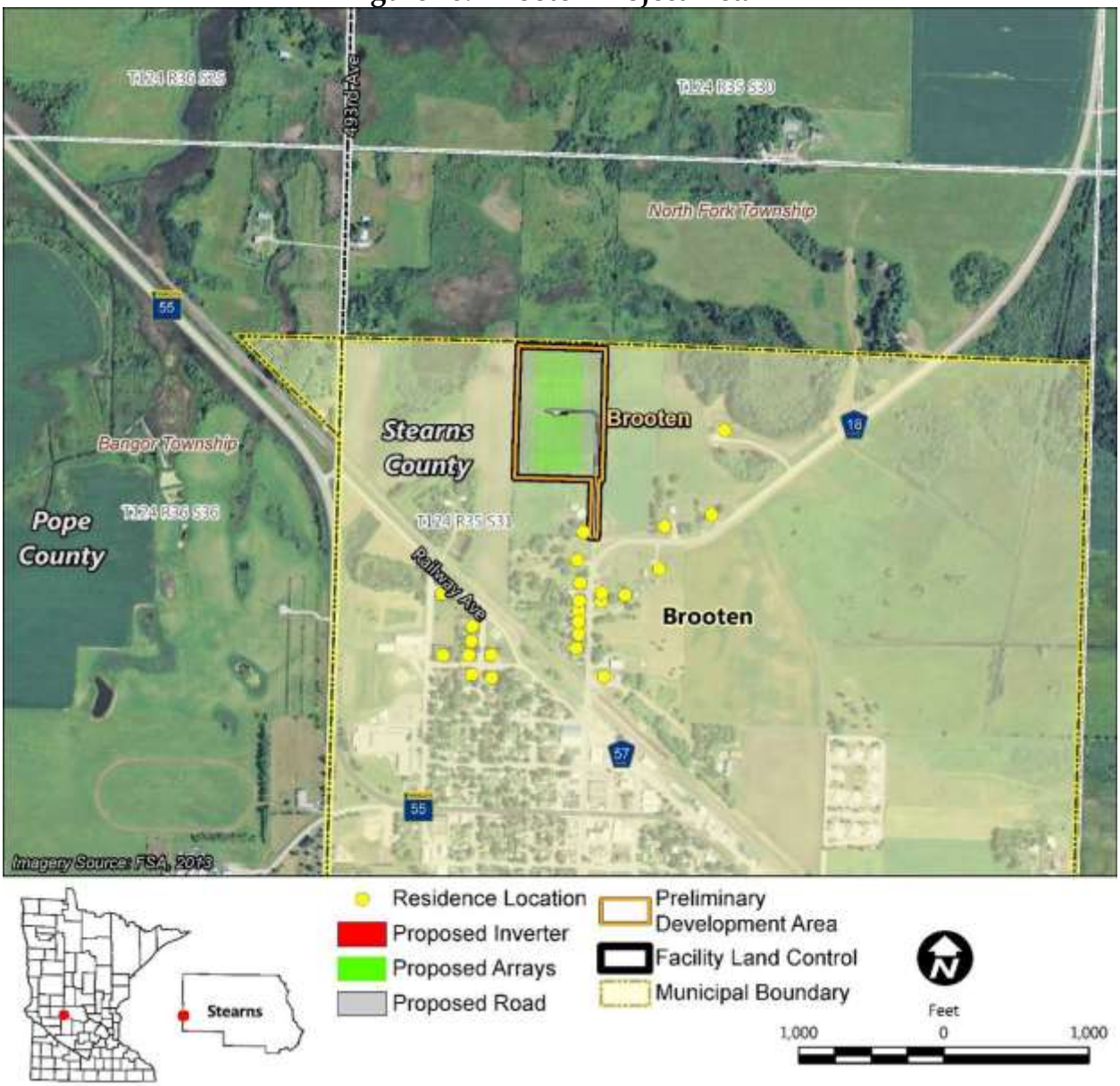


Figure 19: Brooten Land Cover Overview

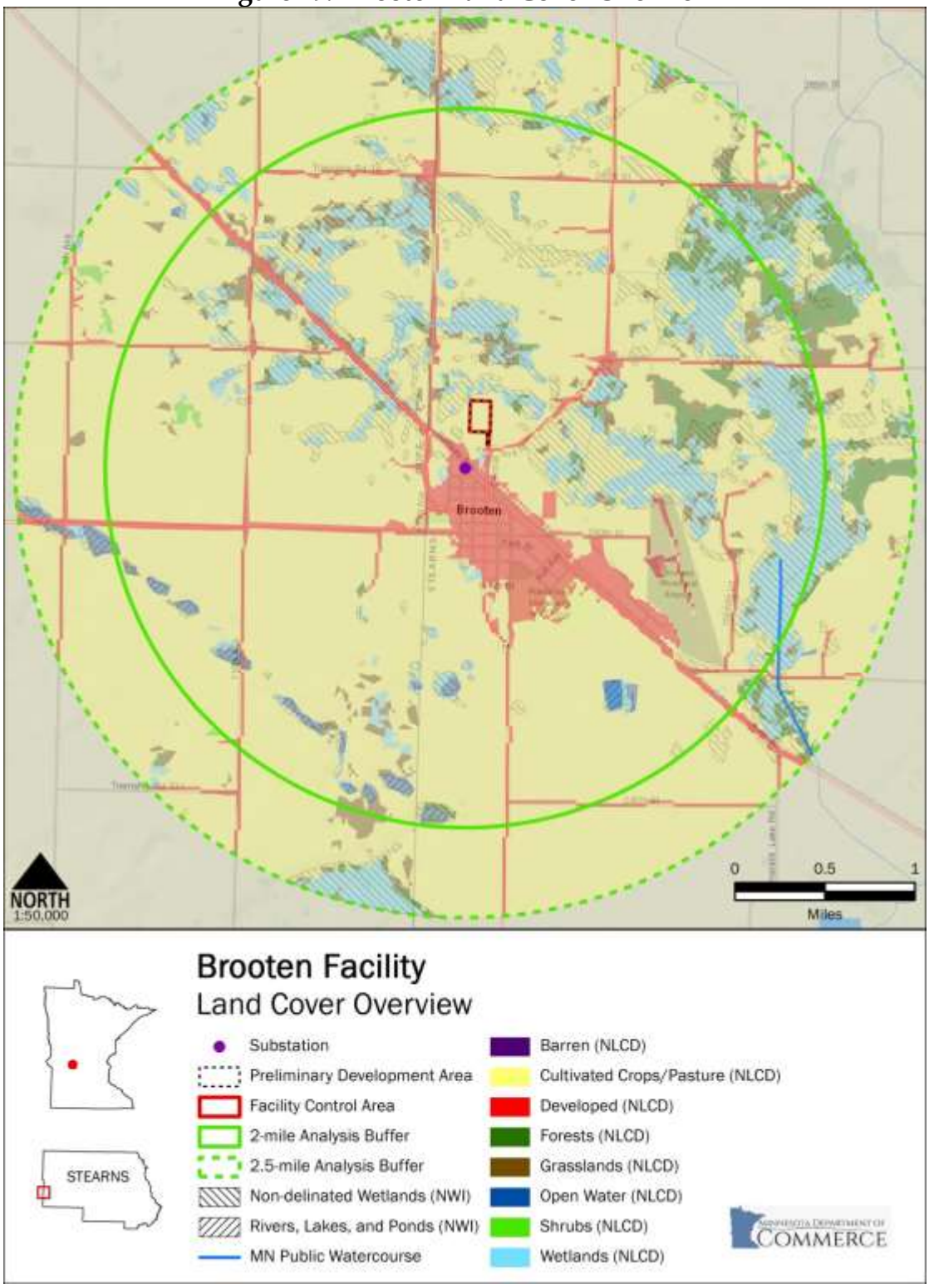


Figure 20: Brooten Generally Incompatible Areas

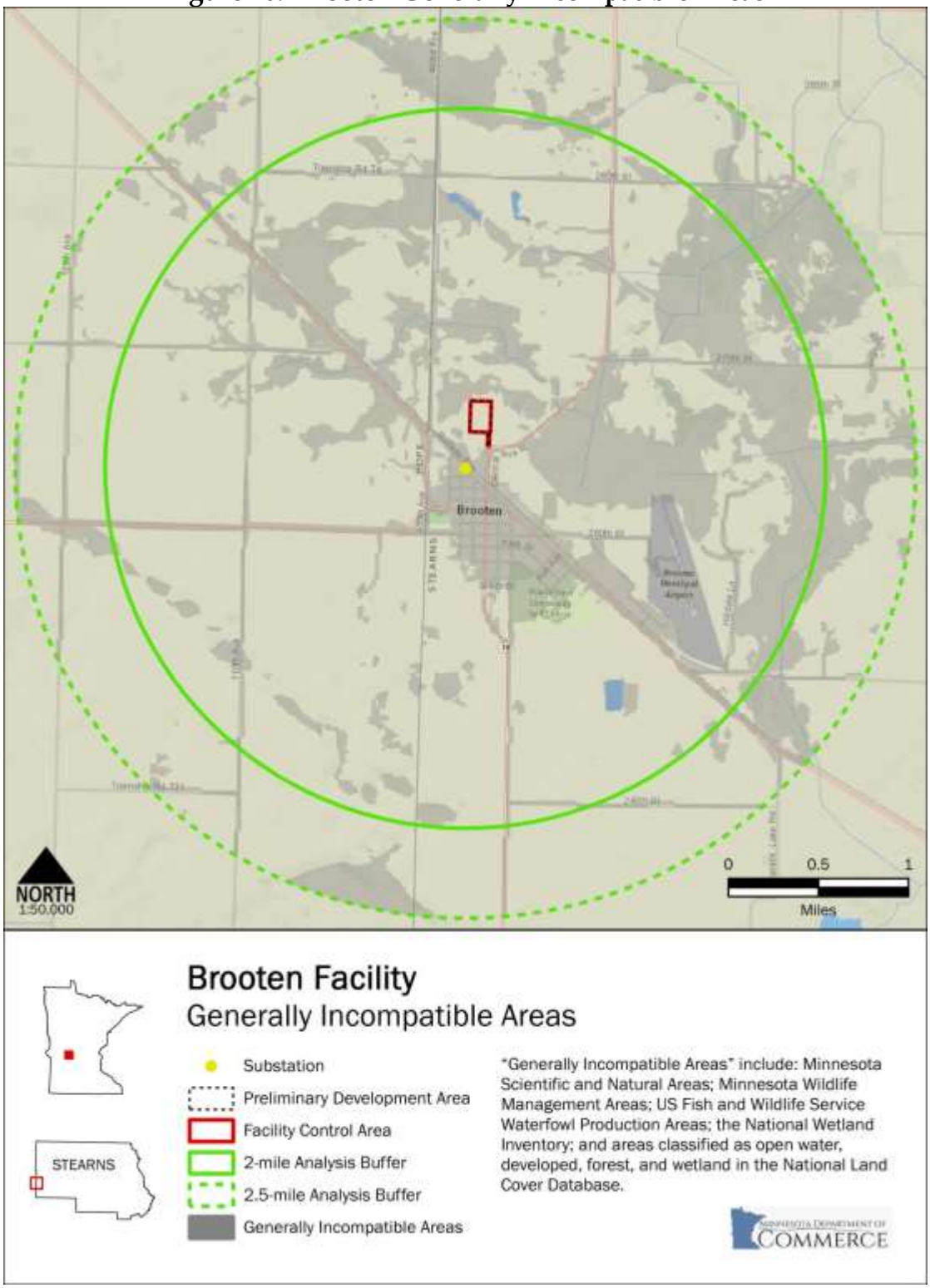
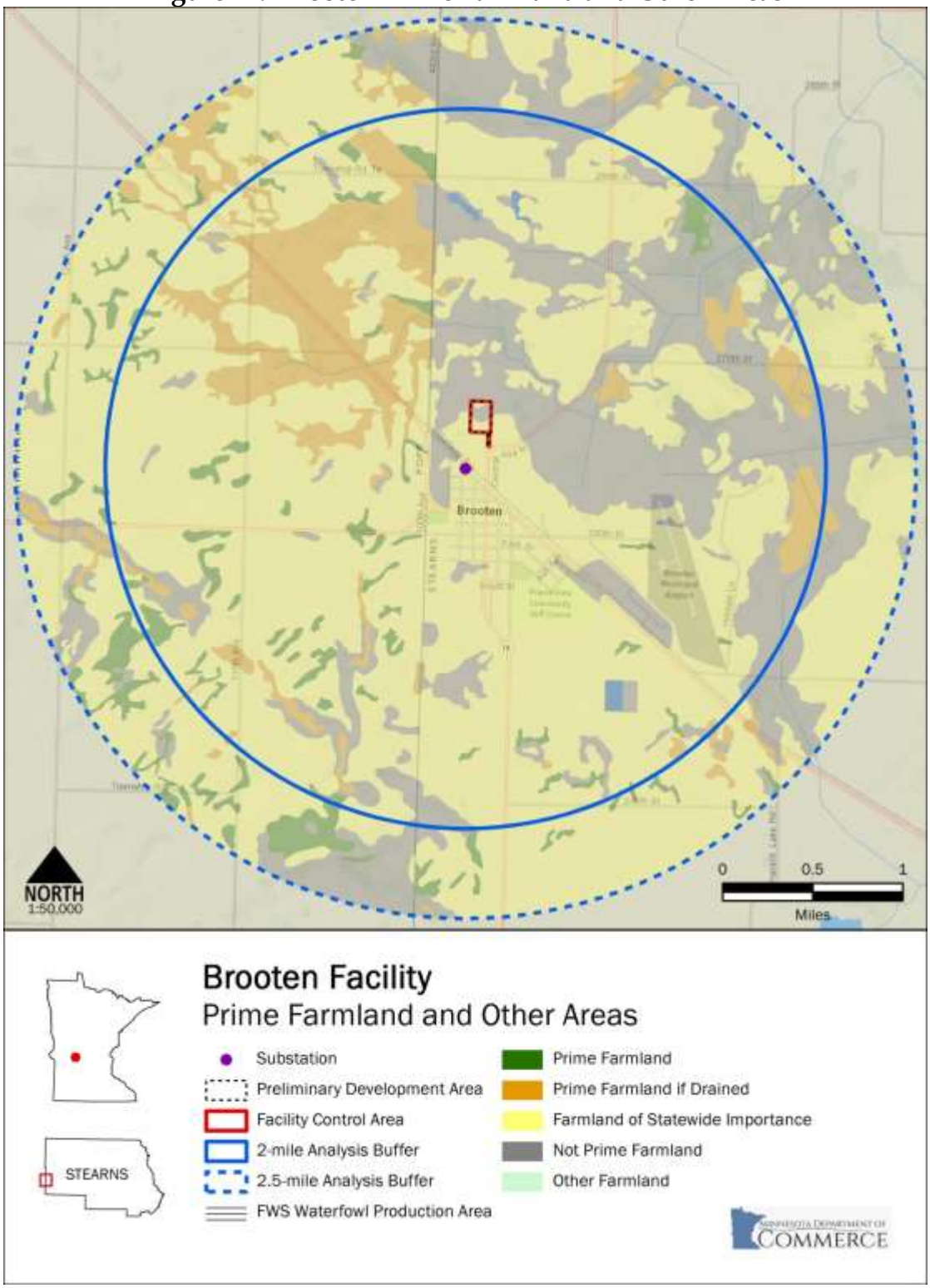


Figure 21: Brooten Prime Farmland and Other Areas



6.5 Chisago

The proposed Chisago facility has a capacity of 7.5 MW AC and is located in Section 12 of Lent Township in Chisago County. The site is located approximately one mile south of the city of North Branch, southeast of the intersection of Kable Avenue and Lincoln Road. Aurora anticipates that the facility will be accessed through a newly constructed access road off of Lincoln Road. Preliminary plans anticipate a development area of approximately 61 acres within the 62 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Chisago Substation located approximately 3420 feet north of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 18) is dominated by cultivated crops (83.3 percent). In addition to cultivated crops there are areas of deciduous forest (9 percent), developed open space (5 percent) and grassland (3 percent). The proposed location avoids the forested and wetland areas that comprise approximately 28 percent and 10 percent respectively of the land cover in the study area around the Chisago Substation, but is comparable to the agricultural land cover in the northern portion of the study area (Figure 23).

Table 18: Chisago Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	349.5	2.8%
Developed, Open Space	3.9	6.3%	3.1	5.1%	533.1	4.3%
Developed, Low Intensity	-	-	-	-	85.5	0.7%
Developed, Medium Intensity	-	-	-	-	12.5	0.1%
Developed, High Intensity	-	-	-	-	-	-
Barren Land	-	-	-	-	3.5	-
Deciduous Forest	6.3	10.1%	5.4	8.9%	3,481.6	27.7%
Evergreen Forest	-	-	-	-	105.6	0.8%
Mixed Forest	-	-	-	-	22.4	0.2%
Shrub/Scrub	-	-	-	-	71.2	0.6%
Grassland Herbaceous	1.6	2.64%	1.6	2.7%	488.0	3.9%
Pasture/Hay	-	-	-	-	1,256.4	10.0%
Cultivated Crops	50.6	81.0%	50.4	83.3%	4,951.4	39.5%
Woody Wetlands	-	-	-	-	68.5	0.6%
Emergent Herbaceous Wetlands	-	-	-	-	1122.9	9.0%
Totals	**62.4**	**100.0%**	**60.6**	**100.0%**	**12,552.2**	**100.0%**

6.5.1 Effects on Human Settlement

The facility is located on a cultivated parcel in a rural area. There are areas of rural residences south of Lincoln Road, to the west, south and east of the facility and predominantly agricultural areas north of Lincoln Road. The nearest home is located approximately 180 feet south of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned as Rural Residential by Lent Township.

Aurora anticipates that the facility will be accessed through a newly constructed access road off of Lincoln Road and would require a permit from Chisago County. The County Engineer has recommended facility access off of Kable Avenue and a temporary construction access from Lincoln Road.[100]

The Carlos Avery WMA is located approximately one-quarter mile southwest of the site, and is a popular area for bird watching. A snowmobile trail is located east of the site along Kost Trail. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Chisago facility.

6.5.2 Effects on Land Based Economies

The proposed facility would remove approximately 50.4 acres of farmland from agricultural use. In addition to the Chisago facility, Aurora's Lawrence Creek, Scandia and Wyoming facilities, as well as the North Star Solar Project, a 100 MW PV project proposed by North Star Solar PV LLC are all proposed in Chisago County If all of the proposed facilities are developed, the five facilities would result in a cumulative reduction of approximately 970 acres from agricultural use in Chisago County for at least 25 years.

None of the preliminary development area is considered to be prime farmland or farmland of statewide importance (Table 13). The Prime Farmland Exclusion for electric power generation facilities identified in Minnesota Rule part 7850.4400, subpart 4, does not apply due to the facility's proximity to North Branch.

The proposed project would not impact tourism, mining or mineral extraction activities, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Chisago facility.

[100] Chisago County Comments, p. 5

6.5.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Chisago facility. No mitigation measures beyond those described in Section 5.4 are identified for the Chisago facility.

6.5.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 0.51 acres of Type 6 (shrub swamp) wetlands within the area of land control.[101]

The preliminary design for the facility anticipates grading of approximately 7.8 acres of the site during construction.[102]

No mitigation measures beyond those described in Section 5.5 are identified for the Chisago facility.

6.5.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Chisago facility. As shown in Table 19, the NHIS database review did show records for two state listed threatened species (Blanding's Turtle (Emydoidea) and Tooth-cup (Rotala ramosior)) within the preliminary development area, and several instances of threatened and special concern species within one mile of the area of site control for the facility.[103] Several of the species identified within one mile of the facility are mussels and would not be present at the facility as there is no aquatic habitat within the area of site control.[104]

[101] Appendix C
[102] Application, at Appendix F
[103] Application, at p. 81, Appendix I
[104] Application at p. 81

Table 19: Chisago Facility - Rare and Unique Natural Resources

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 mile of Land Control	Records Within Preliminary Development Area
Actinonaias ligamentina	Mucket	Threatened	None	1	--
Elliptio dilatata	Spike	Threatened	None	2	--
Emydoidea blandingii	Blanding's Turtle	Threatened	None	7	2
Lasmigona costata	Fluted-shell	Threatened	None	1	--
Rotala ramosior	Tooth-cup	Threatened	None	1	1
Lasmigona compressa	Creek Heelsplitter	Special Concern	None	2	--
Ligumia recta	Black Sandshell	Special Concern	None	2	--
Pleurobema sintoxia	Round Pigtoe	Special Concern	None	1	--

As discussed in Section 5.6, a field survey of the Chisago facility would identify potentially impacted rare or unique natural resources.

As identified in Section 5.5, the use of wildlife friendly mesh for erosion control can reduce the potential for reptiles becoming entangled that occurs with more typical types of erosion control mesh.

Section 14.1 of the Site Permit Template requires specific recommendations for minimizing potential impacts to Blanding's Turtle.

Figure 22: Chisago Project Detail

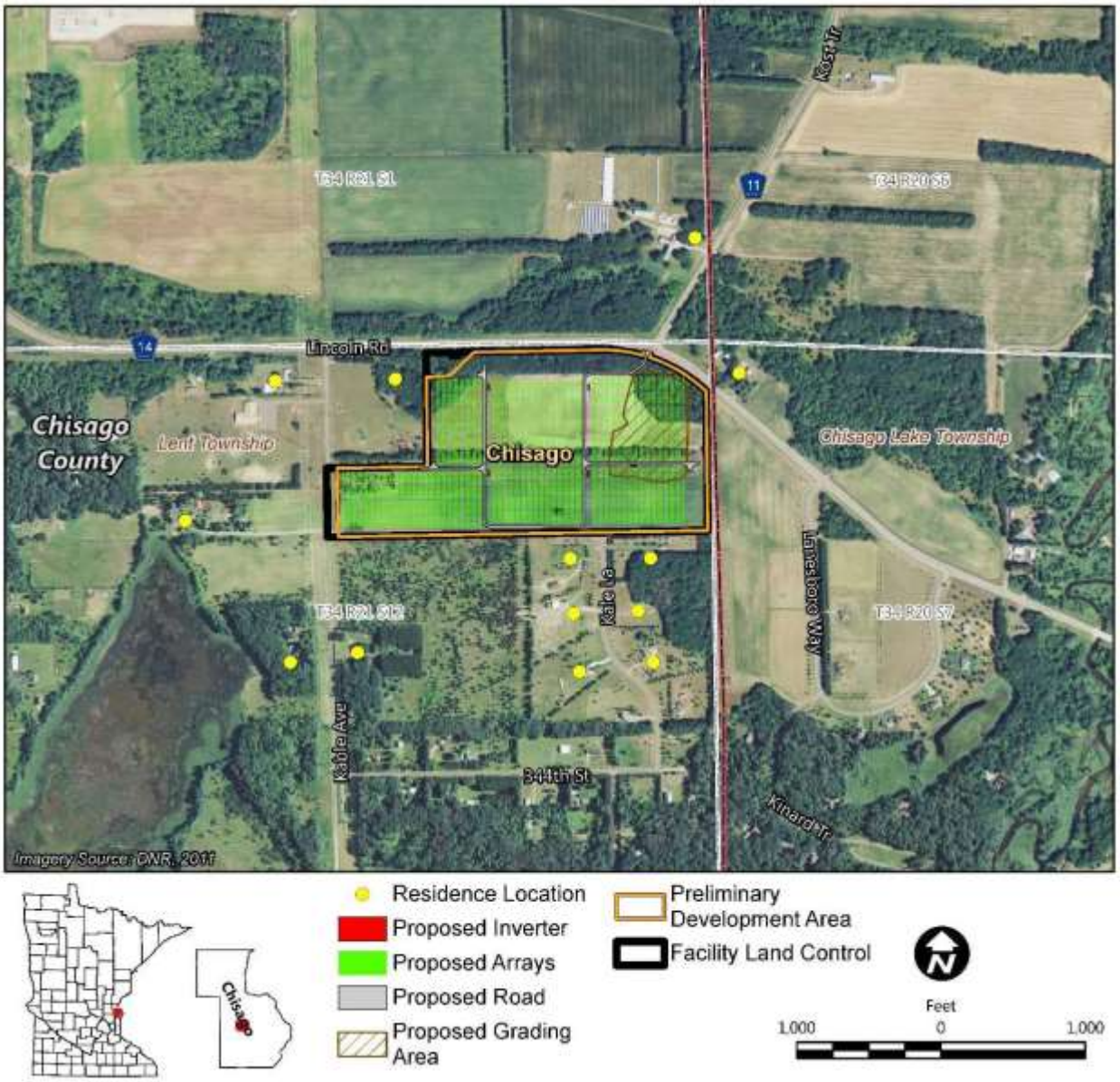


Figure 23: Chisago Land Cover Overview

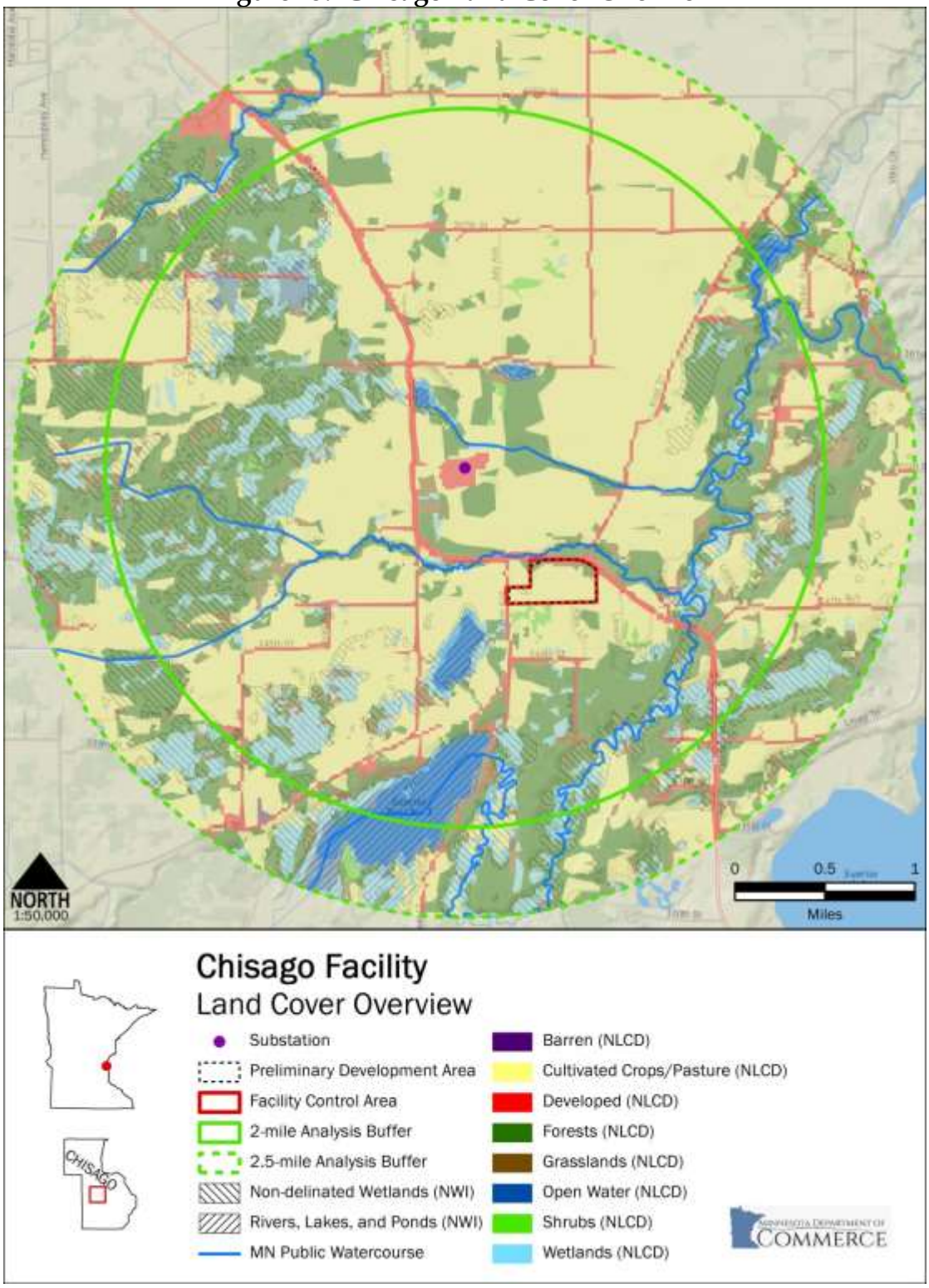


Figure 24: Chisago Generally Incompatible Areas

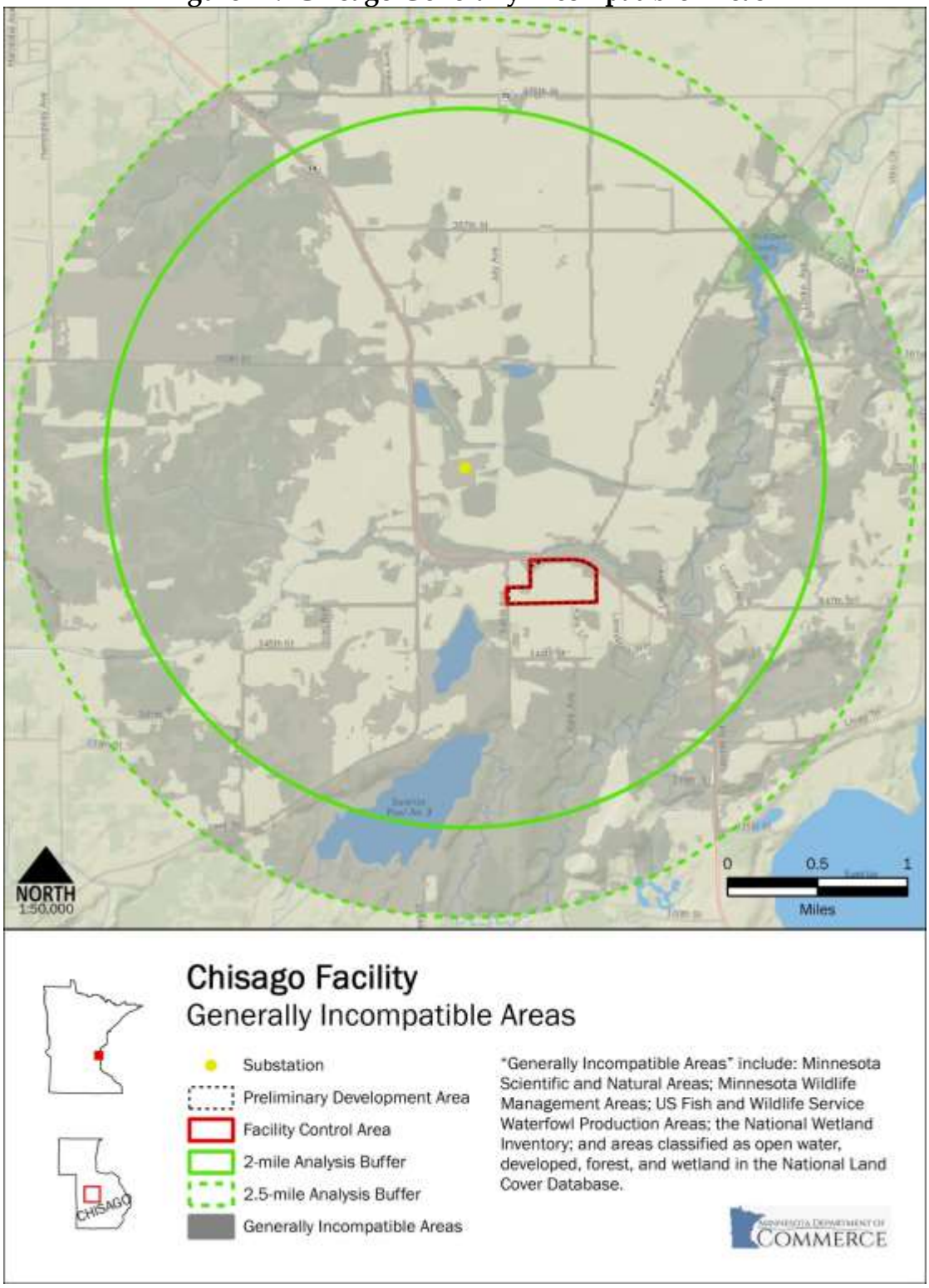
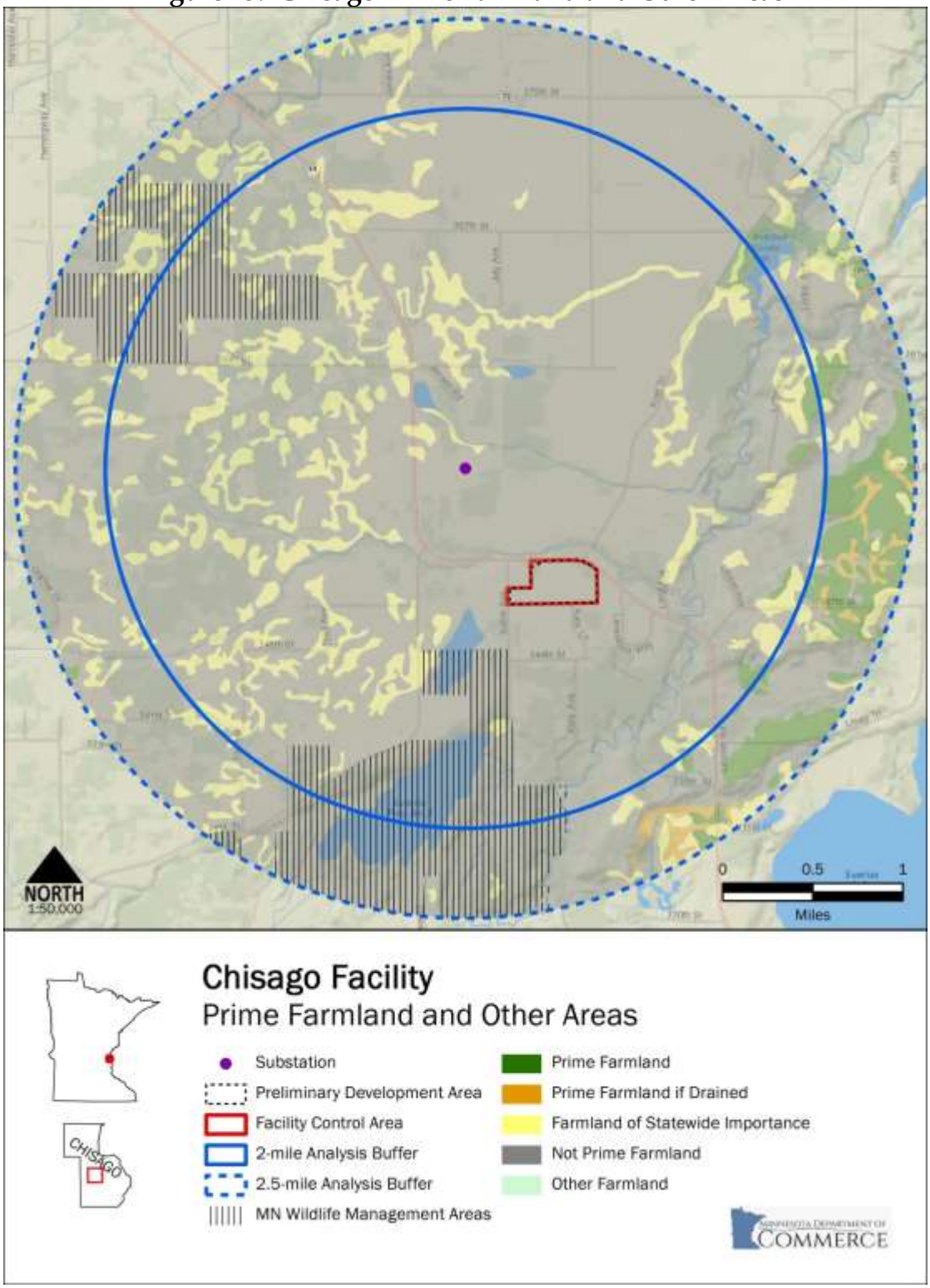


Figure 25: Chisago Prime Farmland and Other Areas



6.6 Dodge Center

The proposed Dodge Center facility has a capacity of 6.5 MW AC and is located in Section 32 of Wasioja Township in Dodge County. The site is located approximately one mile west of the city of Dodge Center, southwest of the intersection of 635th Street and 180th Avenue. Aurora anticipates that the facility will be accessed through a newly constructed drive off of 180th Avenue, just south of County Road H. Preliminary plans anticipate a development area of approximately 60 acres within the 68.5 acres of Aurora's site control. Electricity from the facility will be delivered to Xcel Energy's Dodge Center Substation, located approximately 1.1 miles east of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 20) is dominated by cultivated crops (84 percent). While the study area around the Dodge Center Substation is also largely agricultural, the preliminary development area avoids the developed area located near Dodge Center, northeast of the city and the forested, wetland, and grassland areas located north and west of the facility (Figure 27).

Table 20: Dodge Center Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	21.8	0.2%
Developed, Open Space	3.4	4.9%	2.6	4.4%	1,090.9	8.7%
Developed, Low Intensity	1.8	2.7%	1.9	3.2%	712.4	5.7%
Developed, Medium Intensity	-	-	-	-	296.9	2.4%
Developed, High Intensity	-	-	-	-	103.4	0.8%
Barren Land	-	-	-	-	0.9	-
Deciduous Forest	1.7	2.5%	0.07	0.1%	580.7	4.6%
Evergreen Forest	-	-	-	-	4.5	-
Mixed Forest	-	-	-	-	-	-
Shrub/Scrub	-	-	-	-	14.7	0.1%
Grassland Herbaceous	5.2	7.5%	5.1	8.5%	868.7	6.92%
Pasture/Hay	0.7	1.0%	0.1	0.2%	517.4	4.1%
Cultivated Crops	55.7	81.4%	50.1	83.5%	7,897.1	62.9%
Woody Wetlands	-	-	-	-	421.1	3.4%
Emergent Herbaceous Wetlands	-	-	-	-	21.7	0.2%
Totals	**68.5**	**100.0%**	**60.0**	**100.0%**	**12,552.2**	**100.0%**

6.6.1 Effects on Human Settlement

The facility is located on a largely cultivated parcel with areas of grassland in a predominantly agricultural area with scattered rural residences. The nearest home is located approximately 50 feet north of the preliminary development area; based on the preliminary design the nearest home to the location of the PV arrays is approximately 230

feet to the northwest. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned as Urban Expansion District by Dodge County. Solar farms would be allowed as a conditional use in the Urban Expansion Zoning District.[105] The western edge of the parcel is a watercourse with Shoreland and Floodplain Overlays; county zoning requirements do not permit construction within a floodplain. The *Dodge County Comprehensive Plan (2001)* identifies the area as planned for unspecified future growth.[106]

There is a snowmobile trail east of the proposed facility location. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Dodge Center facility.

6.6.2 Effects on Land Based Economies

The proposed facility would remove approximately 50 acres of farmland from agricultural use. EERA staff is unaware of other solar facilities announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Within the preliminary development area, 44 acres (73 percent) is considered to be prime farmland and 12 acres (20 percent) is considered to be prime farmland if drained (Table 13). Within the study area surrounding the Dodge Center Substation, approximately 53 percent qualifies as prime farmland and 39 percent qualifies as prime farmland if drained (Table 13). In order to avoid the developed area around Dodge Center, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 29).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Dodge Center facility.

6.6.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Dodge Center facility. No mitigation measures beyond those described in Section 5.4 are identified.

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[105] Dodge County, Dodge County Zoning Ordinance, http://www.co.dodge.mn.us/departments/land_use.php, see Chapters 8 and 10.
[106] Dodge County comments

6.6.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 13.1 acres of wetlands within the area of land control; 0.18 acres of Type 2 (wet meadow) and 2.95 acres of Type 7 (wooded swamp).[107] As discussed in Section 6.6.5, impacts to the Southern Wet-Mesic Hardwood Forest in the southwestern portion of the facility are not permissible under Minnesota's Wetland Conservation Act.

The preliminary design for the facility anticipates grading of approximately 53.0 acres of the site during construction.[108]

No mitigation measures beyond those described in Section 5.5 are identified for the Dodge Center facility.

6.6.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Dodge Center facility. The NHIS database review did show records for two state-listed threatened species (Jointed Sedge (Carex conjuncta) and Wood Turtle (Glyptemys inscultpta)) and one state-listed special concern species (Creek Heelsplitter (Lasmigona compressa)) within one mile of the area of site control for the facility.[109]

Additionally, the southwestern portion of the facility's preliminary development area appears to overlap a mapped native community, Southern Wet-Mesic Hardwood Forest.[110] Minnesota's Wetland Conservation Act would preclude development of the Southern Wet-Mesic Hardwood Forest of the preliminary development area.[111]

As described in Section 5.6, a field survey of the Dodge Center facility would identify potentially impacted rare or unique natural resources.

As described in Section 5.5, the use of wildlife friendly mesh for erosion control can reduce the potential for reptiles becoming entangled that occurs with more typical types of erosion control mesh and ensuring that open trenches are inspected and trapped turtles are removed would minimize impacts to identified species.

[107] Appendix C
[108] Application, at Appendix F
[109] Application, at p. 81, Appendix I
[110] Application, at p. 75
[111] MN Rule 8420.0515, Subp. 3, https://www.revisor.mn.gov/rules/?id=8420.0515

Figure 26: Dodge Center Project Detail

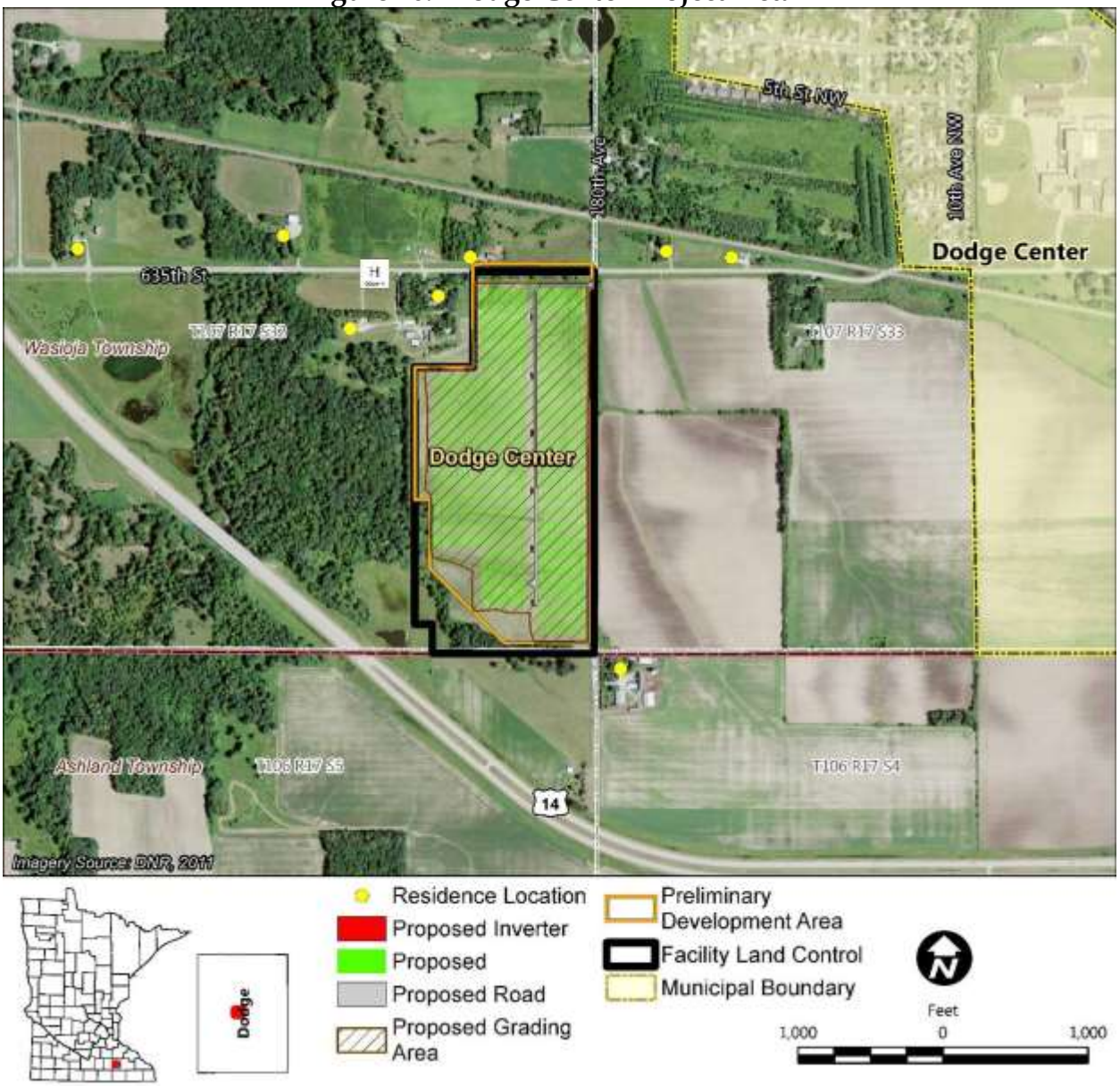


Figure 27: Dodge Center Land Cover Overview

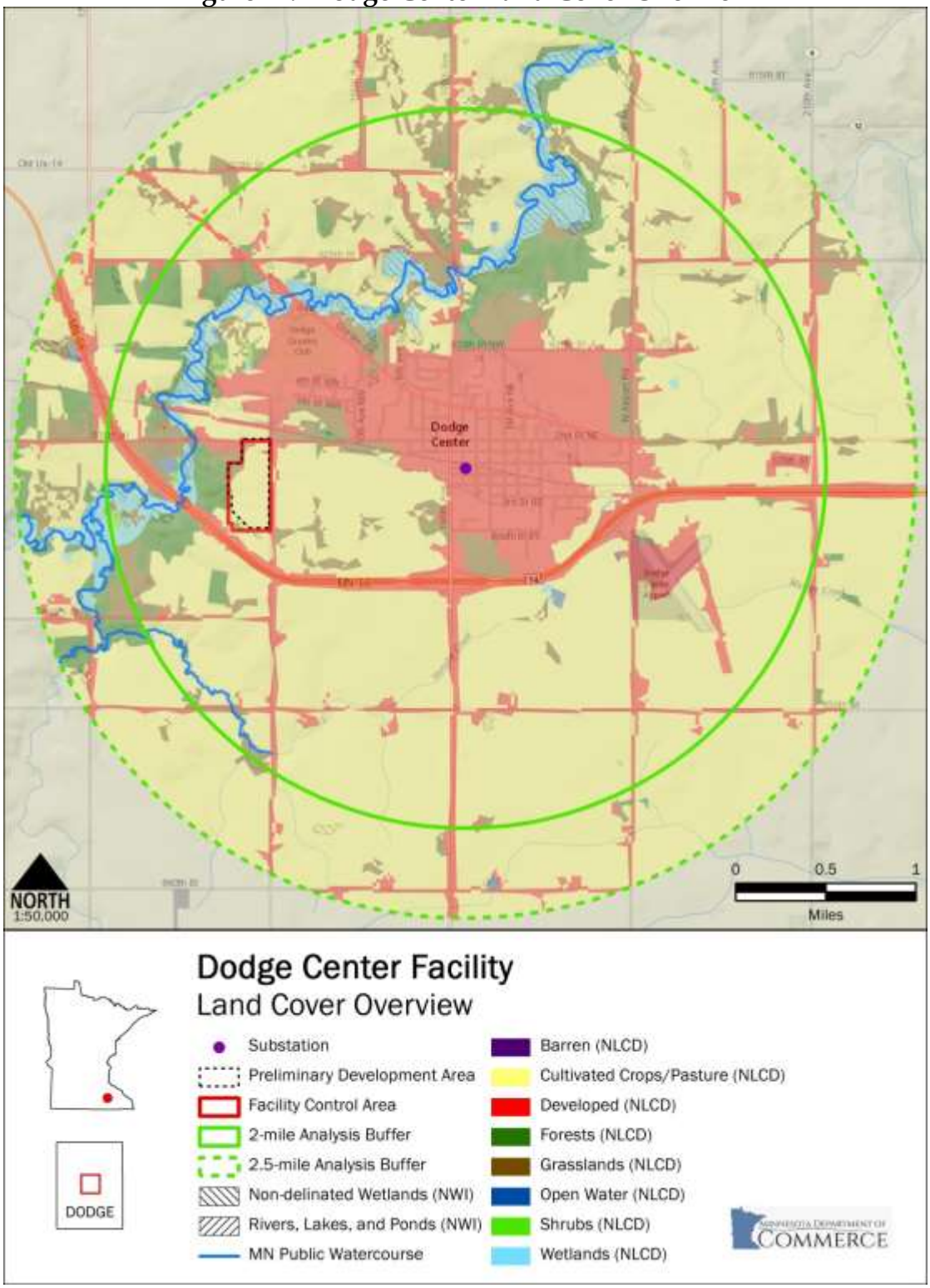


Figure 28: Dodge Center Generally Incompatible Areas

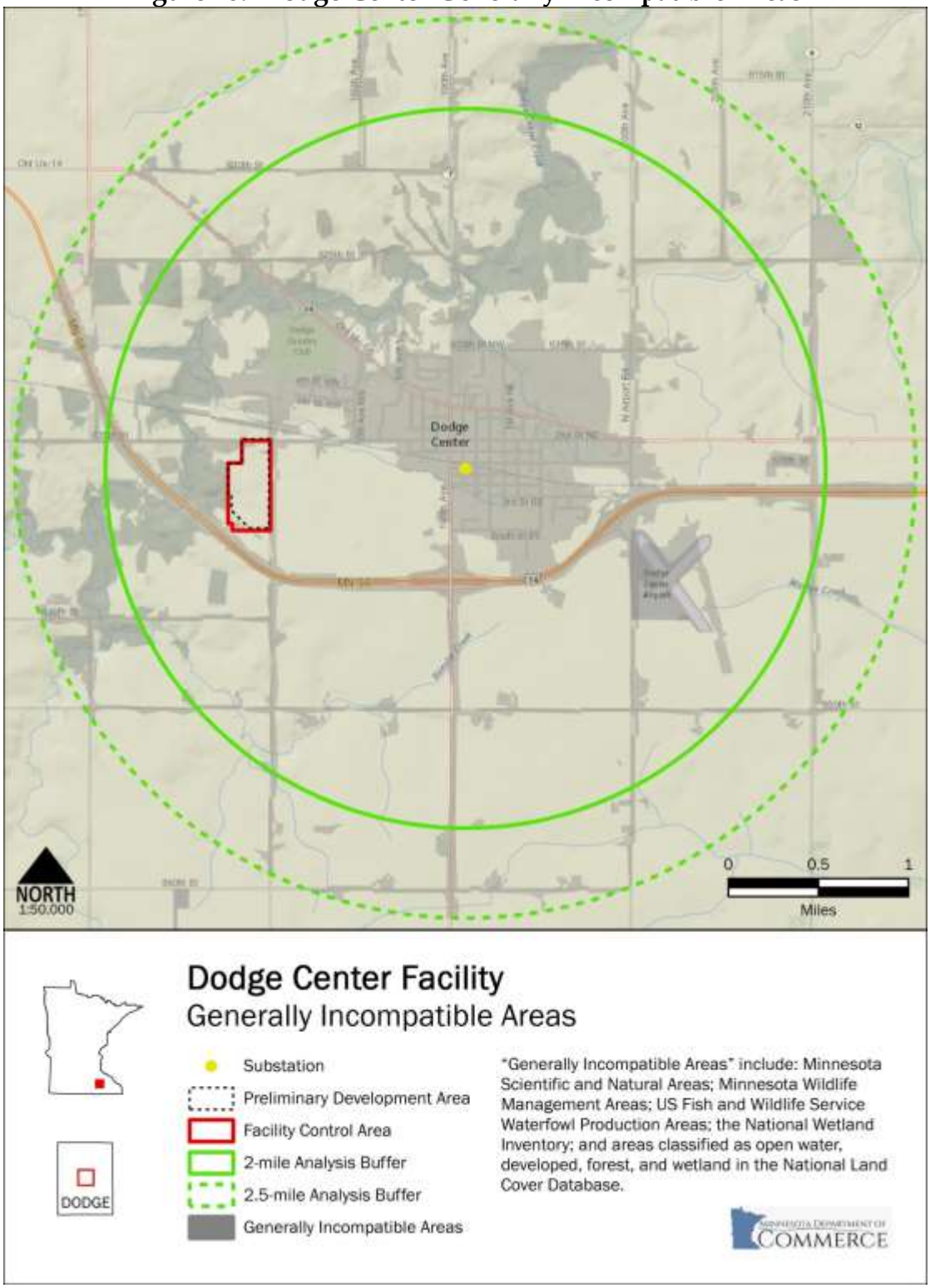
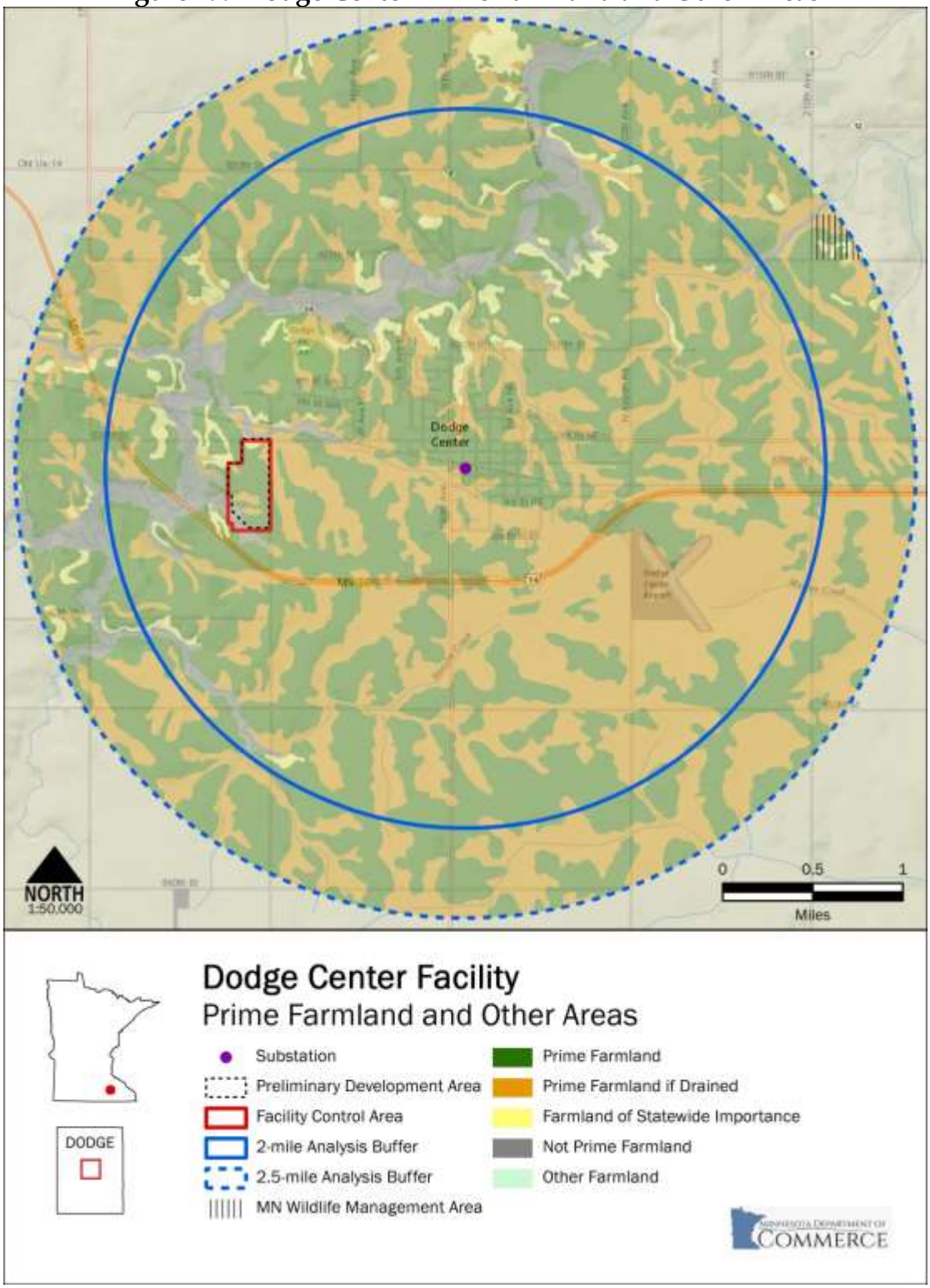


Figure 29: Dodge Center Prime Farmland and Other Areas



6.7 Eastwood

The proposed Eastwood facility has a capacity of 5.5 MW AC and is located in Section 14 of Mankato Township in Blue Earth County. The site is located east of the city of Mankato, southwest of the intersection of County Highway 17 and County Road 186. Aurora anticipates that access to the facility will be through a newly constructed access road off of County Road 186. Preliminary plans anticipate that all of the 49.7 acres of Aurora's site control would be developed for the facility. Electricity from the facility will be delivered to Xcel Energy's Eastwood Substation, located approximately 1.2 miles northwest of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 21) is dominated by cultivated crops (93 percent). The preliminary development area avoids Mankato to the west, and is similar in agricultural land cover to the eastern portion of the study area around the Eastwood Substation (Figure 31).

Table 21: Eastwood Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	236.4	1.9%
Developed, Open Space	1.9	3.9%	1.9	3.9%	1,440.6	11.5%
Developed, Low Intensity	-	-	-	-	1,297.7	10.3%
Developed, Medium Intensity	0.1	0.1%	0.1	0.1%	1,437.9	11.5%
Developed, High Intensity	-	-	-	-	631.3	5.0%
Barren Land	-	-	-	-	80.5	0.6%
Deciduous Forest	1.3	2.5%	1.3	2.5%	447.5	3.6%
Evergreen Forest	-	-	-	-	1.3	0.0%
Mixed Forest	-	-	-	-	-	-
Shrub/Scrub	-	-	-	-	4.7	0.0%
Grassland Herbaceous	0.2	0.5%	0.23	0.5%	457.8	3.7%
Pasture/Hay	-	-	-	-	101.2	0.8%
Cultivated Crops	46.2	93.0%	46.2	93.0%	5,817.9	46.3%
Woody Wetlands	-	-	-	-	58.9	0.5%
Emergent Herbaceous Wetlands	-	-	-	-	540.2	4.3%
Totals	**49.7**	**100.0%**	**49.7**	**100.0%**	**12,553.94**	**100.0%**

6.7.1 Effects on Human Settlement

The facility is on a cultivated parcel located in a predominantly agricultural area with scattered rural residences. The nearest home is located approximately 220 feet south of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

The facility is located in the Greater East Mankato Infill District, an extra-territorial planning area of the city of Mankato. Mankato Township and the city of Mankato have entered into a Joint Resolution for Orderly Annexation for the entire township; under the joint resolution all non-farm development is required to be annexed into the city prior to development. The area of site control is designated as low density residential in the Land use Plan.

There are no recreational trails, county, state or local parks within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Eastwood facility.

6.7.2 Effects on Land Based Economies

The proposed facility would remove approximately 46 acres from agricultural use. At this time EERA staff is not aware of any other announced solar developments in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 8.5 acres (17 percent) of the preliminary development area are considered to be prime farmland and 41.2 acres (83 percent) of the preliminary development area are considered to be prime farmland if drained (Table 13). The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Eastwood facility as it is within an orderly annexation area.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Eastwood facility.

6.7.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Eastwood facility. No mitigation measures beyond those identified in Section 5.4 are identified for the Eastwood faciilty.

6.7.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 2.71 acres of wetlands within the

area of land control; 2.14 acres of Type 1 (seasonally flooded basins or floodplains, 0.01 acres of Type 2 (wet meadow) and 0.56 acres of Type 3 (shallow marsh).[112]

The preliminary design for the facility does not anticipate any grading of the site during construction.[113]

No mitigation measures beyond those described in Section 5.5 are identified for the Eastwood facility.

6.7.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Eastwood facility.[114]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Eastwood facility.

[112] Appendix C
[113] Application, at Appendix F
[114] Application, at p. 81

Figure 30: Eastwood Project Detail

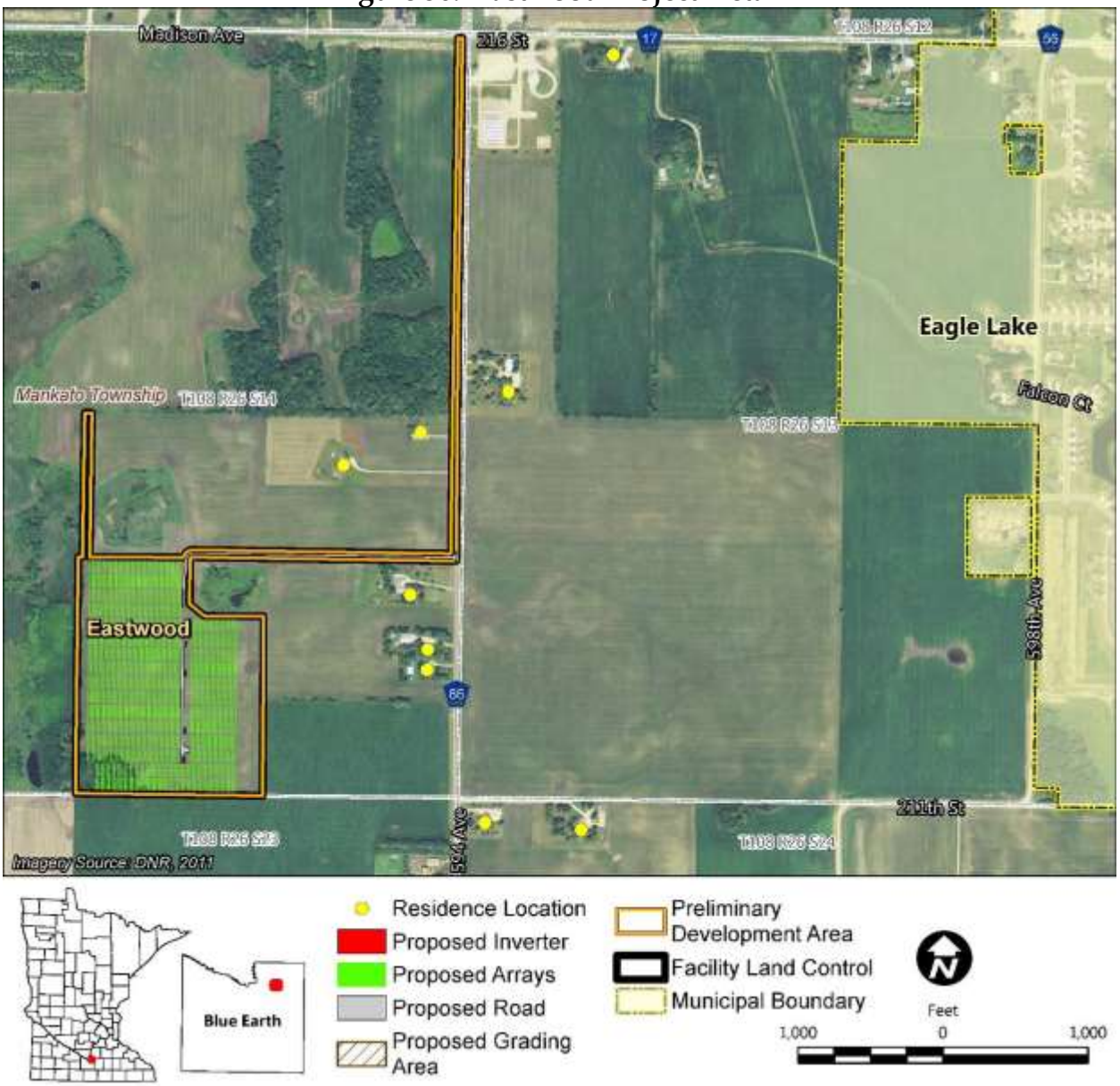


Figure 31: Eastwood Land Cover Overview

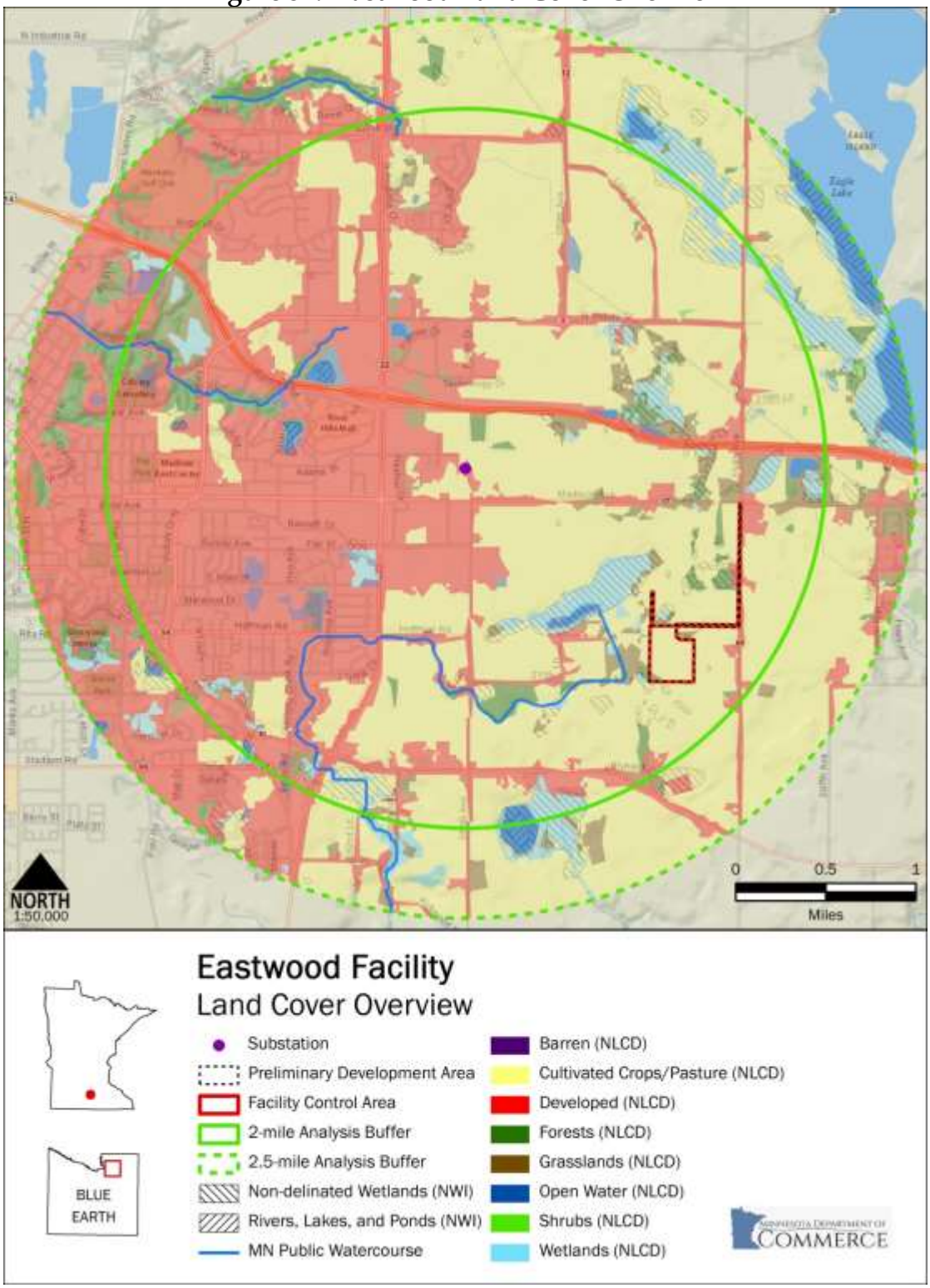


Figure 32: Eastwood Generally Incompatible Areas

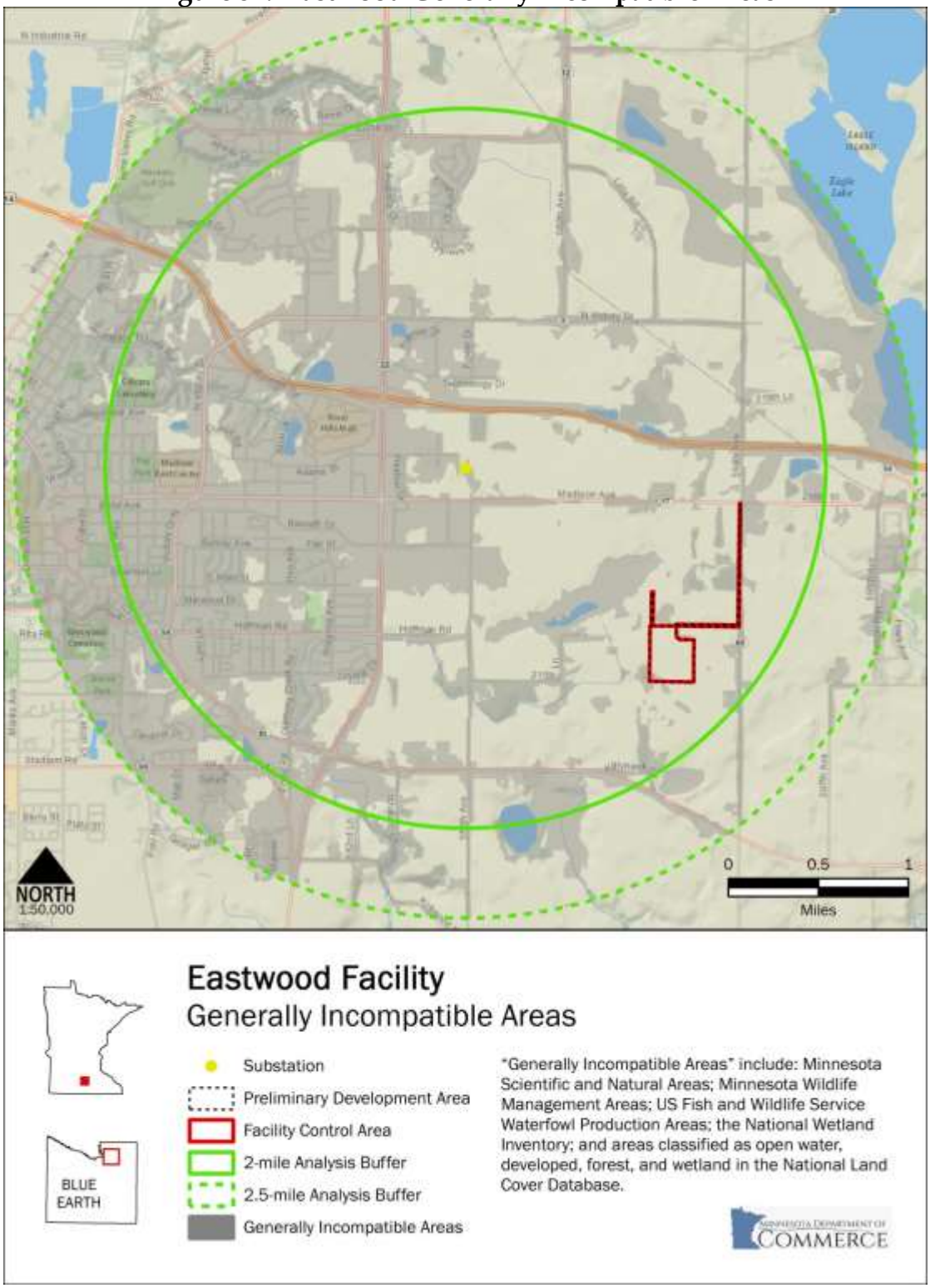
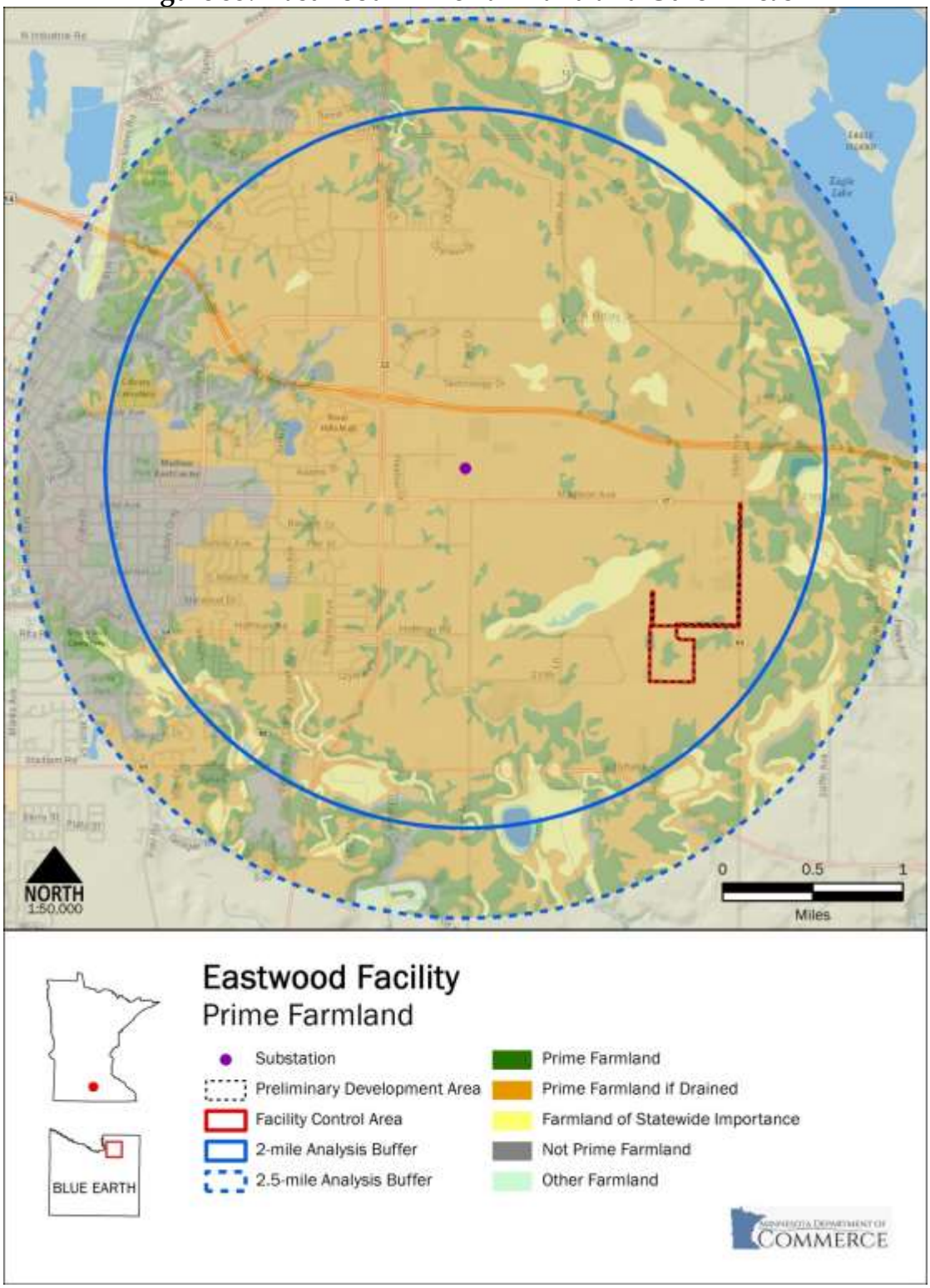


Figure 33: Eastwood Prime Farmland and Other Areas



6.8 Fiesta City

The proposed Fiesta City facility has a capacity of 2.5 MW AC and is located in 9 of Sparta Township in Chippewa County. The site is located east of the city of Montevideo, northeast of the intersection of State Highway 7 and 24th Street. Aurora anticipates that access through the facility will be through a new access road off of 24th Street. Preliminary plans anticipate a development area encompassing all of the 25.6 acres of Aurora's site control. Electricity from the facility will be delivered to Xcel Energy's Fiesta City Substation, located approximately 0.6 miles west of the facility.

The facility is located within the North-Central Glaciated Plains Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 22) is entirely cultivated 100 percent. In comparison to the study area around the Fiesta City Substation, the facility location avoids the developed area around Montevideo and the wetland areas to the west (Figure 35).

Table 22: Fiesta City Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	286.3	2.3%
Developed, Open Space	-	-	-	-	1,182.7	9.4%
Developed, Low Intensity	-	-	-	-	1,044.0	8.3%
Developed, Medium Intensity	-	-	-	-	419.5	3.3%
Developed, High Intensity	-	-	-	-	138.9	1.1%
Barren Land	-	-	-	-	27.4	0.2%
Deciduous Forest	-	-	-	-	314.9	2.5%
Evergreen Forest	-	-	-	-	-	-
Mixed Forest	-	-	-	-	3.0	-
Shrub/Scrub	-	-	-	-	-	-
Grassland Herbaceous	-	-	-	-	477.1	3.8%
Pasture/Hay	-	-	-	-	555.4	4.4%
Cultivated Crops	25.6	100.0%	25.6	100.0%	6,646.5	52.9%
Woody Wetlands	-	-	-	-	324.9	2.6%
Emergent Herbaceous Wetlands	-	-	-	-	1,145.8	9.1%
Totals	**25.6**	**100.0%**	**25.63**	**100.0**	**12,566.3**	**100.0%**

6.8.1 Effects on Human Settlement

The facility location is a cultivated parcel located just north of the commercial corridor along State Highway 7 in a rural area with scattered rural residences. The nearest home is located approximately 1,670 feet southeast of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located

in an area zoned as Agricultural Preservation by Chippewa County. Chippewa County does not have a solar ordinance. The proposed facility location has not been identified as part of any orderly annexation agreement.[115]

There is a snowmobile trail along State Highway 7; there are no other recreational trails, county, state or local parks located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

The location of the facility is approximately one mile southeast of the Montevideo Airport Following initial screening, the FAA requested that Aurora file a 7460-1 *Notice of Proposed Construction* for the Fiesta City facility. The results of a glare analysis performed according to the FAA's Solar Glare Hazard Analysis Tool methodology indicate that at various times throughout the year the facility will create a low potential for temporary after-image glare on three runways, and no potential for glare on a fourth runway. The FAA considers low potential for temporary after-image to be acceptable for pilots.[116] Aurora intends to file a Notice of Proposed Construction with the FAA for the Fiesta City facility.

Section 11.4.1 of the Site Permit Template requires compliance with FAA determinations.

No mitigation measures beyond those described in Section 5.2 are identified for the Eastwood facility.

6.8.2 Effects on Land Based Economies

The proposed facility would remove approximately 26 acres from agricultural production for at least 25 years. EERA staff is not aware of other announced solar facilities in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 17 acres (65 percent) of the developed area are considered to be prime farmland and 6 acres are considered to be prime farmland if drained (Table 13). Within the study area surrounding the Fiesta City Substation, approximately 46 percent is considered to be prime farmland and 14 percent is considered to be prime farmland if drained. In order to avoid the developed area around Montevideo, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 37).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

[115] Chippewa County Comments, September 24, 2014
[116] Application, at pp. 53-54

No mitigation measures beyond those described in Section 5.3 are identified for the Fiesta City facility.

6.8.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Fiesta City facility. No mitigation measures beyond those described in Section 5.4 are identified for the Fiesta City facility.

6.8.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 0.19 acres of wetlands within the area of land control; 0.13 acres of Type 1 (seasonally flooded basins or floodplains and 0.06 acres of Type 2 (wet meadow).[117]

The preliminary design for the facility anticipates grading of approximately 11.6 acres of the site during construction.[118]

No mitigation measures beyond those described in Section 5.5 are identified for the Fiesta City facility.

6.8.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Fiesta City facility.[119]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Fiesta City facility.

[117] Appendix C
[118] Application, at Appendix F
[119] Application, at p. 81

Figure 34: Fiesta City Project Detail

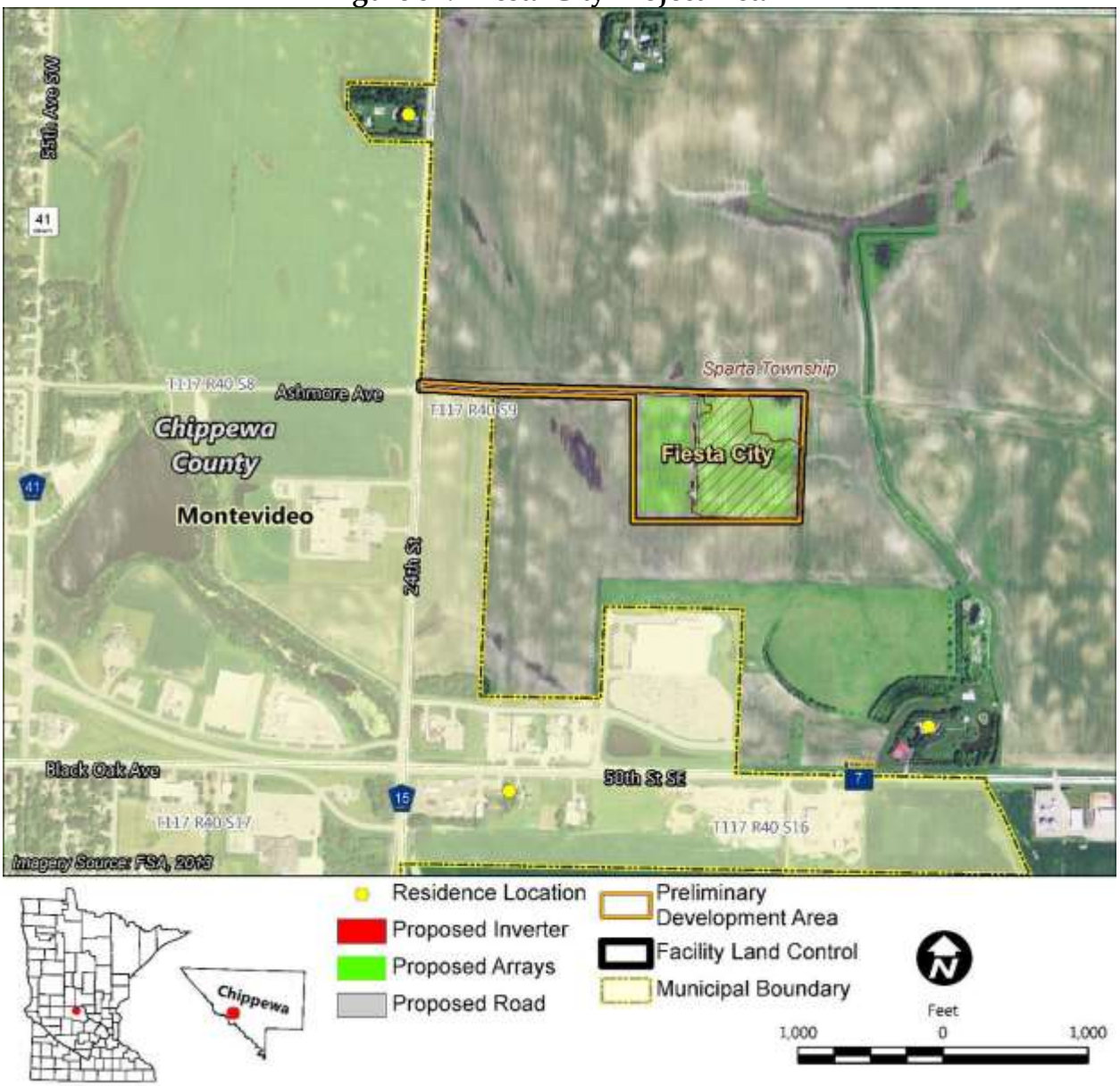


Figure 35: Fiesta City Land Cover Overview

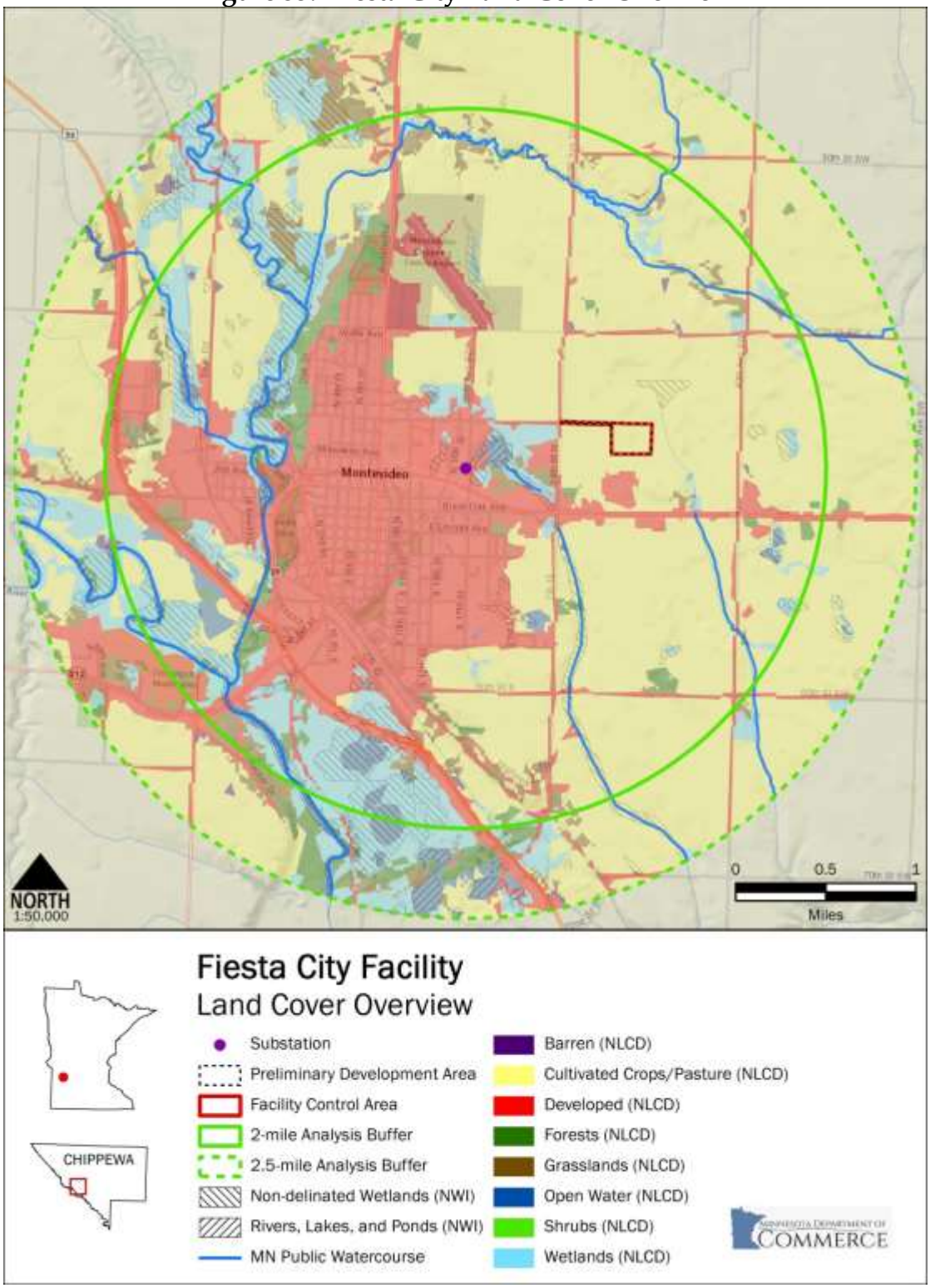


Figure 36: Fiesta City Generally Incompatible Areas

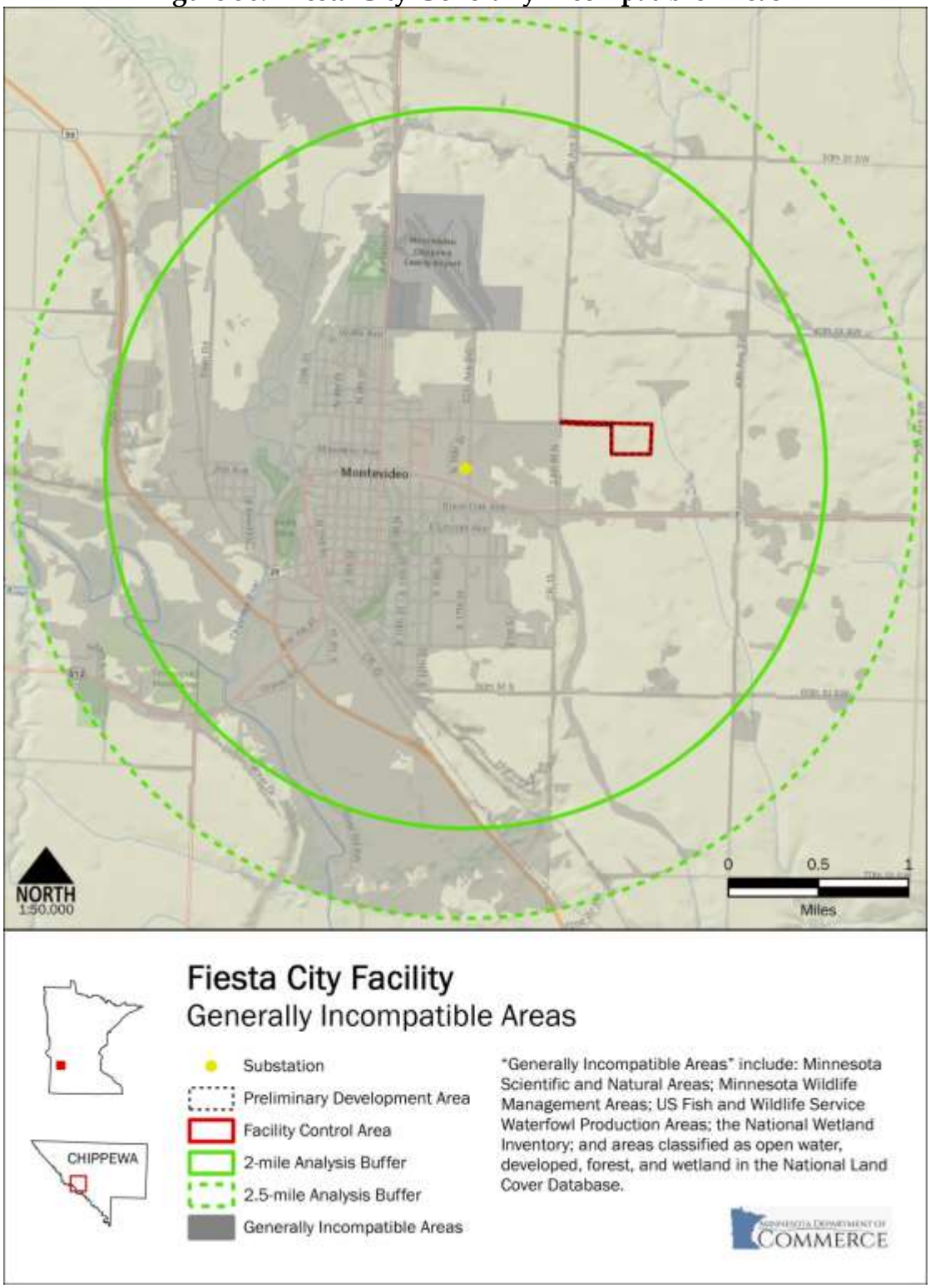
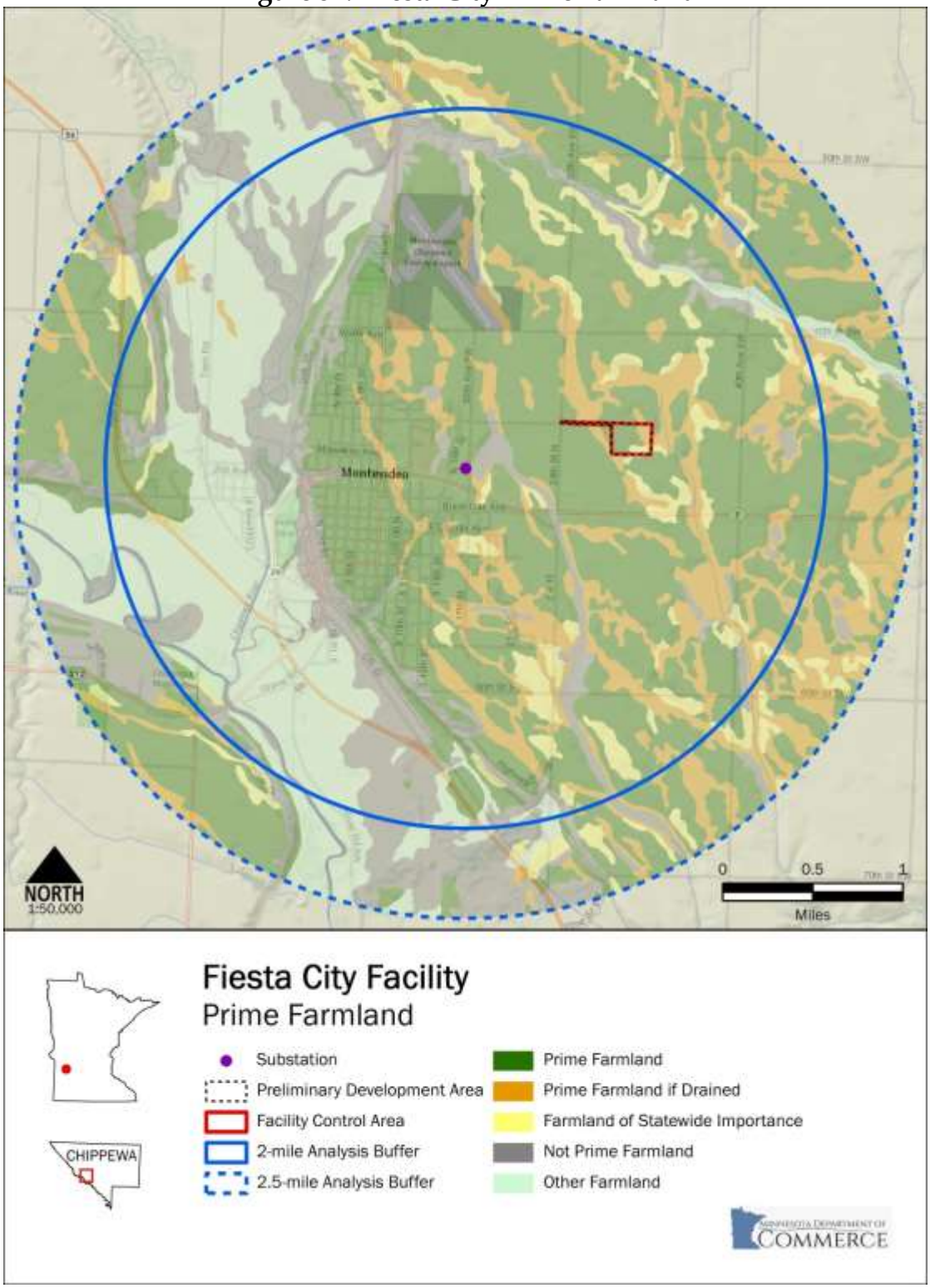


Figure 37: Fiesta City Prime Farmland



6.9 Hastings

The proposed Hastings facility has a capacity of 5.0 MW AC and is located in Section 8 of Denmark Township in Washington County. The site is located across the Mississippi River from the city of Hastings, northeast of the intersection of US Highway 10 and Norell Road South. Aurora anticipates that the facility will be accessed from a new access road off of Norell Road South. Preliminary plans anticipate development area of the entire 40.6 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Hastings Substation, located approximately 1.5 miles southwest of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 23) is comprised almost entirely by cultivated crops (99.8 percent). When compared to the land cover in the study area surrounding the Hastings Substation, the facility location avoids the developed area of Hastings, wetlands and Mississippi River to the south and the St. Croix River to the East (Figure 39).

Table 23: Hastings Facility Land Cover

Land Cover	Control Area		Preliminary Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	1,983.8	15.8%
Developed, Open Space	0.10	0.2%	0.1	0.2%	1,634.5	13.0%
Developed, Low Intensity	-	-	-	-	1,809.8	14.4%
Developed, Medium Intensity	-	-	-	-	1,247.5	10.0%
Developed, High Intensity	-	-	-	-	312.2	2.5%
Barren Land	-	-	-	-	7.8	-
Deciduous Forest	-	-	-	-	969.2	7.7%
Evergreen Forest	-	-	-	-	12.7	0.1%
Mixed Forest	-	-	-	-	2.0	-
Shrub/Scrub	-	-	-	-	72.5	0.6%
Grassland Herbaceous	-	-	-	-	148.7	1.2%
Pasture/Hay	-	-	-	-	808.0	6.4%
Cultivated Crops	40.6	100.0%	40.5	99.8%	2,298.8	18.3%
Woody Wetlands	-	-	-	-	1,038.0	8.3%
Emergent Herbaceous Wetlands	-	-	-	-	192.9	1.5%
Totals	**40.6**	**100.0%**	**40.6**	**100.0**	**12,538.4**	**100.0%**

6.9.1 Effects on Human Settlement

The proposed facility location is a cultivated parcel located in a predominantly agricultural area with scattered rural residences. The nearest home is located approximately 645 feet northwest of the preliminary development area. Construction of the facility will not result in

displacement of any homes or businesses. The facility is located in an area zoned as A-2 by Washington County. The area of site control is designated as General Rural in Chapter 3 of the *Washington County 2030 Comprehensive Plan*.[120]

The Rutstrum WMA and the St. Croix National Scenic Riverway are located within one mile of the proposed facility. The facility would not be visible from these areas. There are no additional recreational trails, state, county or local parks within one-half mile of the proposed facility. Neither construction nor operation of the facility would impact the use of nearby recreational resources.

No mitigation measures beyond those proposed in Section 5.2 are identified for the Hastings facility.

6.9.2 Effects on Land Based Economies

The proposed facility would remove approximately 41 acres of farmland from agricultural use for at least 25 years. EERA staff is not aware of other solar facilities announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses for the proposed project would be part of a cumulative reduction of available land for crops or pasture.

Essentially all of the 41 acre preliminary development area is considered to be prime farmland (Table 13). The Prime Farmland Exclusion for electric power generation facilities identified in Minnesota Rule part 7850.4400, subpart 4, does not apply due to the facility's proximity to Hastings. The facility location is not enrolled in the Metropolitan Agricultural Preserves Program.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Hastings facility.

6.9.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Hastings facility. No mitigation measures beyond those described in Section 5.4 are identified.

[120] Washington County, *Washington County 2030 Comprehensive Plan: A Policy Guide to 2030: Land Use*, (September 2010) Figure 3-11 "Future Land Use" http://www.co.washington.mn.us/DocumentCenter/View/124

6.9.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. The proposed facility is located near the juncture of the Mississippi and St. Croix Rivers in an area. Because of the presence of two Audubon Important Bird Areas (IBA) (the St. Croix Lake IBA and Vermillion Bottoms IBA), the DNR anticipates this area will have a relatively high level of avian activity. Significant impacts from the PV installation are not anticipated, but any overhead electric lines present a potential risk for avian collisions.

Field delineations performed in the summer of 2014 did not identify any wetlands in the area of land control.[121]

The preliminary design for the facility does not anticipate any grading of the site during construction.[122]

In addition to those mitigation measures described in Section 5.5, marking of any overhead collector lines and poles with bird flight diverters and raptor shields may reduce the potential for avian collisions at the Hastings facility.

6.9.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Hastings facility. The NHIS database review did show records for many instances of federally and state listed endangered, threatened and special concern species within one mile of the area of site control for the facility (Table 24).[123] However, many of the species identified are aquatic species that would not be impacted as there is no aquatic habitat located within the facility.

Table 24: Hasting Facility - NHIS Records

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 Mile of Land Control
Ebonyshell	Fusconaia ebena	Endangered	None	2
Elephant-ear	Elliptio crassidens	Endangered	None	1
Higgins Eye	Lampsilis higginsii	Endangered	Listed Endangered	3
Pallid Shiner	Hybopsis amnis	Endangered	None	1
Pistolgrip	Tritogonia verrucosa	Endangered	None	1
Purple Wartyback	Cyclonaias tuberculata	Endangered	None	1
Rock Pocketbook	Arcidens confragosus	Endangered	None	1
Sheepnose	Plethobasus cyphyus	Endangered	Candidate	1
Snuffbox	Epioblasma triquetra	Endangered	None	1
Washboard	Megalonaias nervosa	Endangered	None	1

[121] Appendix C
[122] Application, at Appendix F
[123] Application, at p. 81, Appendix I

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 Mile of Land Control
Winged Mapleleaf	Quadrula fragosa	Endangered	Listed Endangered	1
Butterfly	Ellipsaria lineolata	Threatened	None	1
Elktoe	Alasmidonta marginata	Threatened	None	1
Kitten-tails	Besseya bullii	Threatened	None	1
Monkeyface	Quadrula metanevra	Threatened	None	1
Mucket	Actinonaias ligamentina	Threatened	None	2
Paddlefish	Polyodon spathula	Threatened	None	1
Spike	Elliptio dilatata	Threatened	None	2
Wartyback	Quadrula nodulata	Threatened	None	1
American Ginseng	Panax quinquefolius	Special Concern	None	1
Black Sandshell	Ligumia recta	Special Concern	None	2
Blue Sucker	Cycleptus elongatus	Special Concern	None	3
Creeping Juniper	Juniperus horizontalis	Special Concern	None	1
Lake Sturgeon	Acipenser fulvescens	Special Concern	None	2
Red-shouldered Hawk	Buteo lineatus	Special Concern	None	2
Round Pigtoe	Pleurobema sintoxia	Special Concern	None	2
Bald Eagle	Haliaeetus leucocephaluTracked		None	2
Hickorynut	Obovaria olivaria	Tracked	None	2
Walter's Barnyard Grass	Echinochloa walteri	Tracked	None	1

As discussed in Section 5.6, a field survey of the Hastings facility would identify potentially impacted rare or unique natural resources.

As identified in Section 5.5, the use of wildlife friendly mesh for erosion control can reduce the potential for reptiles becoming entangled that occurs with more typical types of erosion control mesh.

Figure 38: Hastings Project Detail

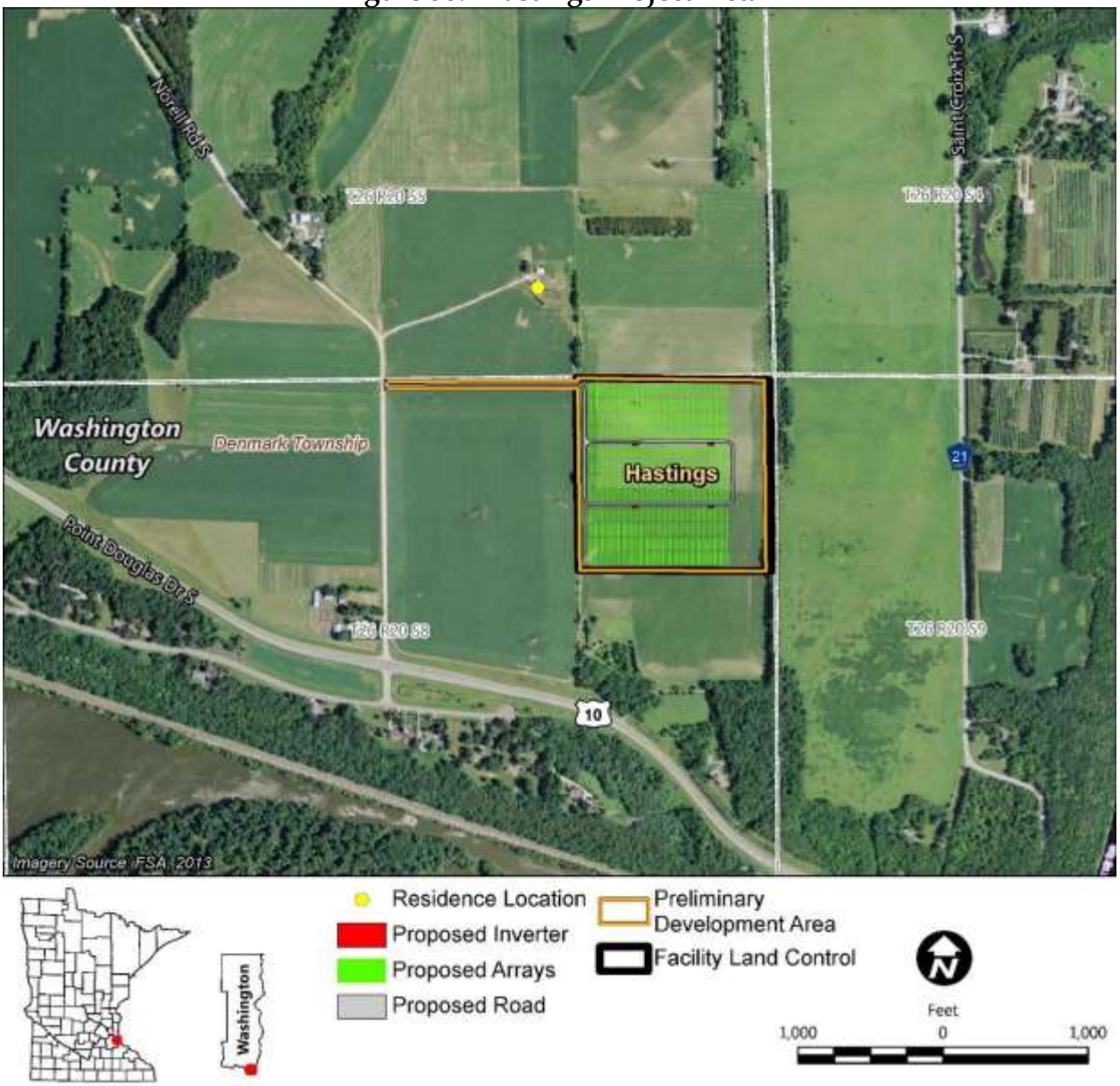


Figure 39: Hastings Land Cover Overview

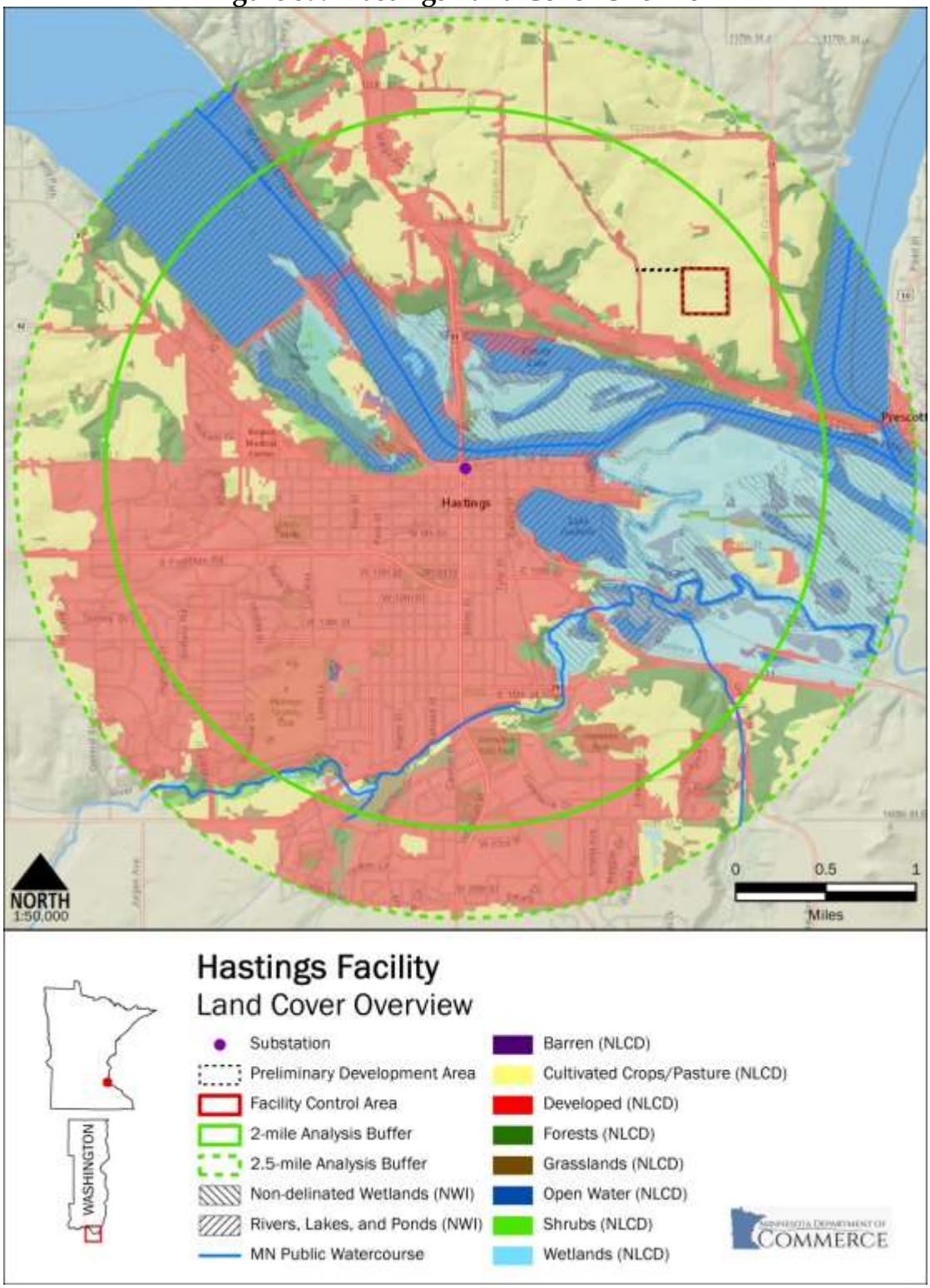


Figure 40: Hastings Generally Incompatible Areas

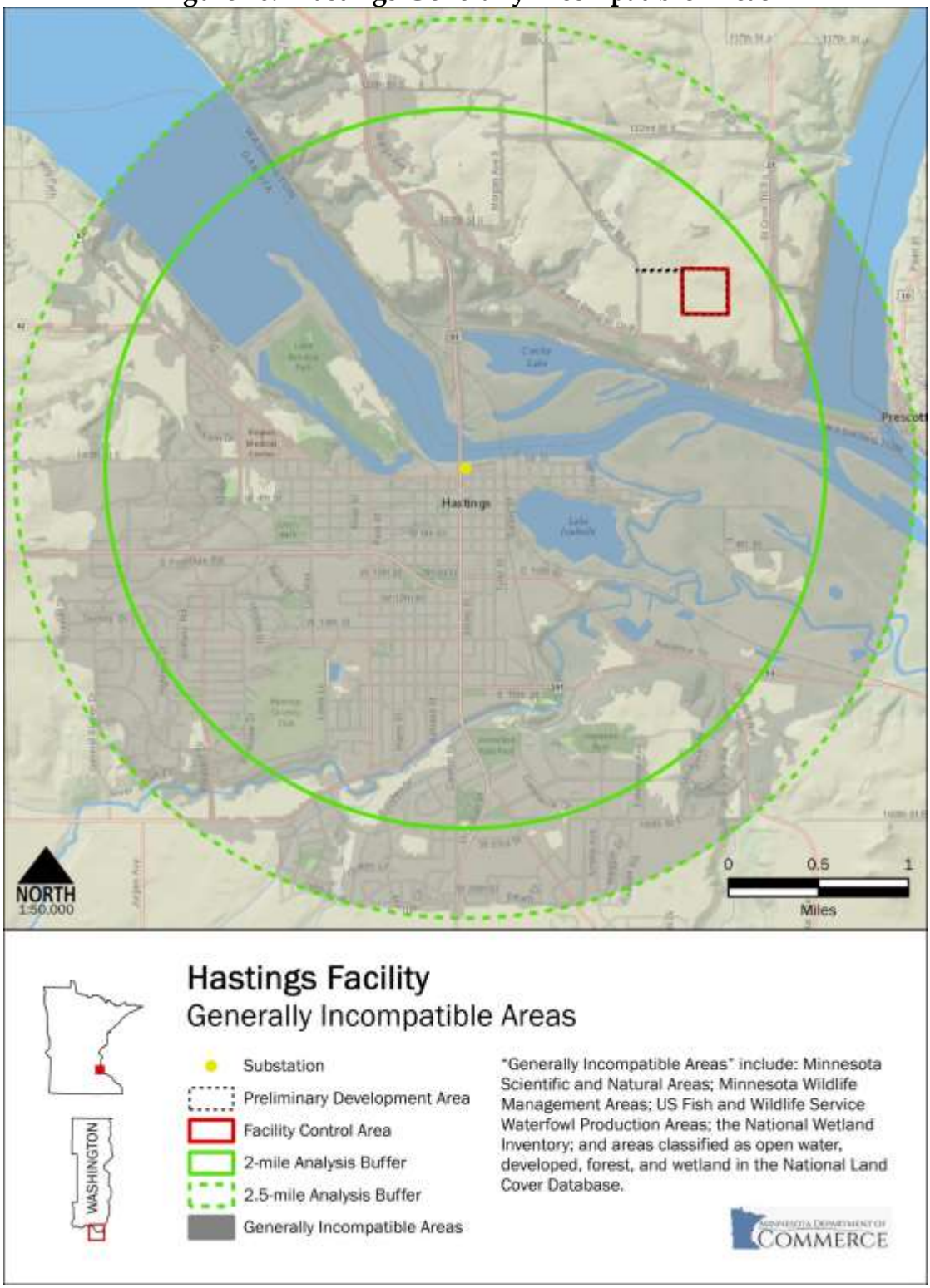
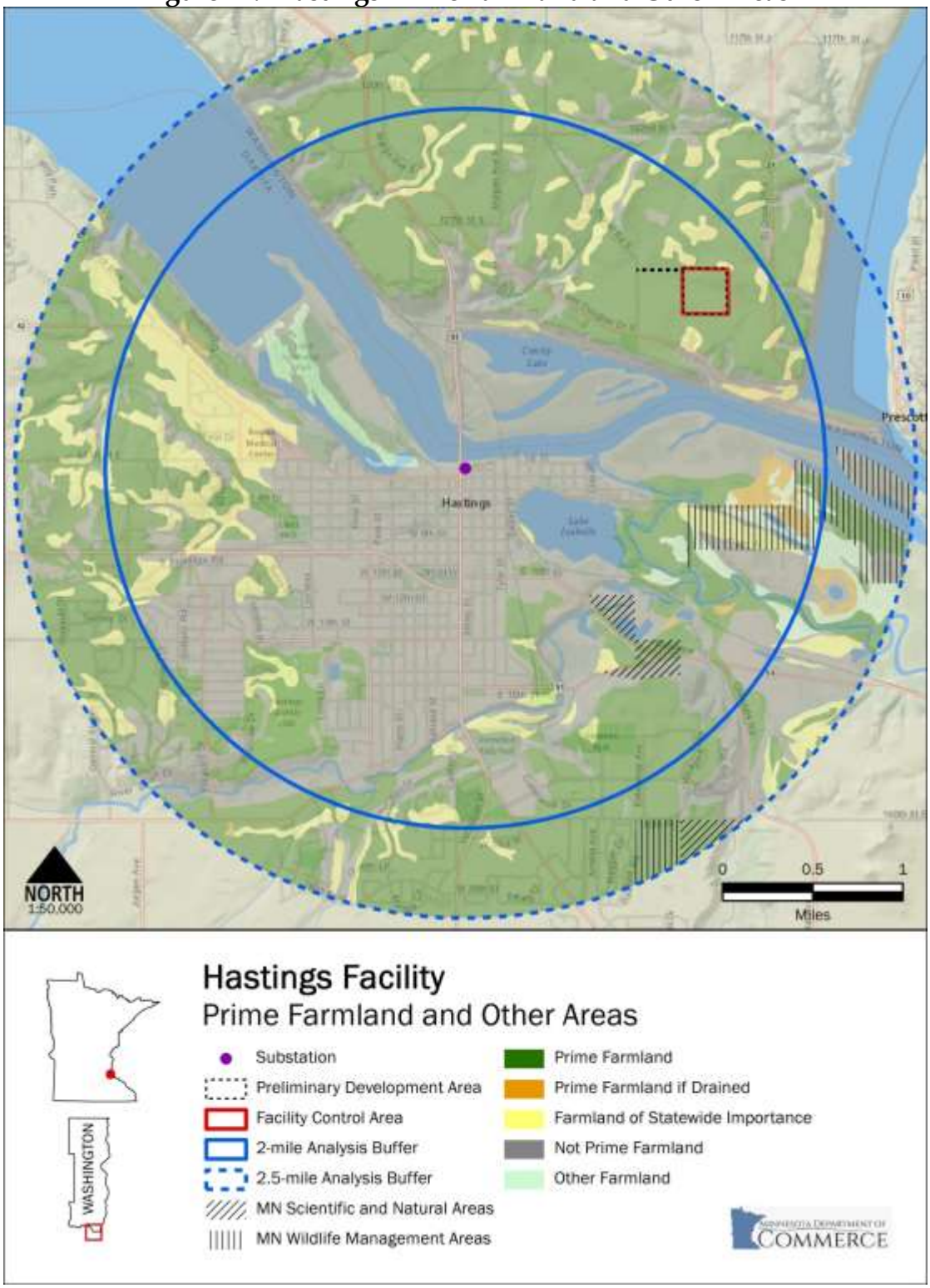


Figure 41: Hastings Prime Farmland and Other Areas



6.10 Lake Emily

The proposed Lake Emily facility has a capacity of 5.0 MW AC and is located in Section 24 of Kasota Township in Le Sueur County. The site is located east of the city of St. Peter, northwest of the intersection of State Highway 99 and County Road 106. Aurora anticipates that the facility will be accessed through a newly constructed access road off of State Highway 99. Preliminary plans anticipate a development area of approximately 42.4 acres within the 46.9 acres of Aurora's site control. Electricity from the facility will be delivered to Xcel Energy's Lake Emily Substation, located approximately 130 feet southwest of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 25) is dominated by cultivated crops (100 percent). While the study area around the Lake Emily Substation is also largely agricultural, the facility location avoids the developed area of St. Peter, Minnesota River and its associated wetlands located west of the facility (Figure 43).

Table 25: Lake Emily Facility Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	1,294.0	10.3%
Developed, Open Space	-	-	-	-	311.3	2.5%
Developed, Low Intensity	0.11	0.2%	0.1	0.1%	329.7	2.6%
Developed, Medium Intensity	-	-	-	-	137.8	1.1%
Developed, High Intensity	-	-	-	-	58.5	0.5%
Barren Land	-	-	-	-	2.9	0.0%
Deciduous Forest	-	-	-	-	1,464.6	11.7%
Evergreen Forest	-	-	-	-	28.0	0.2%
Mixed Forest	-	-	-	-	0.0	0.0%
Shrub/Scrub	-	-	-	-	437.6	3.5%
Grassland Herbaceous	-	-	-	-	243.1	1.9%
Pasture/Hay	-	-	-	-	1,076.7	8.6%
Cultivated Crops	46.8	99.8%	42.3	99.9%	6,310.5	50.3%
Woody Wetlands	-	-	-	-	43.84	0.4%
Emergent Herbaceous Wetlands	-	-	-	-	815.58	6.5%
Totals	**46.9**	**100.0%**	**42.4**	**100.0%**	**12,553.8**	**100.0%**

6.10.1 Effects on Human Settlement

The proposed facility location is a cultivated parcel in a rural area with scattered residences. The nearest home is located approximately 510 feet north/northwest of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The location is zoned as Agricultural by Le Sueur County.

There are no recreational trails, county, state or local parks within one-half mile of the proposed facility. The Ottowa WMA, 577 acre area consisting almost entirely of marsh and shrubland on the floodplain of the Minnesota River, is located approximately 0.7 miles northwest of the facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those discussed in Section 5.2 are identified for the Lake Emily facility.

6.10.2 Effects on Land Based Economies

The proposed facility would remove approximately 42 acres from agricultural use. EERA staff is not aware of other solar facilities have been announced in the area of the Lake Emily facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 28 acres (65 percent) of the developed area are considered to be prime farmland and 10 acres (24 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Lake Emily Substation, approximately 28 percent is considered to be prime farmland and 19 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Lake Emily facility due to its proximity to St. Peter.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those discussed in Section 5.3 are identified for the Lake Emily facility.

6.10.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Lake Emily facility. No mitigation measures beyond those discussed in Section 5.4 are identified for the Lake Emily facility.

6.10.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 did not identify any wetlands in the area of land control.[124]

The preliminary design for the facility anticipates grading of approximately 27.2 acres of the site during construction.[125]

No mitigation measures beyond those discussed in Section 5.3 are identified for the Lake Emily facility.

6.10.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Lake Emily facility. The NHIS database review did show records for one state-listed threatened (Blanding's Turtle (Emydoidea blandingii)) and one special concern (Small White Lady's-slipper (Cypripedium candidum)) species within one mile of the area of site control for the facility.[126]

DNR data records show that there is a state-designated calcareous fen located between one-half and one mile from the Lake Emily Facility. Calcareous fens are a rare type of wetland that supports a unique plant community, and are highly susceptible to disturbance.[127] As discussed in Section 5.5.2, excavation is expected to be well above the water table at the facility. Due to the distance between the facility and the low potential for impacts to groundwater, the potential for impacts to the calcareous fen is very low and no special mitigation measures are proposed related to the identified calcareous fen.

As described in Section 5.6, a field survey of the Lake Emily facility would identify potentially impacted rare or unique natural resources.

As described in Section 5.5, the use of wildlife friendly mesh for erosion control can reduce the potential for reptiles becoming entangled that occurs with more typical types of erosion control mesh.

Section 14.1 of the Site Permit Template requires specific recommendations for minimizing potential impacts to Blanding's Turtle.

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[124] Appendix C
[125] Application, at Appendix F
[126] Application, at p. 81, I-26
[127] DNR. *What is a Calcareous Seepage Fen?* 2011. http://files.dnr.state.mn.us/natural_resources/water/wetlands/calcareous_fen_fact_sheet_dec_2011.pdf

Figure 42: Lake Emily Project Detail

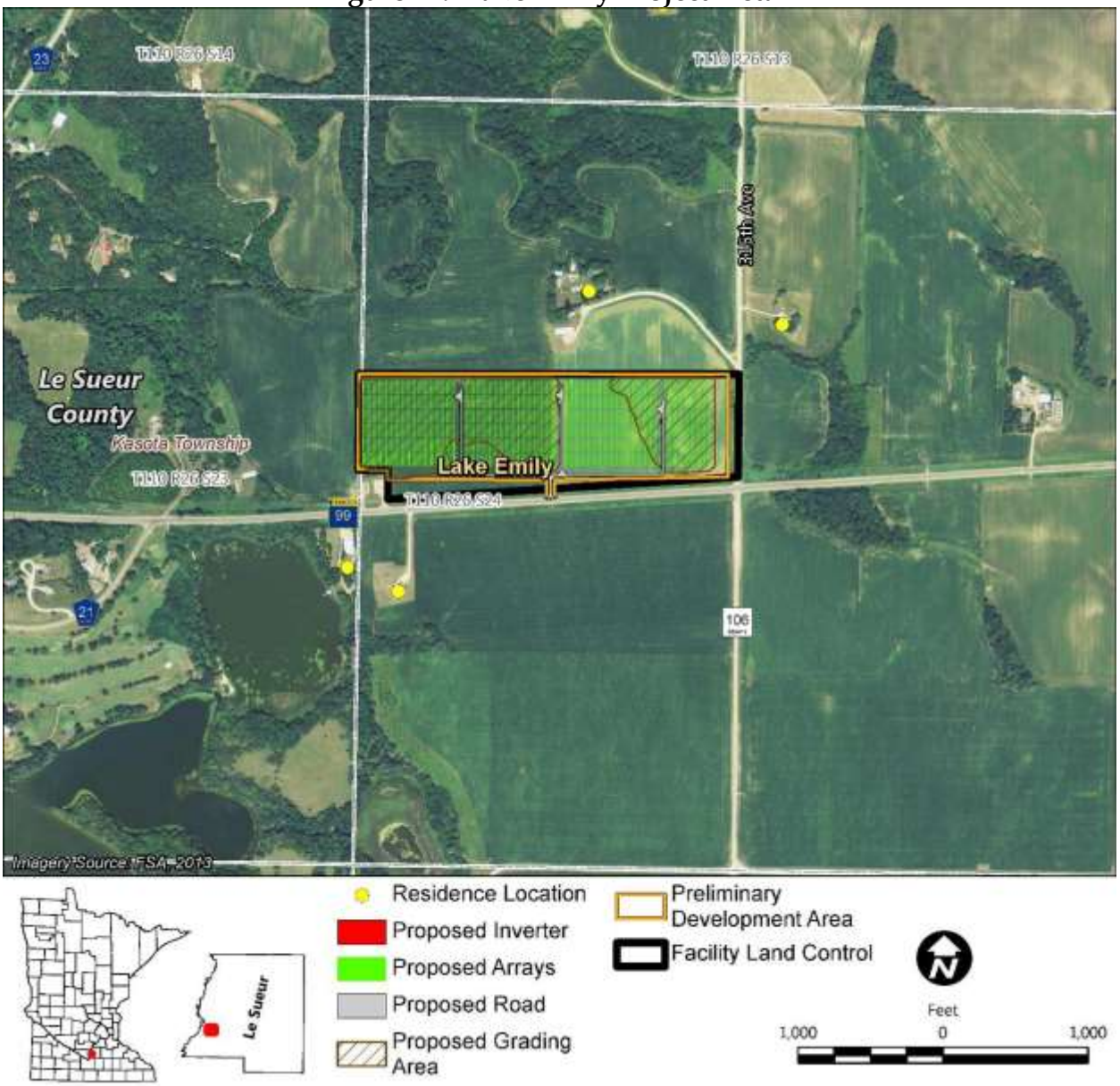


Figure 43: Lake Emily Land Cover Overview

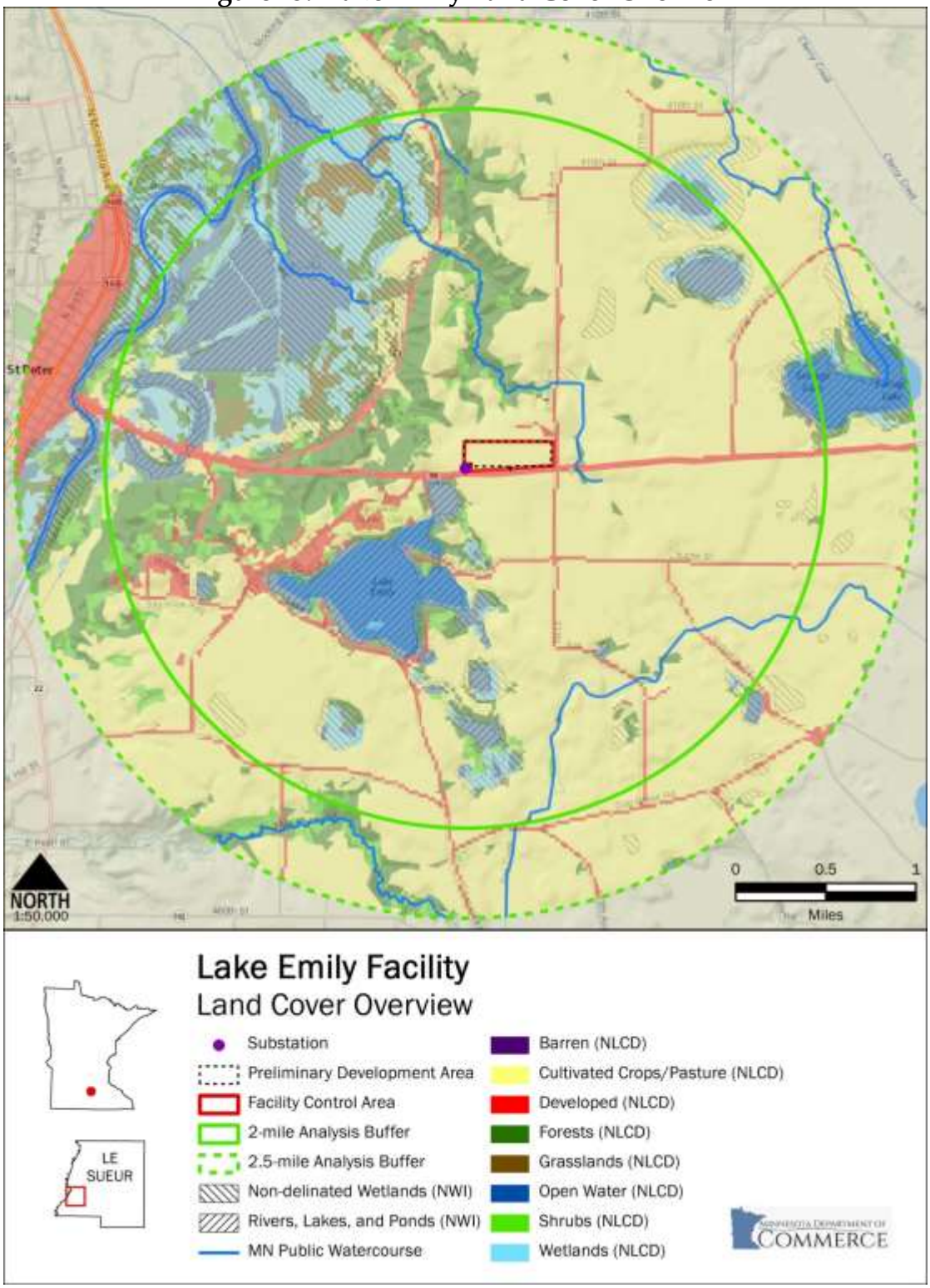


Figure 44: Lake Emily Generally Incompatible Areas

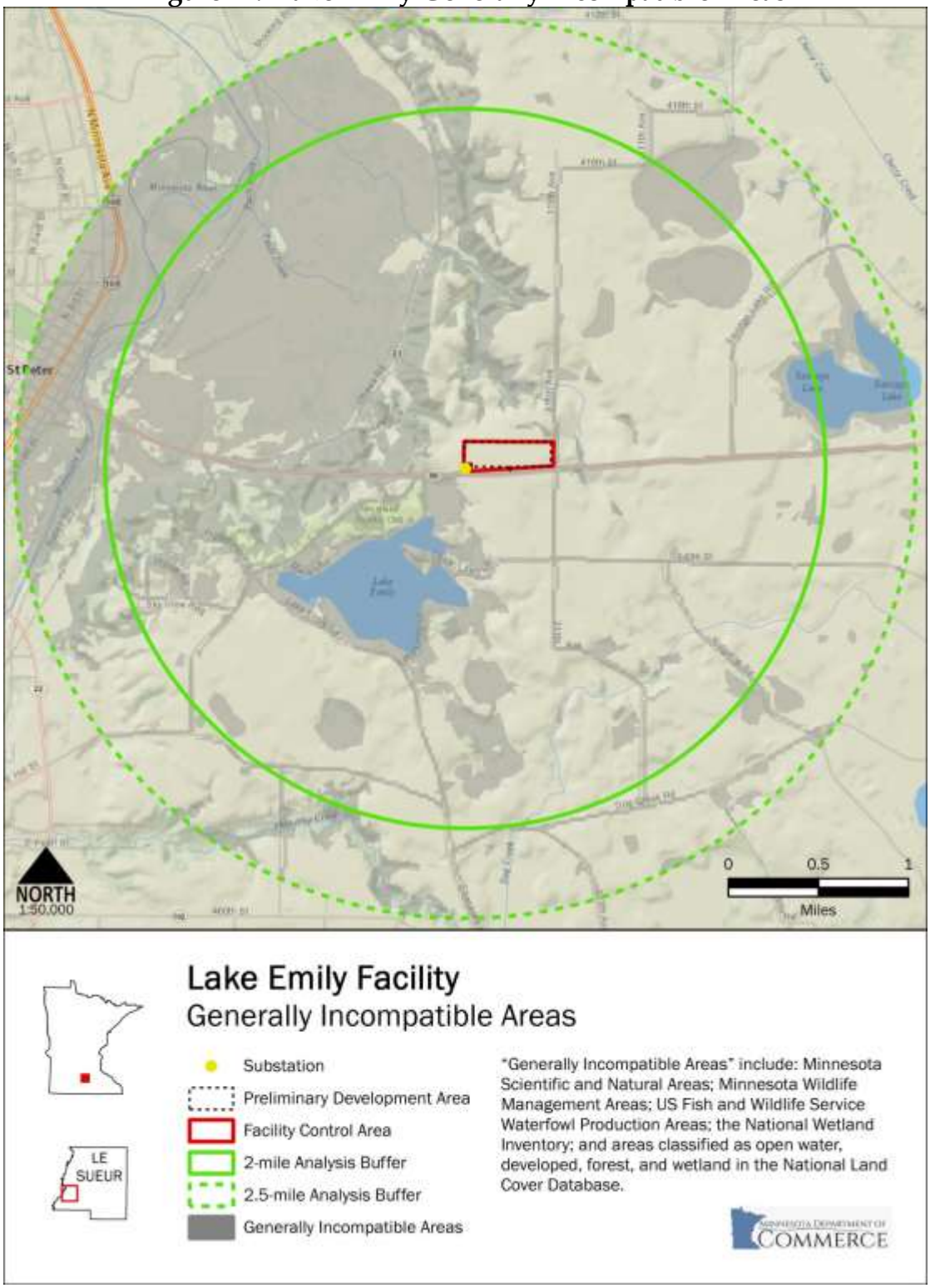
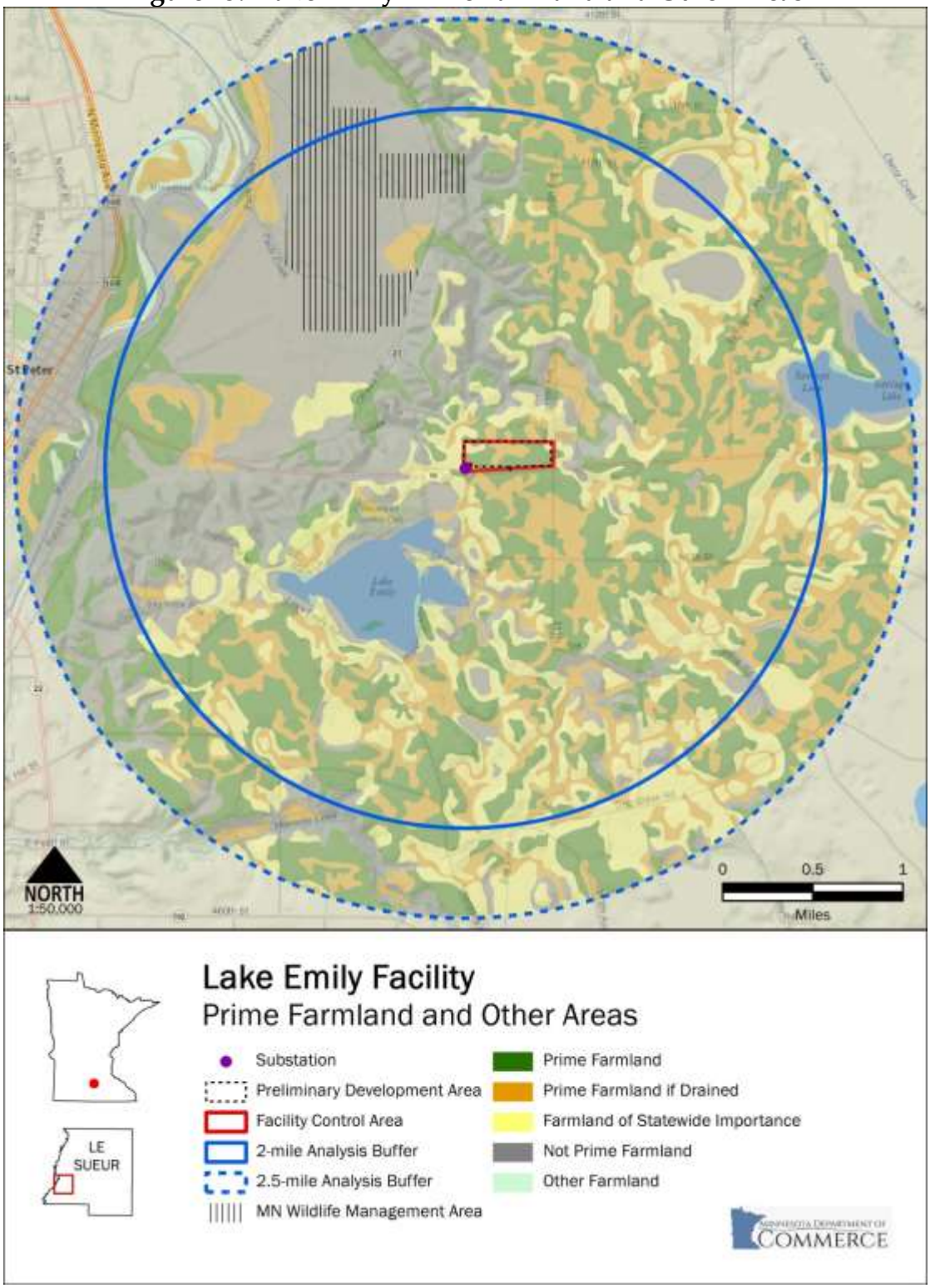


Figure 45: Lake Emily Prime Farmland and Other Areas



6.11 Lake Pulaski

The proposed Lake Pulaski facility has a capacity of 8.5 MW AC and is located in Section 15 of Buffalo Township in Wright County. The site is located east of the city of Buffalo, west of Eaken Avenue NE and north of 20th Street NE. Aurora anticipates that the facility will be accessed through a newly constructed access road off of Eaken Avenue Northeast. Preliminary plans anticipate a development area of approximately 63.2 acres within the 75.8 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Lake Pulaski Substation located approximately 0.5 miles south of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 26) is dominated by cultivated crops (87 percent). In comparison to the land cover in the study area surrounding the Lake Pulaski Substation, the location of the facility avoids the developed area of Buffalo to the west and the lakes to the east (Figure 47).

Table 26: Lake Pulaski Facility land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	1,531.0	12.2%
Developed, Open Space	0.3	0.4%	--	--	490.0	3.9%
Developed, Low Intensity	--	--	--	--	605.9	4.8%
Developed, Medium Intensity	--	--	--	--	244.1	1.9%
Developed, High Intensity	--	--	--	--	28.2	0.2%
Barren Land	--	--	--	--	--	--
Deciduous Forest	9.8	13.0%	7.06	11.2%	1,364.2	10.9%
Evergreen Forest	--	--	--	--	57.3	0.5%
Mixed Forest	--	--	--	--	4.6	0.0%
Shrub/Scrub	--	--	--	--	469.5	3.7%
Grassland Herbaceous	--	--	--	--	258.2	2.1%
Pasture/Hay	4.3	5.7%	0.61	1.0%	2,914.6	23.2%
Cultivated Crops	59.7	78.8%	54.70	86.5%	4,239.6	33.8%
Woody Wetlands	--	--	--	--	6.3	0.1%
Emergent Herbaceous Wetlands	1.7	2.2%	0.8	1.3	340.0	2.7%
Totals	**75.8**	**100.0%**	**63.2**	**100.0%**	**12,553.4**	**100.0%**

6.11.1 Effects on Human Settlement

The proposed facility location is a cultivated parcel in a rural area with scattered rural residences. The nearest home is located approximately 280 feet northeast of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned as AG-Agricultural District

by Wright County. Solar farms are not specifically addressed in the Wright County Zoning Ordinance.[128] The area of site control is designated as Agricultural in the *Wright County Land Use Plan*.

There is a snowmobile trail located approximately one-half mile east of the facility. There are no other recreational trails, state, county or local parks within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Lake Pulaski facility.

6.11.2 Effects on Land Based Economies

The proposed facility would remove approximately 55 acres from agricultural use. Aurora's proposed Annandale and Montrose facilities are also proposed in Wright County. If all three of the Aurora facilities were constructed, approximately 159 acres of farmland would be taken out of production for the useful life of the project (estimated to be at least 25 years).

Approximately 10 acres (16 percent) of the developed area are considered to be prime farmland and 13 acres are considered to be prime farmland if drained (Table 13). Within the study area surrounding the Lake Pulaski Substation, approximately 40 percent is considered to be prime farmland and 21 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Lake Pulaski facility due to its proximity to Buffalo.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Lake Pulaski facility.

6.11.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Lake Pulaski facility. No mitigation measures beyond those identified in Section 5.4 are proposed.

6.11.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control, although a small pond is located within the area of land control, north of the preliminary development area.

[128] Wright County Comments, September 25, 2014.

Field delineations performed in the summer of 2014 show 1.09 acres of Type 2 wetlands (wet meadow) within the preliminary development area.[129]

The preliminary design for the facility anticipates grading of approximately 62.8 acres of the site during construction.[130]

No mitigation measures beyond those described in Section 5.5 are identified for the Lake Pulaski facility.

6.11.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Lake Pulaski facility.[131]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Lake Pulaski facility.

[129] Appendix C
[130] Application, at Appendix F
[131] Application, at p. 81

Figure 46: Lake Pulaski Project Detail

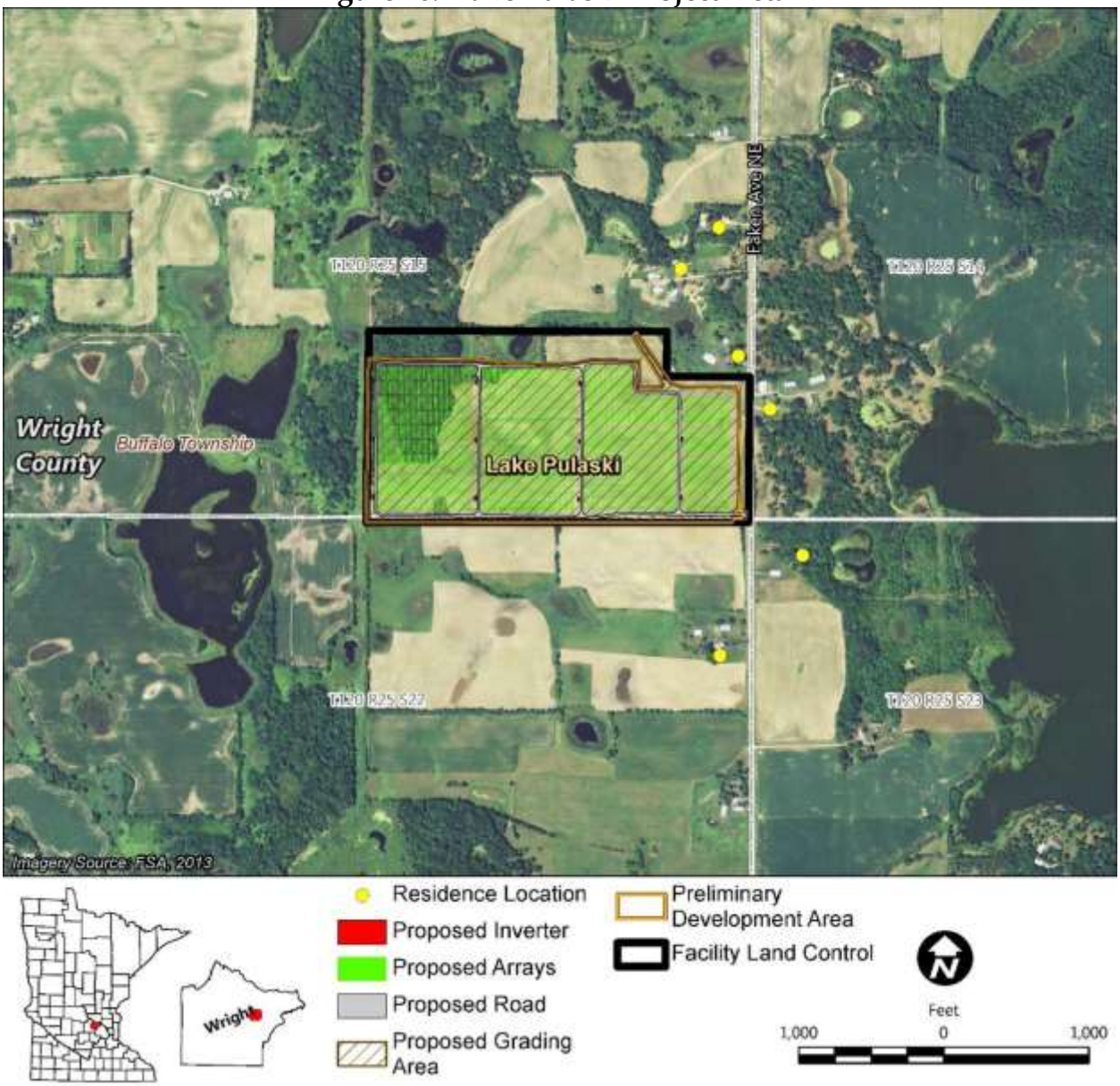


Figure 47: Lake Pulaski Land Cover Overview

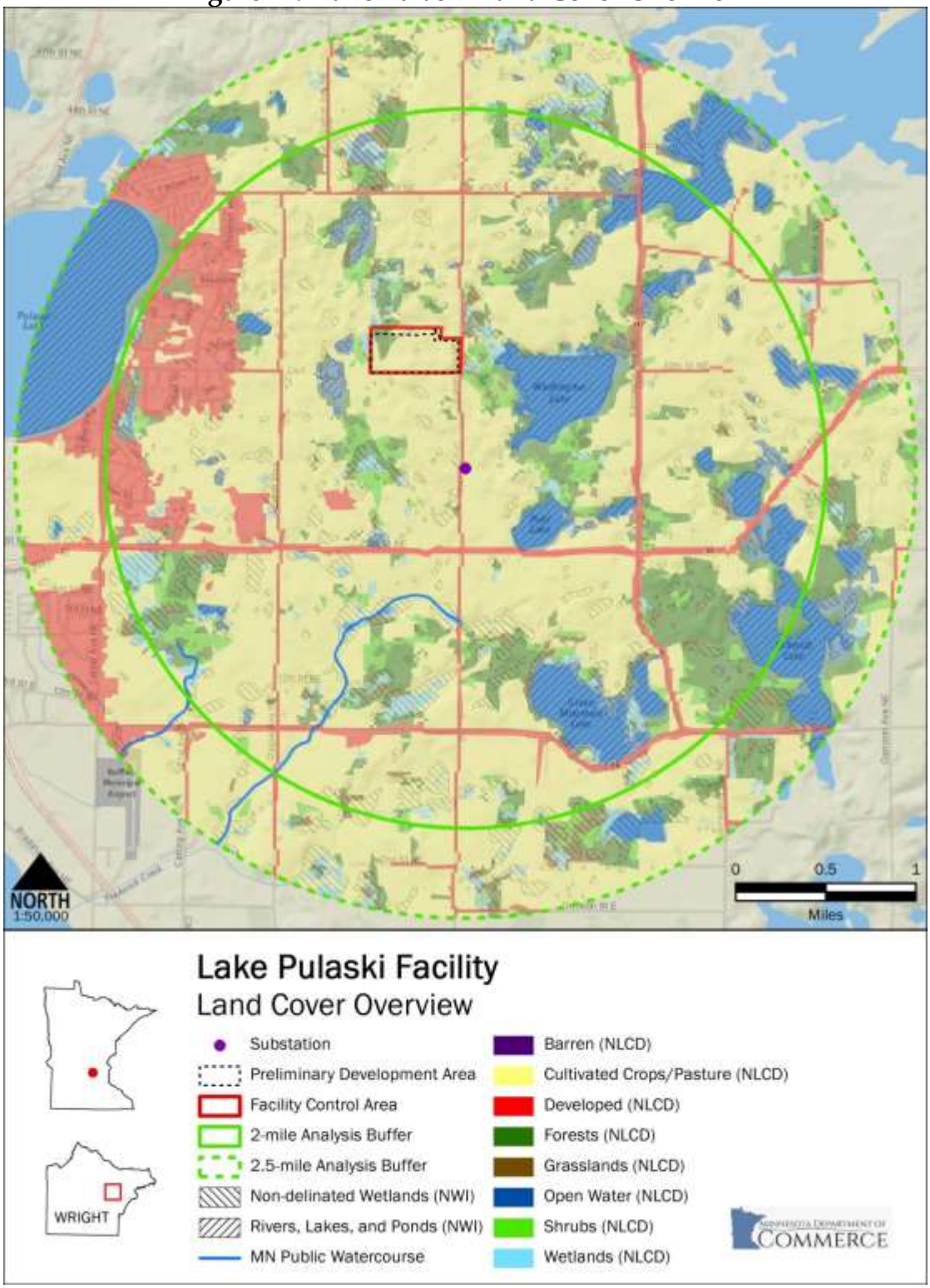


Figure 48: Lake Pulaski Generally Incompatible Areas

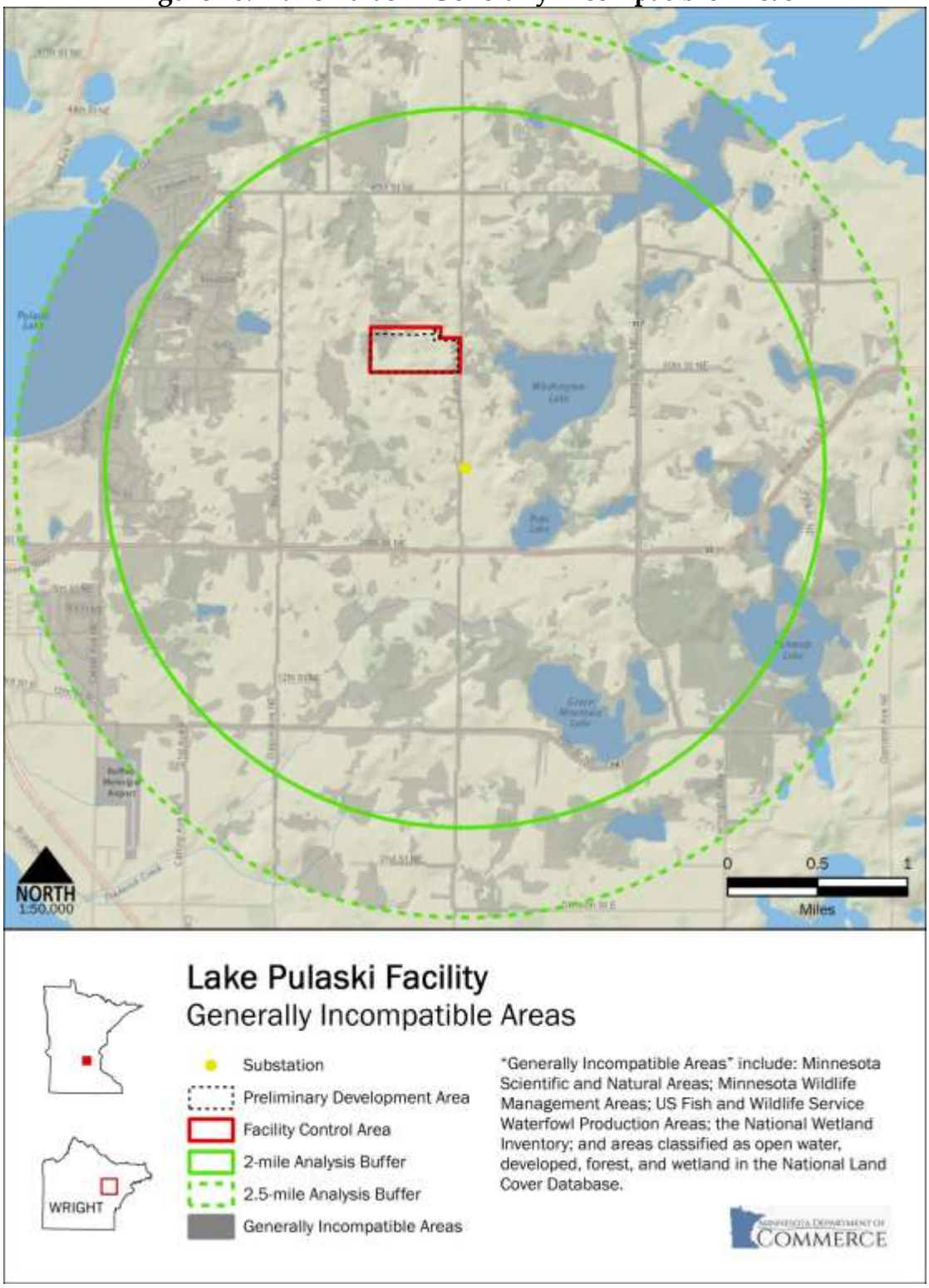
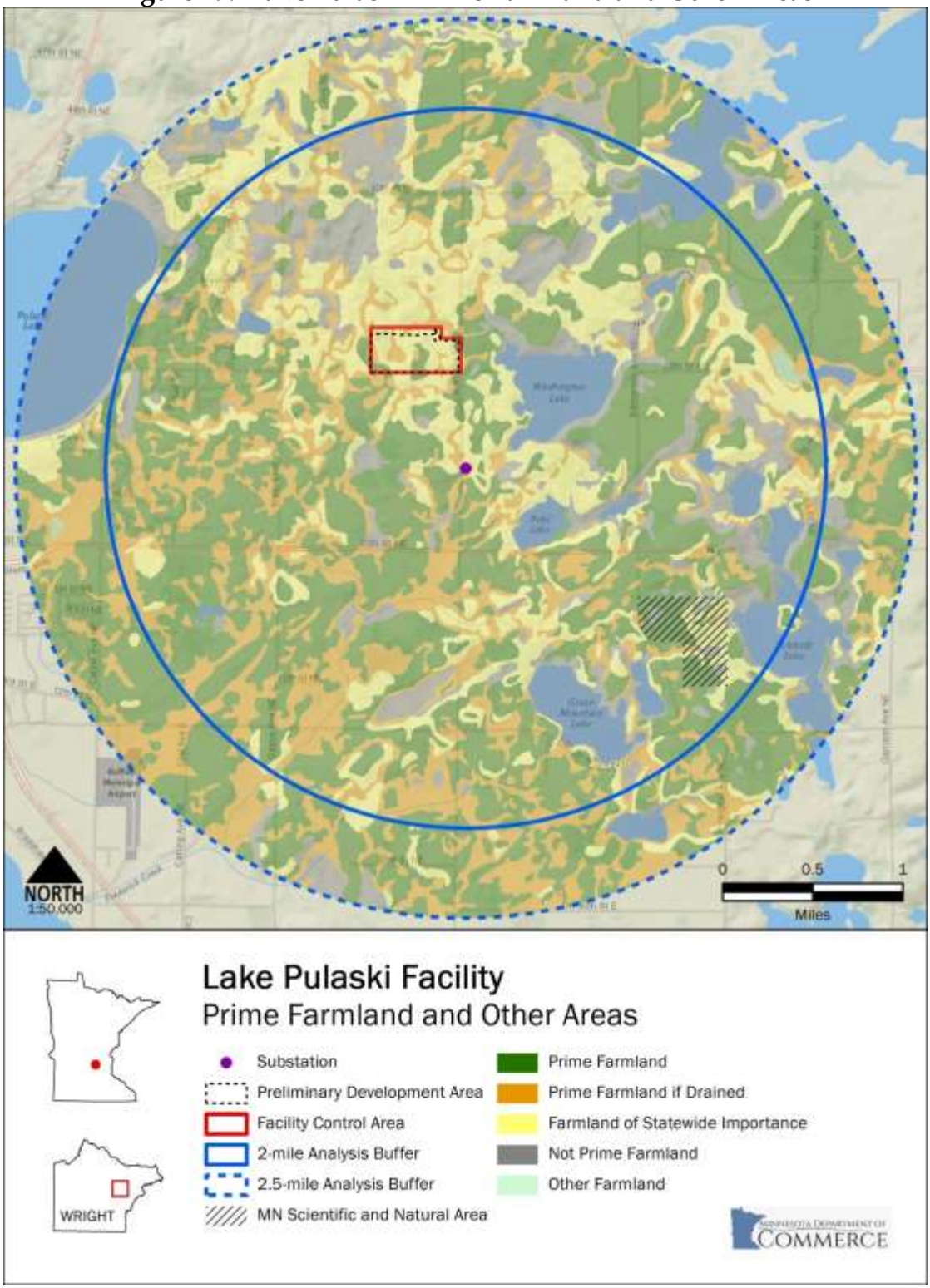


Figure 49: Lake Pulaski Prime Farmland and Other Areas



6.12 Lawrence Creek

The proposed Lawrence Creek facility has a capacity of 4.0 MW AC and is located in Section 27 of Shafer Township in Chisago County. The site is located west of Taylors Falls, north of County Road 37 (310th Street North). Aurora anticipates that access to the facility will be through a newly constructed road off of County Road 37. Preliminary plans anticipate a development area of approximately 39.4 acres within the 74.3 acres of Aurora's site control. The site is currently cultivated and the nearest home is located approximately 230 feet southeast of the preliminary development area. Electricity from the facility would be delivered to Xcel Energy's Lawrence Creek Substation located approximately 0.4 miles east of the facility.

The facility is located within the Western Superior Uplands Section of the Laurentian Mixed Forest Province. Land cover within the preliminary development area (Table 27) is dominated by agricultural cover comprising both cultivated crops (97.6 percent) and pasture and haylands (2.2 percent). In comparison to the study area the facility location avoids the development and forested areas near Taylors Falls to the east (Figure 51).

Table 27: Lawrence Creek Facility

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	403.9	4.0%
Developed, Open Space	--	--	--	--	757.6	7.5%
Developed, Low Intensity	--	--	--	--	186.6	1.9%
Developed, Medium Intensity	--	--	--	--	76.2	0.8%
Developed, High Intensity	--	--	--	--	25.3	0.3%
Barren Land	--	--	--	--	--	--
Deciduous Forest	7.9	10.6%	--	--	2,139.4	21.2%
Evergreen Forest	--	--	--	--	162.3	1.6%
Mixed Forest	--	--	--	--	67.0	0.7%
Shrub/Scrub	--	--	--	--	21.58	0.2%
Grassland Herbaceous	2.3	3.1%	--	--	282.9	2.8%
Pasture/Hay	6.4	8.6%	0.9	2.2%	2,769.1	27.5%
Cultivated Crops	57.7	77.6%	38.4	97.6%	2,471.0	24.5%
Woody Wetlands	--	--	--	--	91.2	0.9%
Emergent Herbaceous Wetlands	--	--	--	--	627.4	6.2%
Totals	**74.35**	**100.0%**	**39.36**	**100.0%**	**10,081.5**	**100.0%**

6.12.1 Effects on Human Settlement

The proposed location is in a cultivated parcel in an area that is a mixture of scattered rural residences and agricultural land. The nearest home is located approximately 230 feet

southeast of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

The facility is located in an area zoned as Agricultural by Chisago County. The site is not located within an identified orderly annexation area. Solar farms covering up to 20 acres are a permitted use within the Agricultural District; solar farms covering more than 20 acres require a conditional use. Under the Chisago County Zoning Ordinance components of the farm must meet setback, height, and coverage limitations for the district in which the system is located. The ordinance also prohibits solar energy farms in certain areas:

- Shoreland Districts as designated by the Department of Natural Resources (DNR) and the Chisago County Shoreland Management Ordinance
- 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
- Wetlands to the extent prohibited by the Minnesota Wetland Conservation Act, and
- The Floodplain District.

The conditional use permit conditions require some type of visual screening of the facility as well as preservation of natural wildlife, wetland, woodland or other corridors:

The facility is located west of the tourist destinations of Taylors Falls and the St. Croix River Valley. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those proposed in Section 5.2 are identified for the Lawrence Creek facility.

6.12.2 Effects on Land Based Economies

The proposed facility would remove approximately 39 acres of farmland from agricultural use. In addition to the Lawrence Creek facility, Aurora's Chisago, Scandia, and Wyoming facilities, as well as the North Star Solar Project, a 100 MW PV project proposed by North Star Solar PV LLC are all proposed in Chisago County If all of the proposed facilities are developed, the five facilities would result in a cumulative reduction of approximately 970 acres from agricultural use in Chisago County for at least 25 years.

Approximately 18 acres (45 percent) of the developed area are considered to be prime farmland and 16 acres are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Lawrence Creek Substation, approximately 36 percent is considered to be prime farmland and 19 percent is considered to be prime farmland if drained. In order to avoid the developed area around Taylors Falls and the forested areas along the St. Croix River and the wetlands scattered through the study area, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 53).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Lawrence Creek facility.

6.12.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Lawrence Creek facility. No mitigation measures beyond those identified in Section 5.4 are proposed.

6.12.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 9.2 acres of wetlands within the preliminary development area; 0.13 acres of Type 1(seasonally flooded basins or floodplains, 3.35 acres of Type 2 (wet meadow), 4.49 acres of Type 3 (shallow marsh), and 1.21 acres of Type 6 (shrub swamp).[132]

The preliminary design for the facility anticipates grading of approximately 10.7 acres of the site during construction.[133]

No mitigation measures beyond those described in Section 5.5 are identified for the Lawrence Creek facility.

6.12.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Lawrence Creek facility. The NHIS database review did show records for several state-listed threatened, endangered, special concern and tracked species within one mile of the area of site control for the facility (Table 28).[134]

Table 28: Lawrence Creek - NHIS Records

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 mile Of Land Control
Pistolgrip	Tritogonia verrucosa	Endangered	None	1
Purple Wartyback	Cyclonaias tuberculata	Endangered	None	1

[132] Appendix C
[133] Application, at Appendix F
[134] Application, at p. 81, Appendix I

Spotted Pondweed	Potamogeton pulcher	Endangered	None	1
Elktoe	Alasmidonta marginata	Threatened	None	1
Fluted-shell	Lasmigona costata	Threatened	None	1
Monkeyface	Quadrula metanevra	Threatened	None	1
Spike	Elliptio dilatata	Threatened	None	1
Stemless Tick-trefoil	Desmodium nudiflorum	Threatened	None	1
American Water- pennywort	Hydrocotyle americana	Special Concern	None	1
Black Sandshell	Ligumia recta	Special Concern	None	1
Louisiana Waterthrush	Parkesia motacilla	Special Concern	None	1
Round Pigtoe	Pleurobema sintoxia	Special Concern	None	1
Hickorynut	Obovaria olivaria	Tracked	None	1
Spiny Hornwort	Ceratophyllum echinatum	Tracked	None	1
Western Foxsnake	Pantherophis ramspotti	Tracked	None	1
White Baneberry	Actaea pachypoda	Tracked	None	1

As discussed in Section 5.6, a field survey of the Lawrence Creek facility would identify potentially impacted rare or unique natural resources.

As described in Section 5.5, the use of wildlife friendly mesh for erosion control can reduce the potential for reptiles becoming entangled that occurs with more typical types of erosion control mesh.

Figure 50: Lawrence Creek Project Detail

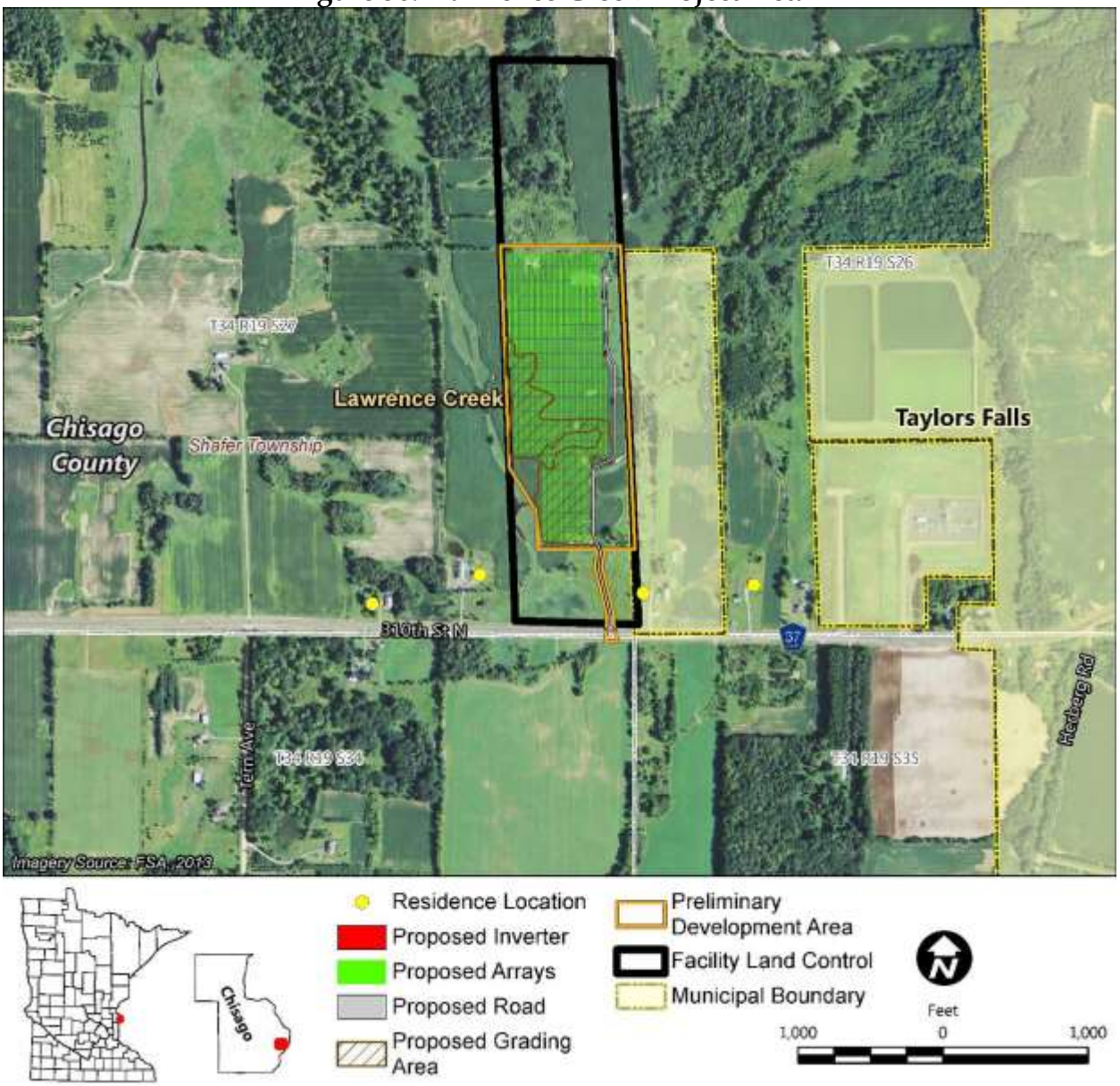


Figure 51: Lawrence Creek Land Cover Overview

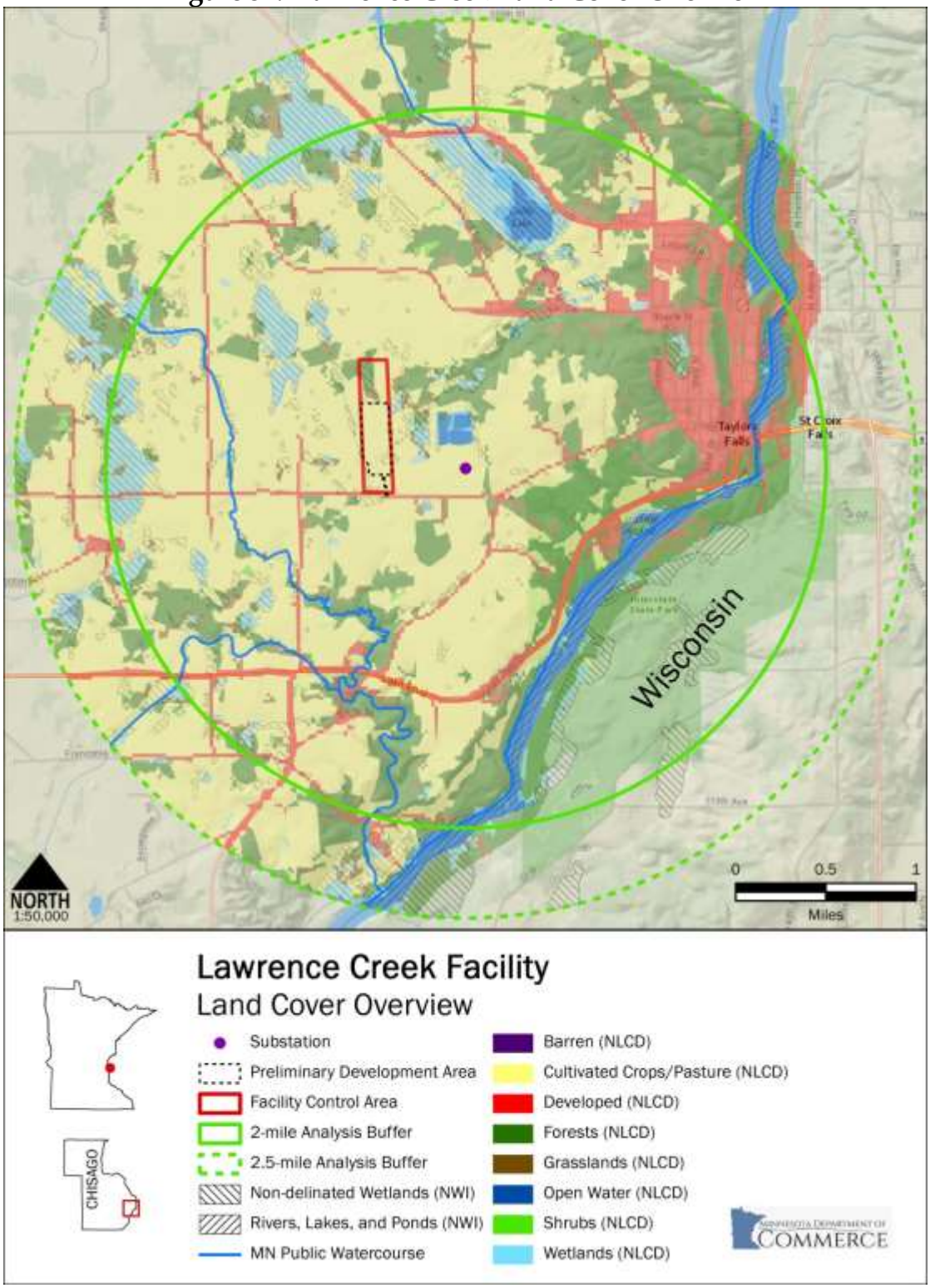


Figure 52: Lawrence Creek Generally Incompatible Areas

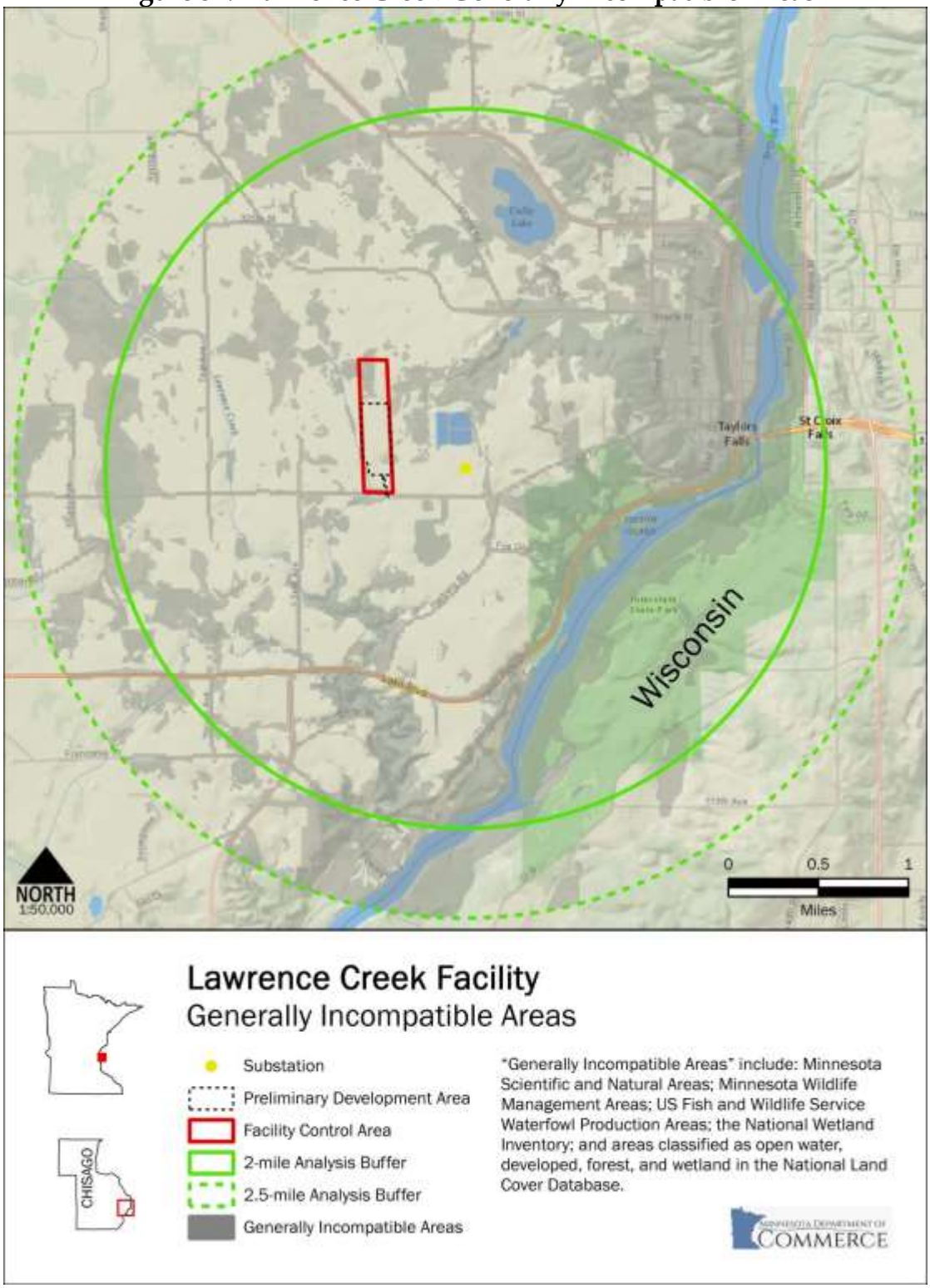
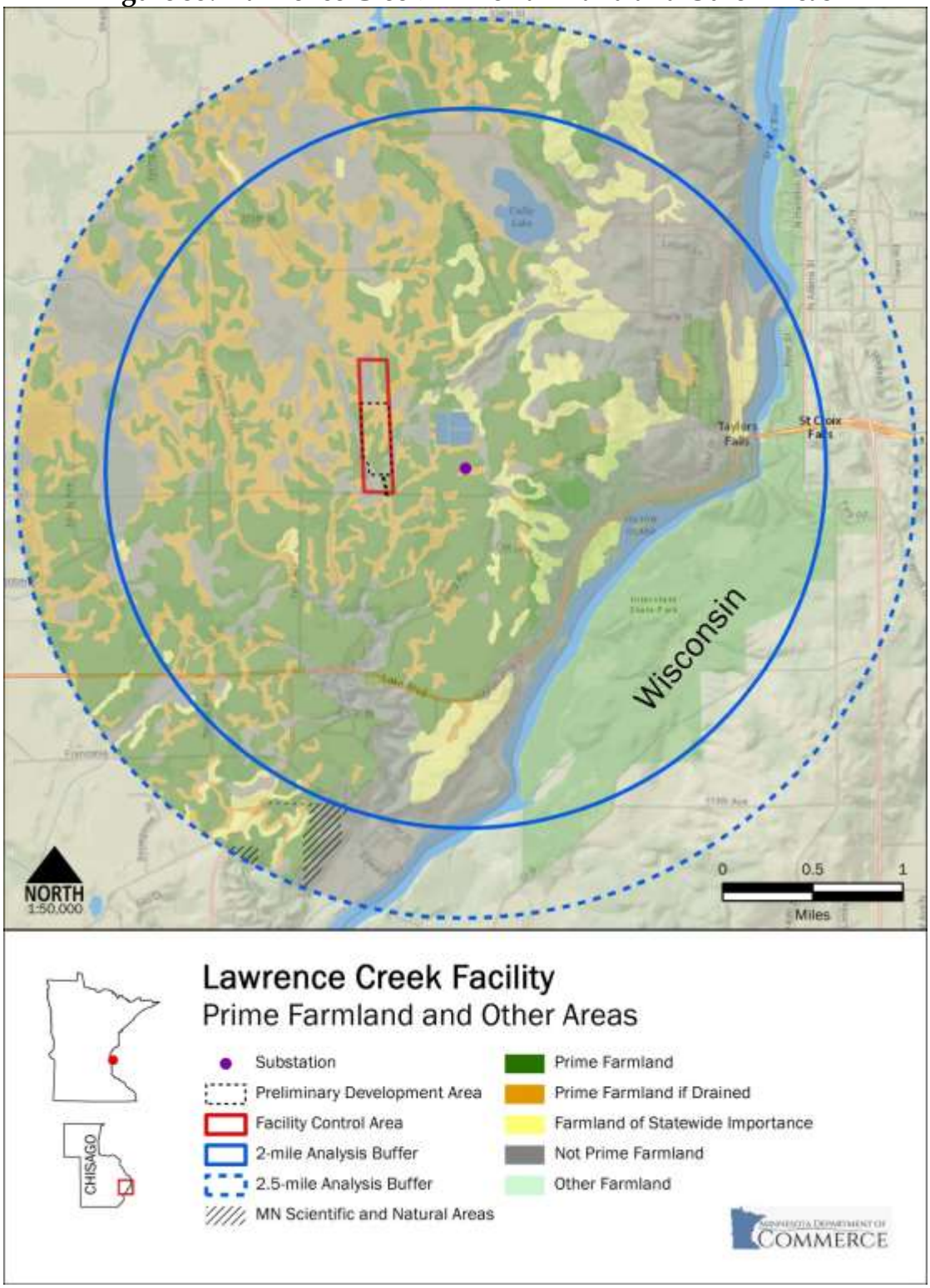


Figure 53: Lawrence Creek Prime Farmland and Other Areas



6.13 Lester Prairie

The proposed Lester Prairie facility has a capacity of 3.5 MW AC and is located in Section 25 of Winsted Township in McLeod County. The site is located northeast of the city of Lester Prairie, northeast of the intersection of State Highway 7 and County Highway 9. Aurora anticipates that the facility will be accessed through a newly constructed access road off of County Road 9. Preliminary plans anticipate a development area of approximately 26.0 acres within the 29.9 acres of Aurora's site control. Electricity from the facility will be delivered to Xcel Energy's Lester Prairie Substation located approximately one mile west of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 29) is dominated by cultivated crops (92.3 percent). The proposed facility location avoids the developed area around Lester Prairie to the south, but is otherwise similar to the predominantly agricultural in the study area surrounding the Lester Prairie Substation (Figure 55).

Table 29: Lester Prairie Facility

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	348.0	2.8%
Developed, Open Space	0.4	1.3%	0.1	0.4%	251.4	2.0%
Developed, Low Intensity	3.2	10.7%	1.8	6.8%	428.9	3.4%
Developed, Medium Intensity	-	-	-	-	209.6	1.7%
Developed, High Intensity	-	-	-	-	55.7	0.4%
Barren Land	-	-	-	-	3.5	--
Deciduous Forest	-	-	-	-	635.6	5.1%
Evergreen Forest	-	-	-	-	10.3	0.1%
Mixed Forest	-	-	-	-	4.5	--
Shrub/Scrub	-	-	-	-	252.5	2.0%
Grassland Herbaceous	-	-	-	-	73.4	0.6%
Pasture/Hay	0.3	1.1%	0.1	0.5%	2,734.3	21.8%
Cultivated Crops	26.0	87.0%	24.0	92.3%	7,348.4	58.5%
Woody Wetlands	-	-	-	-	15.9	0.1%
Emergent Herbaceous Wetlands	-	-	-	-	182.4	1.5%
Totals	**29.9**	**100.0%**	**26.0**	**100.0%**	**12,554.3**	**100.0%**

6.13.1 Effects on Human Settlement

The facility is located on a cultivated parcel in a rural area with scattered rural residences. The nearest home is located approximately 140 feet east of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned as Agricultural by McLeod County.[135]

A snowmobile trail maintained by the Crow River Sno Pros follows County Road 9, on the western edge of the proposed facility. There are no other recreational trails, state, county or local parks identified within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Lester Prairie facility.

6.13.2 Effects on Land Based Economies

The proposed facility would remove approximately 24 acres of farmland from agricultural use. Aurora's proposed West Waconia facility is located within 10 miles of the Lester Prairie facility; together the two facilities would remove approximately 97 acres from agricultural production in the region.

Approximately 11 acres (42 percent) of the developed area are considered to be prime farmland and 15 acres (59 percent) are considered to be prime farmland if drained (Table 13). Within the study area surrounding the Lester Prairie Substation, approximately 37 percent is considered to be prime farmland and 38 percent is considered to be prime farmland if drained. Given the preponderance of prime farmland or prime farmland if drained in the study area, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 57).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Lester Prairie facility.

6.13.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Lester Prairie facility. No mitigation measures beyond those identified in Section 5.4 are identified.

[135] McLeod County Zoning Map, http://co.mcleod.mn.us/department_files/Zoning/LandUseMap2009v12.pdf

6.13.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 did not identify any wetlands in the area of land control.[136]

The preliminary design for the facility anticipates grading of approximately 7.5 acres of the site during construction.[137]

No mitigation measures beyond those described in Section 5.5 are identified for the Lester Prairie facility.

6.13.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Lester Prairie facility.[138]

No mitigation measures beyond the field survey described in Section 5.6, are identified for the Lester Prairie facility.

[136] Appendix C
[137] Application, at Appendix F
[138] Application, at p. 81

Figure 54: Lester Prairie Project Detail

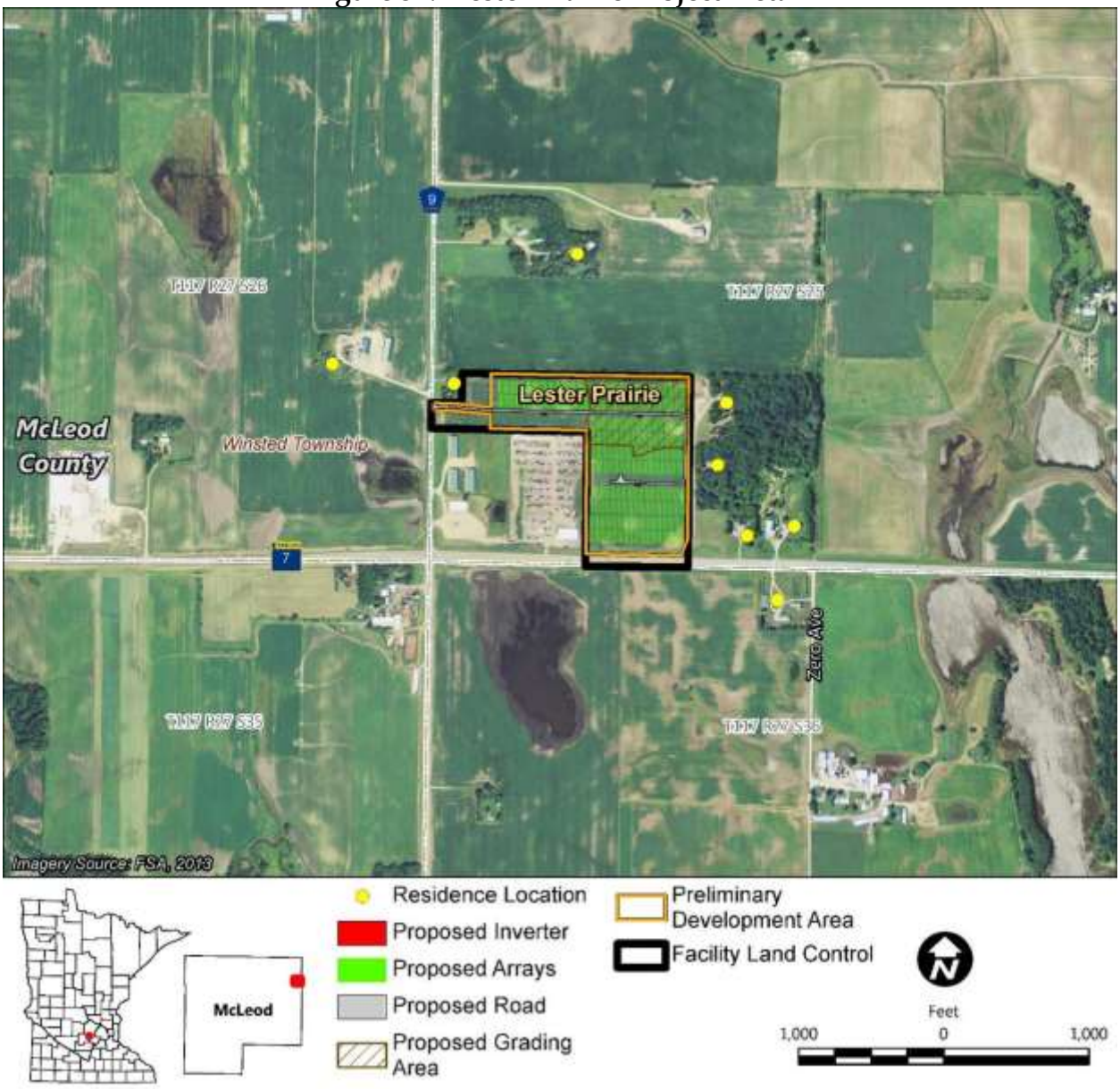


Figure 55: Lester Prairie Land Cover Overview

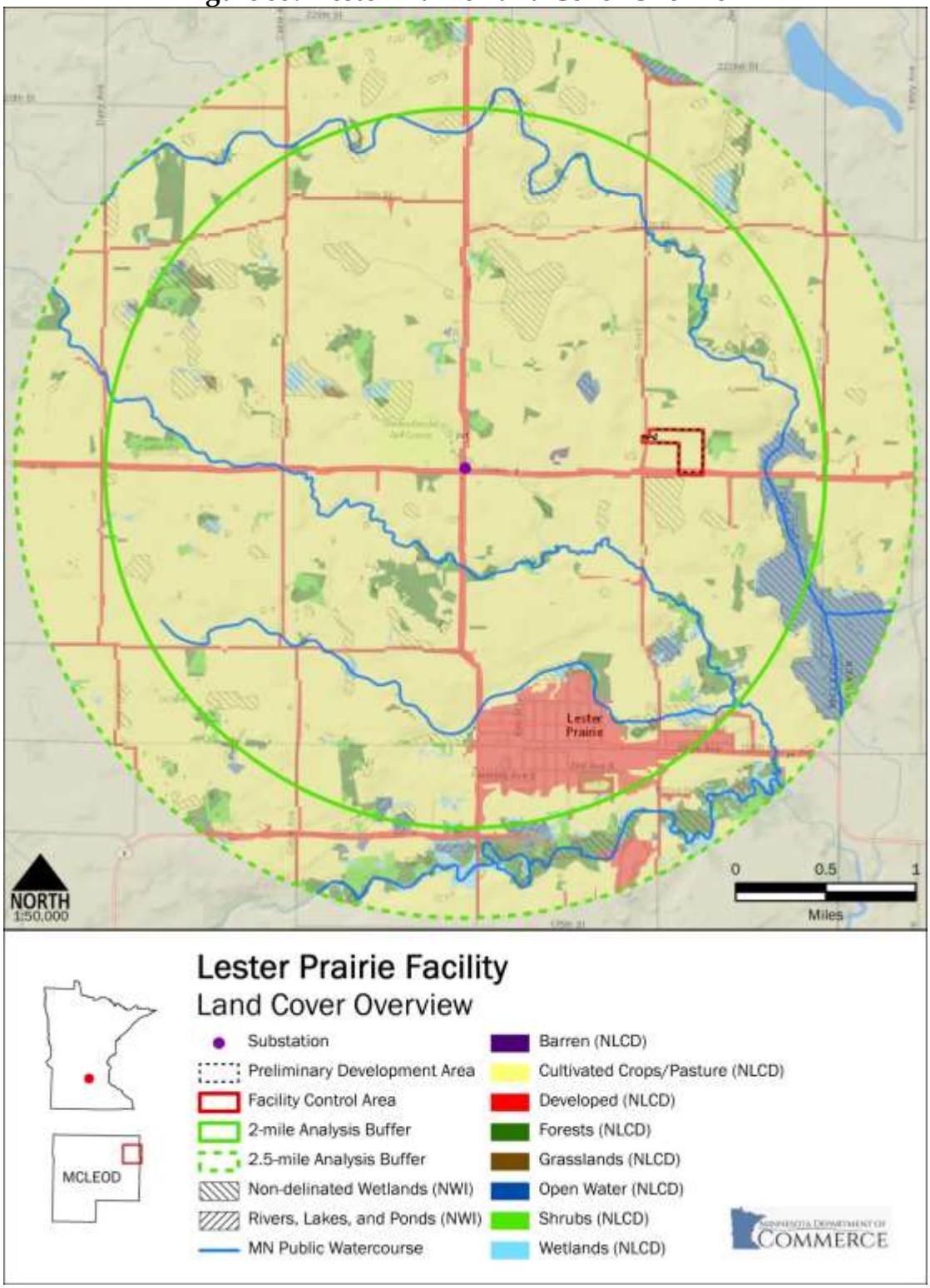


Figure 56: Lester Prairie Generally Incompatible Areas

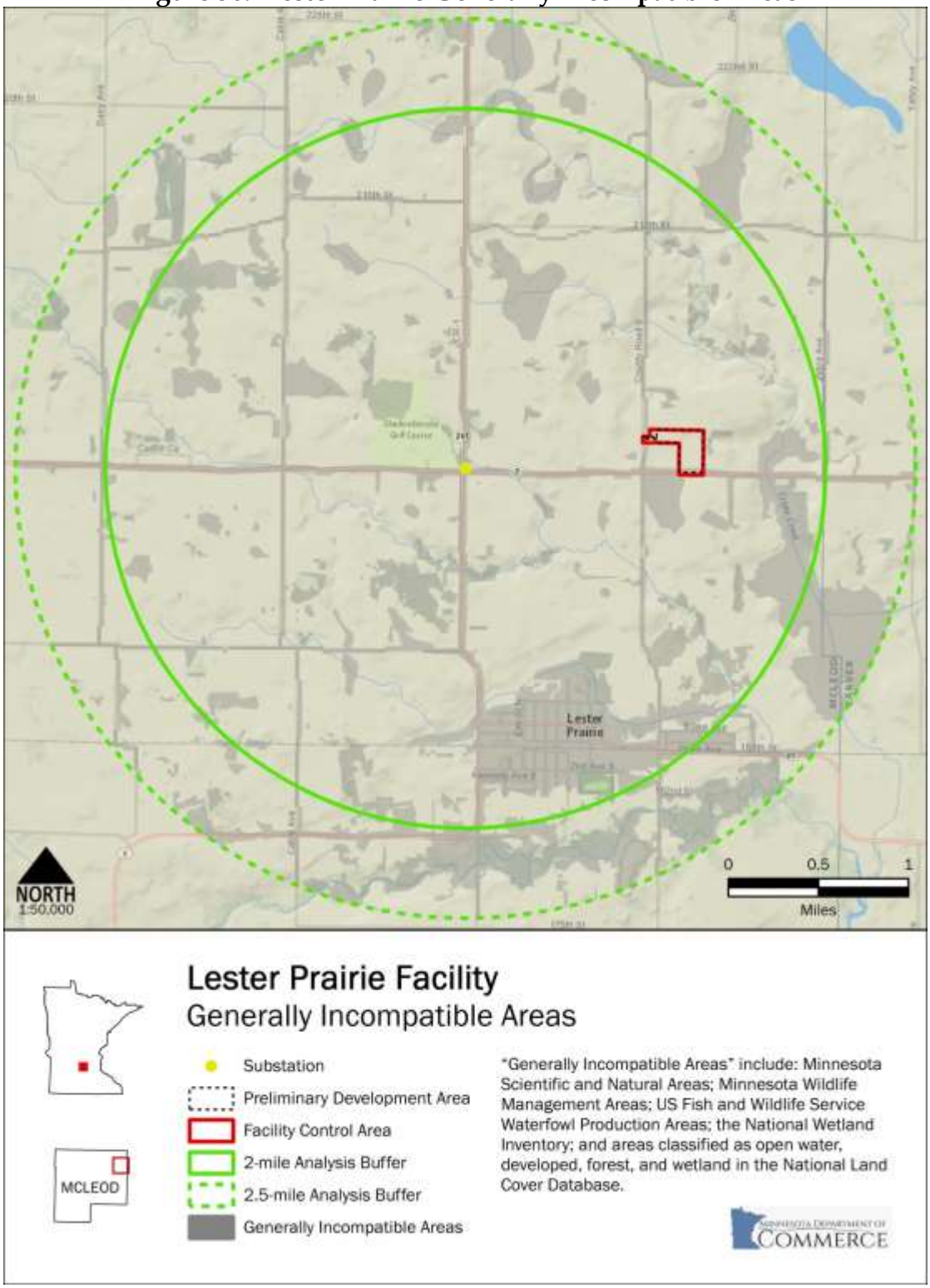
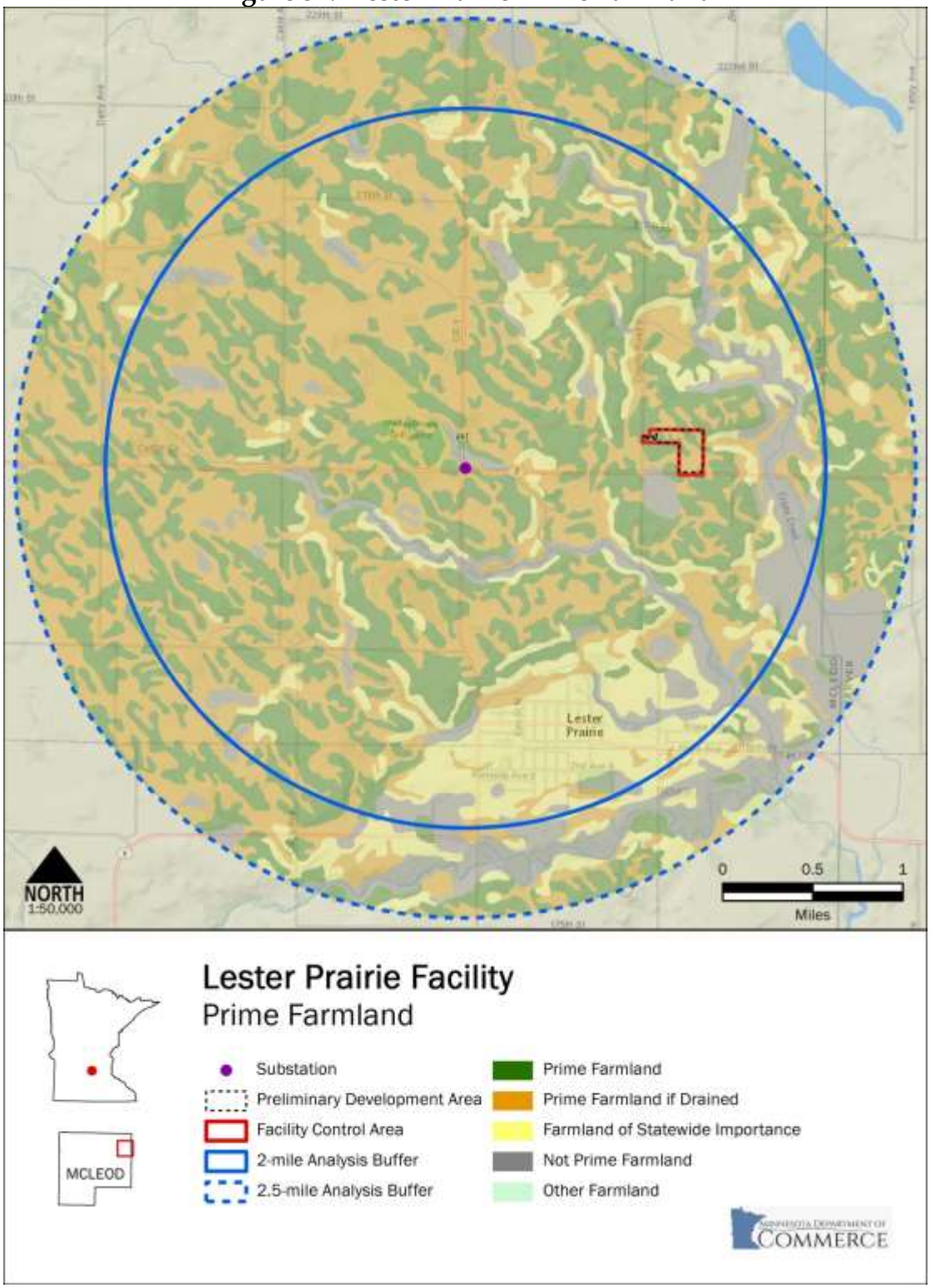


Figure 57: Lester Prairie Prime Farmland



6.14 Mayhew Lake

The proposed Mayhew Lake facility has a capacity of 4.4 MW AC and is located in Section 12 of Sauk Rapids Township in Benton County. The site is located northwest of the city of Sauk Rapids, northeast of the intersection of County Road 29 and County Road 57. Aurora anticipates that the facility will be accessed through a newly constructed access road off of County Road 57. Preliminary plans anticipate a development area of approximately 21.8 acres within the 36 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy Mayhew Lake Substation located approximately 180 feet east of the facility.

The facility is located within the Western Superior Uplands Section of the Laurentian Mixed Forest Province. Land cover within the preliminary development area (Table 30) is dominated by agricultural crops (49.5 percent cultivated crops and 44.6 percent pasture and haylands). The proposed location avoids the more developed areas of Sauk Rapids located to the west and the south and is similar in land cover to the agricultural areas located in the northern and northeastern portions of the study area (Figure 59).

Table 30: Mayhew Lake Facility

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	-	-	-	-	273.0	2.2%
Developed, Open Space	3.5	9.7%	1.1	5.1%	1,039.0	8.3%
Developed, Low Intensity	0.5	1.4%	0.2	0.8%	1,283.8	10.2%
Developed, Medium Intensity	1.1	3.0%	-	-	1,448.2	11.5%
Developed, High Intensity	-	-	-	-	291.2	2.3%
Barren Land	-	-	-	-	20.2	0.2%
Deciduous Forest	-	-	-	-	877.8	7.0%
Evergreen Forest	-	-	-	-	40.5	0.3%
Mixed Forest	-	-	-	-	3.7	--
Shrub/Scrub	-	-	-	-	24.2	0.2%
Grassland Herbaceous	-	-	-	-	239.1	1.9%
Pasture/Hay	19.6	54.5%	9.7	44.6%	2,774.4	22.1%
Cultivated Crops	11.3	31.5%	10.8	49.5%	3,213.7	25.6%
Woody Wetlands	-	-	-	-	38.9	0.3%
Emergent Herbaceous Wetlands	-	-	-	-	987.1	7.9%
Totals	**36.0**	**100.0%**	**21.8**	**100.0%**	**12,554.7**	**100.0%**

6.14.1 Effects on Human Settlement

The proposed facility is on a cultivated parcel in a rural area with scattered rural residences. One home is located within the preliminary development area and would be removed if the

facility is constructed. Outside of the preliminary development area the nearest home is located approximately 290 feet to the east.

The location is within an orderly annexation area between Sauk Rapids Township and the city of Sauk Rapids and is zoned as a "Sauk Rapids Annexation Area" by Benton County. The area of site control is designated as Single Family Residential in the *Sauk Rapids Transportation Plan*.[139] County Road 29 has been designated as a Growth Corridor.[140]

A snowmobile trail maintained by the Benton County Trails Association follows the ditch along County Road 29. The facility is located with the State-Designated Sauk Rapids-Rice Goose Refuge. There are no other recreational trails, state, county or local parks located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

Beyond the mitigation measures described in Section 5.2, Aurora has committed to providing sufficient notice of the project schedule with the landowner to allow for notice to the renters.[141] As the removal of the home is part of a voluntary agreement between Aurora and the landowner, no additional measures are proposed to mitigate the displacement.

No mitigation measures beyond those described in Section 5.2 are identified for the Mayhew Lake facility.

6.14.2 Effects on Land Based Economies

The proposed facility would remove approximately 21 acres of farmland from agricultural use for at least 25 years. EERA staff is not aware of any other solar facilities announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 9 acres (42 percent) of the developed area are considered to be prime farmland and 2 acres are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Mayhew Lake Substation, approximately 27 percent is considered to be prime farmland and 22 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Mayhew Lake facility as it is within an orderly annexation area.

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[139] City of Sauk Rapids, *Sauk Rapids Transportation Plan*. 2011 http://saukrapids.govoffice.com/vertical/Sites/%7B0431F973-8F1A-45B9-BC40-963EF7BF7919%7D/uploads/%7B0C3622A0-840E-4902-8AA4-A88BCB2B47C4%7D.PDF at Figure 10.
[140] Ibid. at Figure 8, Benton County Comments, September 29, 2014
[141] Application, at p. 40

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Mayhew Lake facility.

6.14.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Mayhew Lake facility. A barn located within the preliminary development area has not been surveyed.

If the Mayhew Lake facility is constructed, the barn would need to be evaluated for eligibility for the NRHP. If the barn is determined to be eligible for the NRHP, impacts could be mitigated through avoidance of the barn during construction or development of a mitigation plan in consultation with SHPO.

6.14.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 0.53 acres of Type 2 (wet meadow) wetlands within the area of site control.[142]

The preliminary design for the facility anticipates grading of approximately 5.6 acres of the site during construction.[143]

No mitigation measures beyond those described in Section 5.5 are identified for the Mayhew Lake facility.

6.14.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Mayhew Lake facility. The NHIS database review did show records for one state-listed tracked species (Cowbane (Oxypolis rigidior)) within one mile of the area of site control for the facility.[144]

DNR comments on the facility indicate that the facility is adjacent to a DNR public waters wetland and across the road form a “prairie rich fen,” a native plant community identified as a Site of Biodiversity Significance of moderate rank.[145]

[142] Appendix C
[143] Application, at Appendix F
[144] Application, at p. 81, Appendix I
[145] Application, at Appendix A

As discussed in Section 5.6, a field survey of the Mayhew Lake facility would identify potentially impacted rare or unique natural resources.

Figure 58: Mayhew Lake Project Detail

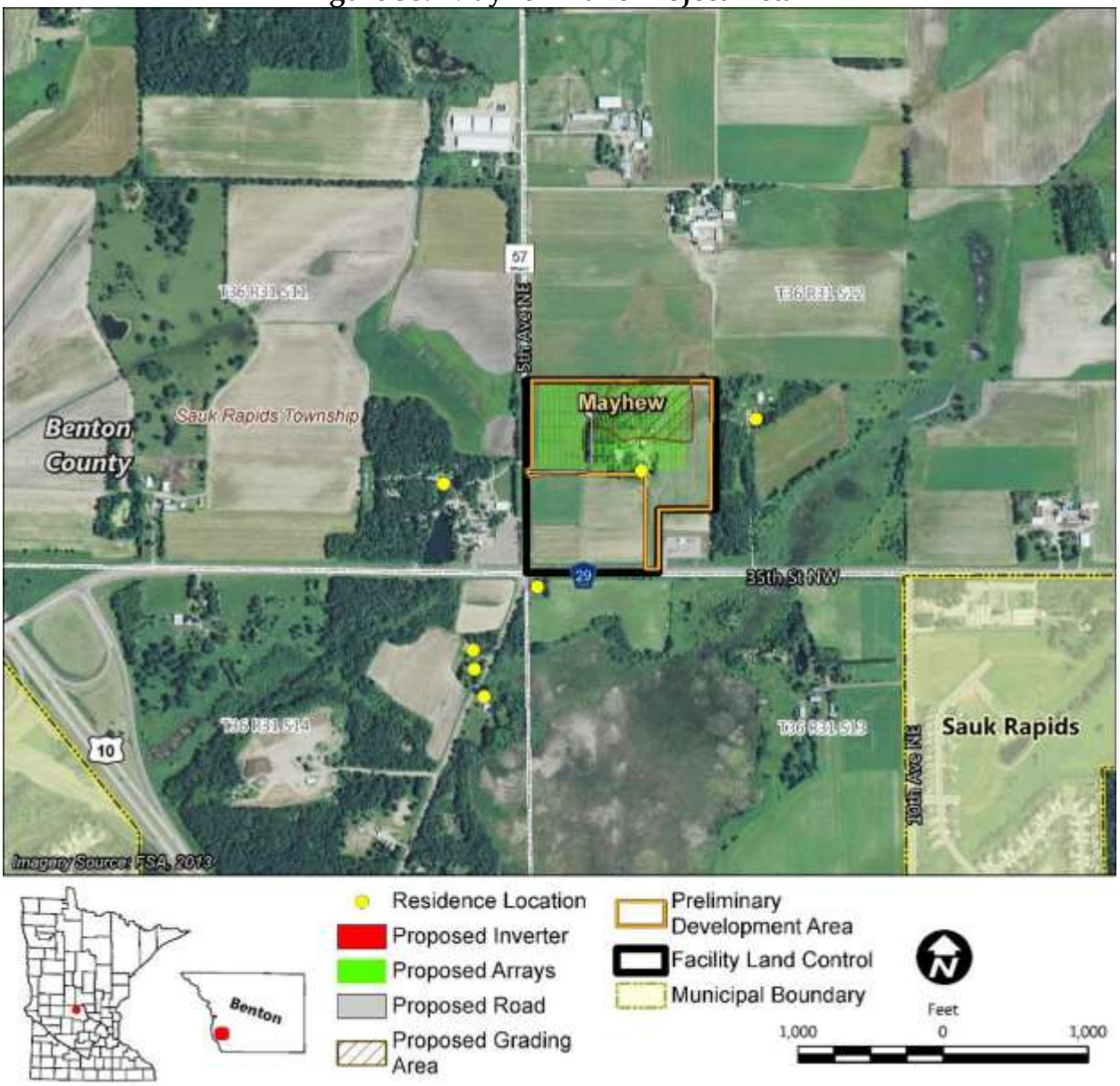


Figure 59: Mayhew Lake Land Cover Overview

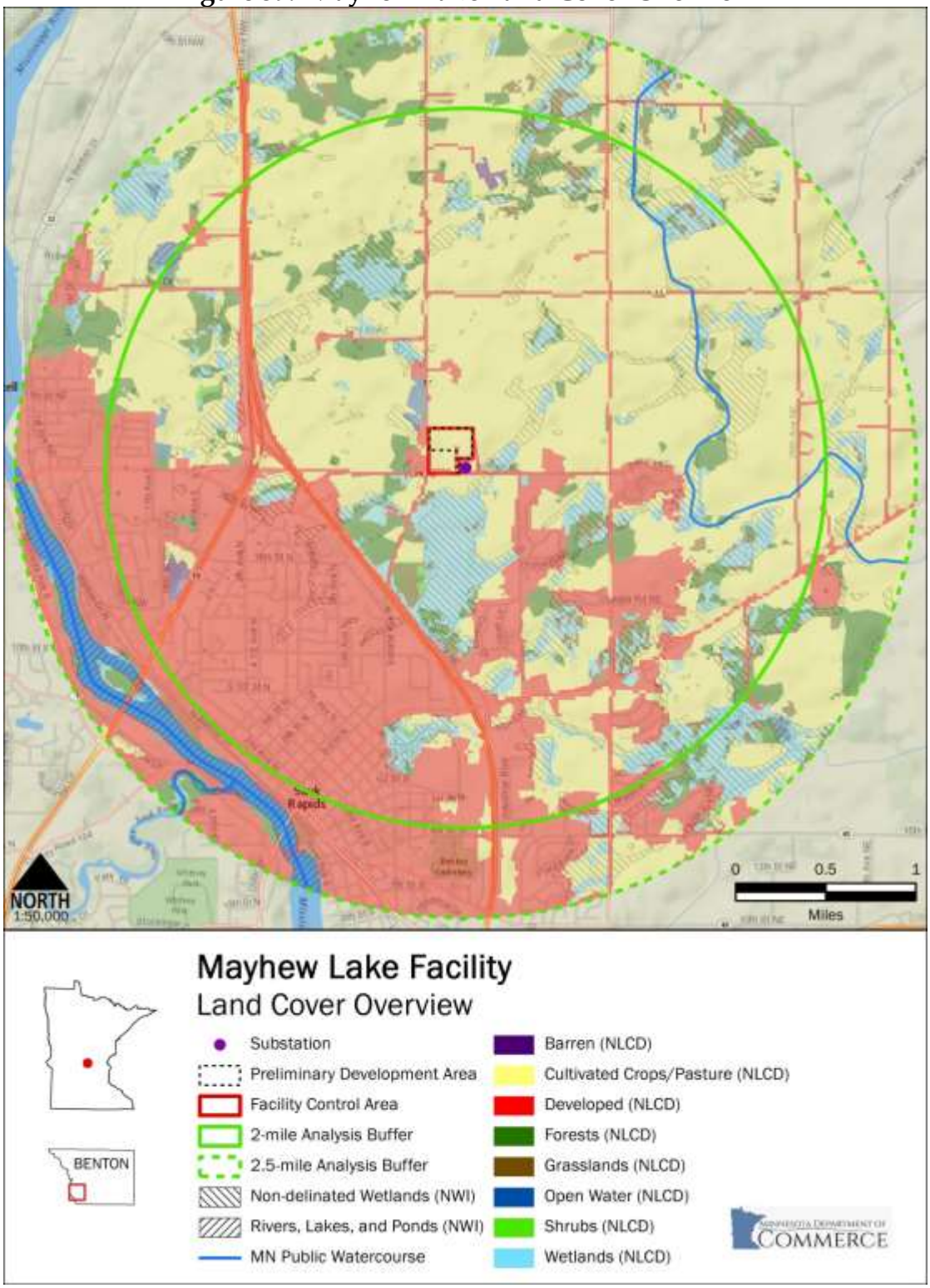


Figure 60: Mayhew Lake Generally Incompatible Areas

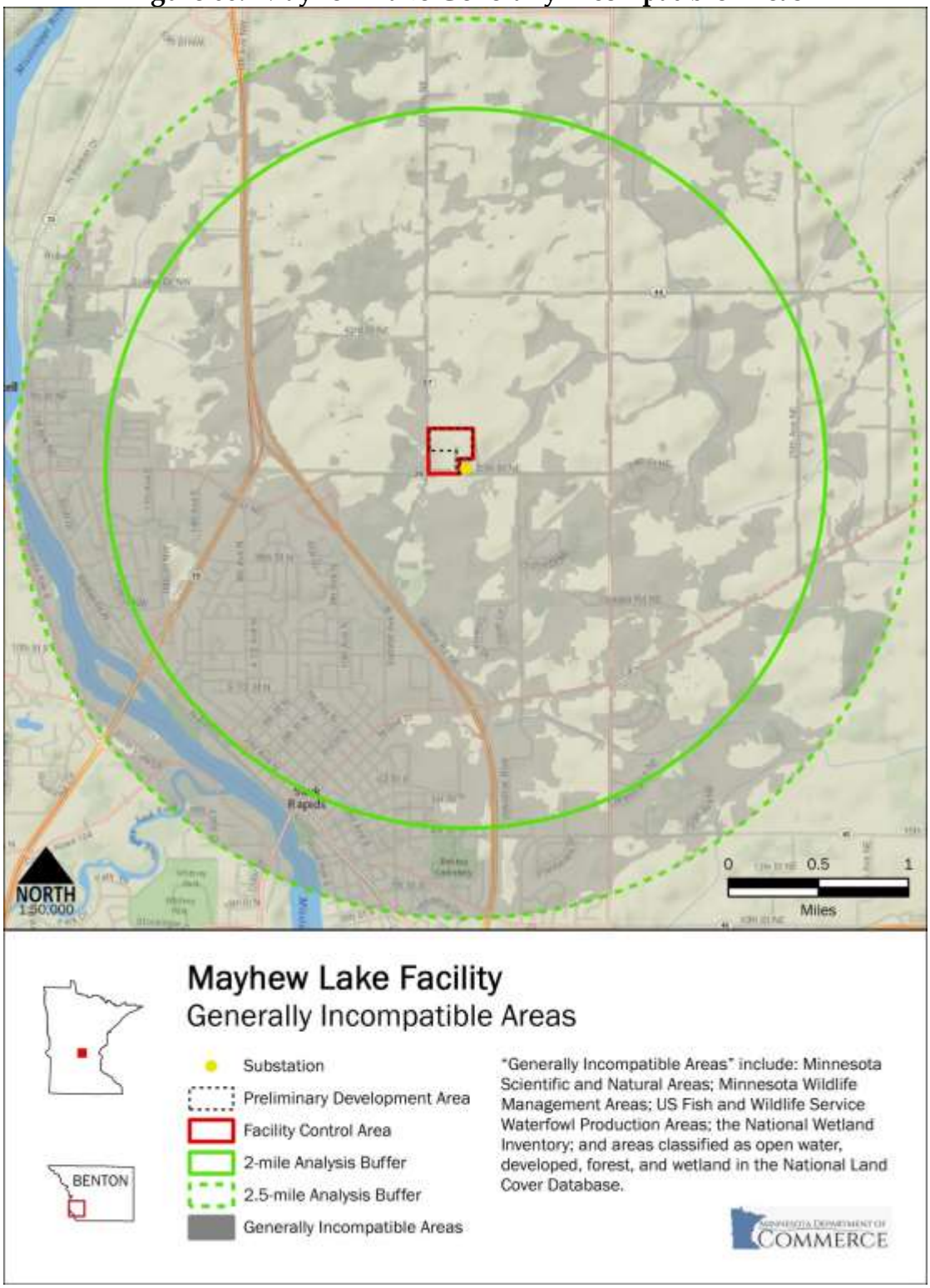
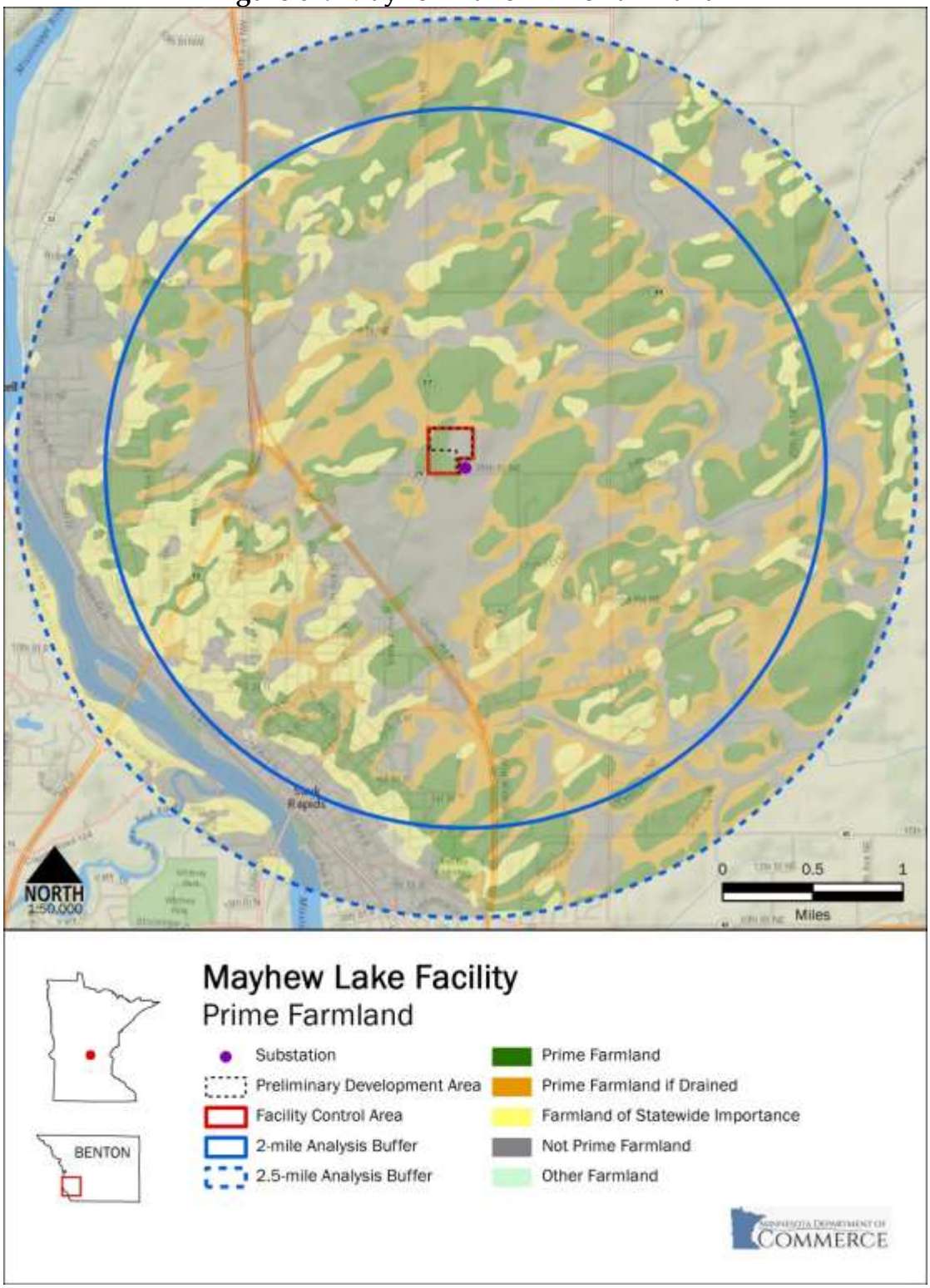


Figure 61: Mayhew Lake Prime Farmland



6.15 Montrose

The proposed Montrose facility has a capacity of 4.0 MW AC and is located in Section 2 of Woodland Township in Wright County. The site is located south of the city of Montrose, approximately one-half mile west of State Highway 25 and one-half mile south of State Highway 12, at the end of Bishop Avenue. Aurora anticipates that the facility will be accessed through a newly constructed extension of Bishop Avenue. Preliminary plans anticipate a development area of approximately 34.8 acres within the 37.7 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Montrose Substation located approximately 0.5 miles east of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 31) is dominated by agricultural cover (75 percent in cultivated crops and 20.2 percent in pasture and haylands). The proposed facility location avoids the developed area of Montrose located generally north of the facility and the lakes and associated wetlands to the west, otherwise the land cover is similar to the largely agricultural cover present in the study area (Figure 63).

Table 31: Montrose Facility

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	1,020.6	8.1%
Developed, Open Space	0.6	1.5%	0.6	1.6%	321.1	2.6%
Developed, Low Intensity	1.0	2.6%	1.0	2.9%	533.3	4.3%
Developed, Medium Intensity	--	--	--	--	362.0	2.9%
Developed, High Intensity	--	--	--	--	37.4	0.3%
Barren Land	--	--	--	--	--	--
Deciduous Forest	0.1	0.3%	0.1	0.3%	712.9	5.7%
Evergreen Forest	--	--	--	--	25.6	0.2%
Mixed Forest	--	--	--	--	4.6	--
Shrub/Scrub	--	--	--	--	203.7	1.6%
Grassland Herbaceous	--	--	--	--	107.8	0.9%
Pasture/Hay	9.5	25.1%	7.0	20.2%	2,430.2	19.4%
Cultivated Crops	26.5	70.5%	26.1	75.0%	6,411.9	51.1%
Woody Wetlands	--	--	--	--	7.1	0.1%
Emergent Herbaceous Wetlands	--	--	--	--	375.7	3.0%
Totals	**37.7**	**100.0%**	**34.8**	**100.0%**	**12,553.8**	**100.0%**

6.15.1 Effects on Human Settlement

The proposed facility is located on a cultivated parcel in a rural area with scattered rural residences. The nearest home is located approximately 83 feet north of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The location is within an orderly annexation area and is zoned as a Transitional Area by Wright County. Solar farms are not specifically addressed in the Wright County Zoning Ordinances.[146] The area of site control is designated as a Transition Area in the Wright County Land Use Plan.[147]

In addition to the snowmobile trail along the northern edge of the area of site control maintained by the Wright County Trails Association, several snowmobile trails and the Malardi Lake WMA are located within one mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

The preliminary development areas of several other facilities also overlap with snowmobile trails that are located in road ditches; these include the Annandale and Montrose facilities (trails maintained by Wright County Trails Association); Lester Prairie Facility (maintained by the Crow River Sno Pros); the Waseca Facility (maintained by the Waseca County Trails Association), and the Mayhew Lake Facility (maintained by the Benton County Trails Association). These trails likely will not be affected and would not need to be realigned; however, Aurora is coordinating with the trail associations for these trails as well.

No mitigation measures beyond those described in Section 5.2 are identified for the Montrose facility.

6.15.2 Effects on Land Based Economies

The proposed facility would remove approximately 27 acres of farmland from agricultural use. Aurora's proposed Annandale and Lake Pulaski facilities are also proposed in Wright County. If all three of the Aurora facilities were constructed, approximately 159 acres of farmland would be taken out of production for the useful life of the project (estimated to be at least 25 years).

Approximately 18 acres (51 percent) of the developed area are considered to be prime farmland and 16 acres (47 percent) are considered to be prime farmland if drained (Table 13 -- Within the comparison area surrounding the Montrose Substation, approximately 32 percent is considered to be prime farmland and 22 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Montrose facility as it is within an orderly annexation area.

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[146] Wright County Comments, September 25, 2014.
[147] Wright County, *Wright County Land Use Plan. 2011. http://www.co.wright.mn.us/184/Wright-County-Land-Use-Plan* , See Woodland County Land Use Plan http://www.co.wright.mn.us/DocumentCenter/Home/View/254

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Montrose facility.

6.15.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Montrose facility. No mitigation measures beyond those described in Section 5.4 are identified for the Montrose facility.

6.15.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 identified approximately 0.35 acres of wetlands within the preliminary development area; 0.07 acres of Type 2 and 3 (wet meadow and shallow marsh), 0.02 acres of Type 3 (shallow marsh), 0.11 acres of Type 6 (shrub swamp) and 0.15 acres of Type 7 (wooded swamp).[148]

The preliminary design for the facility anticipates grading of approximately 22.6 acres of the site during construction.[149]

No mitigation measures beyond those described in Section 5.3 are identified for the Montrose facility.

6.15.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Mayhew Lake facility. The NHIS database review did show records for one state-listed special concern species (Trumpeter Swan (Cygnus buccianator)) within one mile of the area of site control for the facility.[150]

No mitigation measures beyond the field survey described in Section 5.6, are identified for the Montrose facility.

[148] Appendix C
[149] Application, at Appendix F
[150] Application, at p. 81, Appendix I

Figure 62: Montrose Project Detail

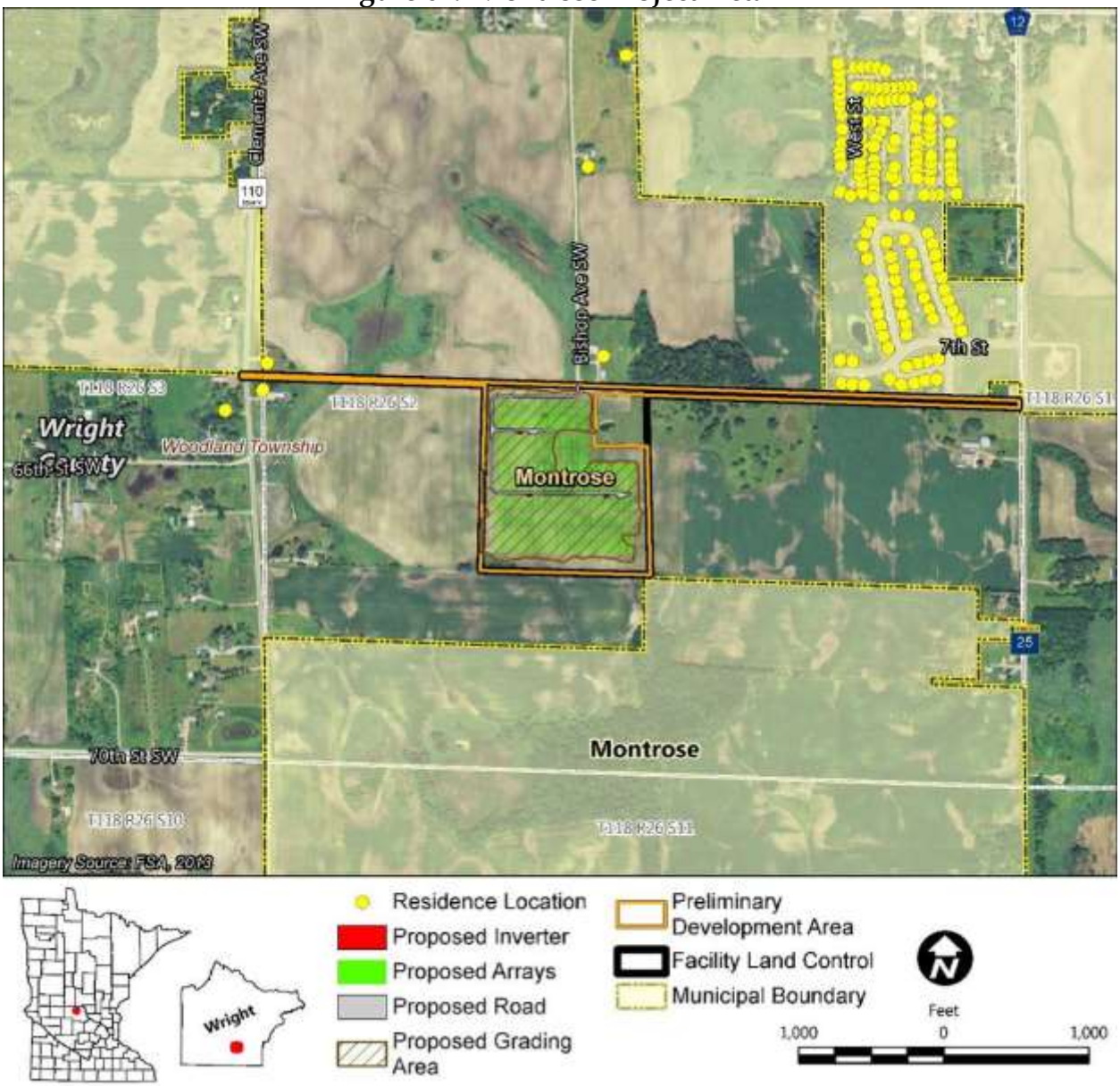


Figure 63: Montrose Land Cover Overview

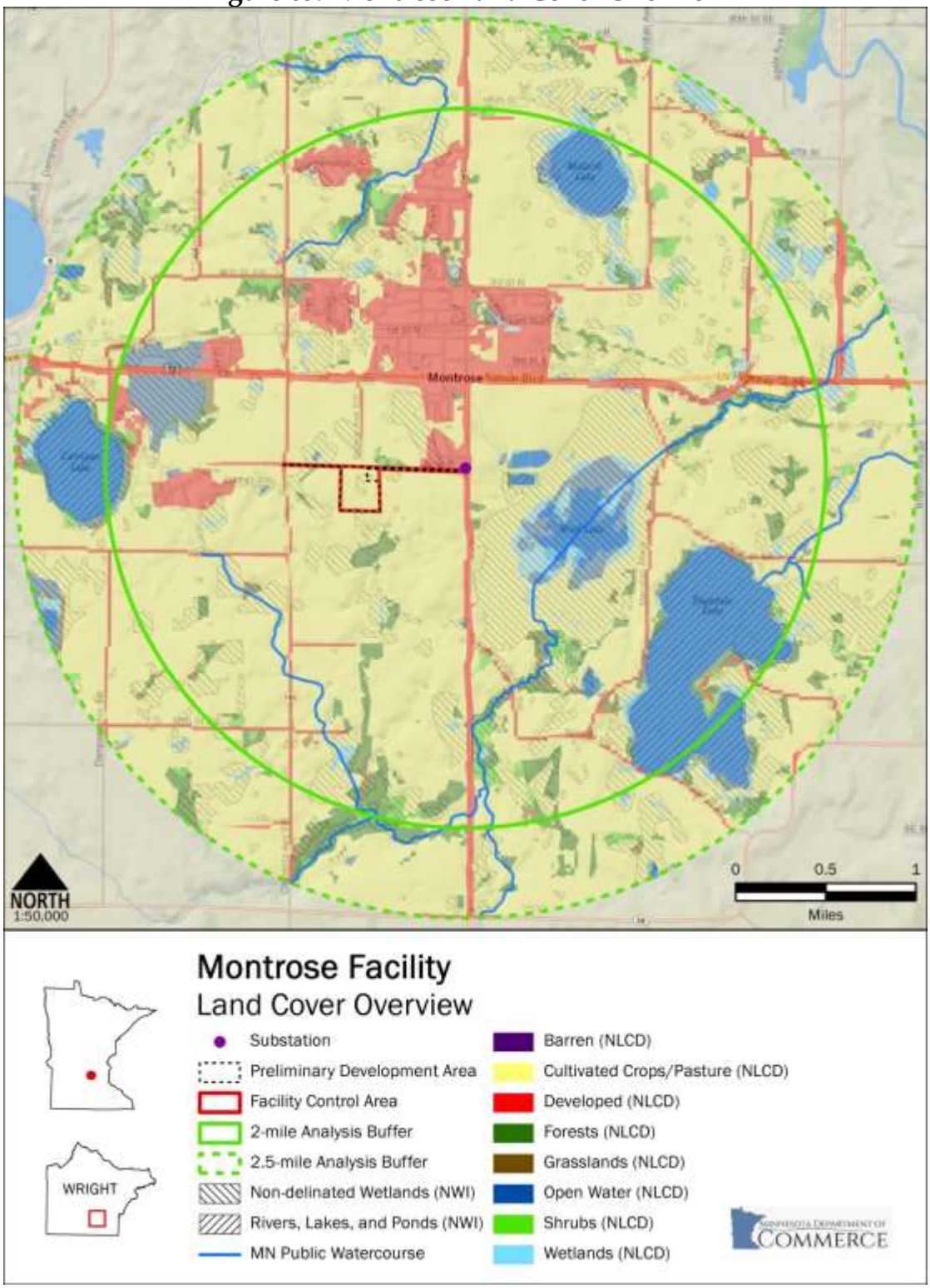


Figure 64: Montrose Generally Incompatible Areas

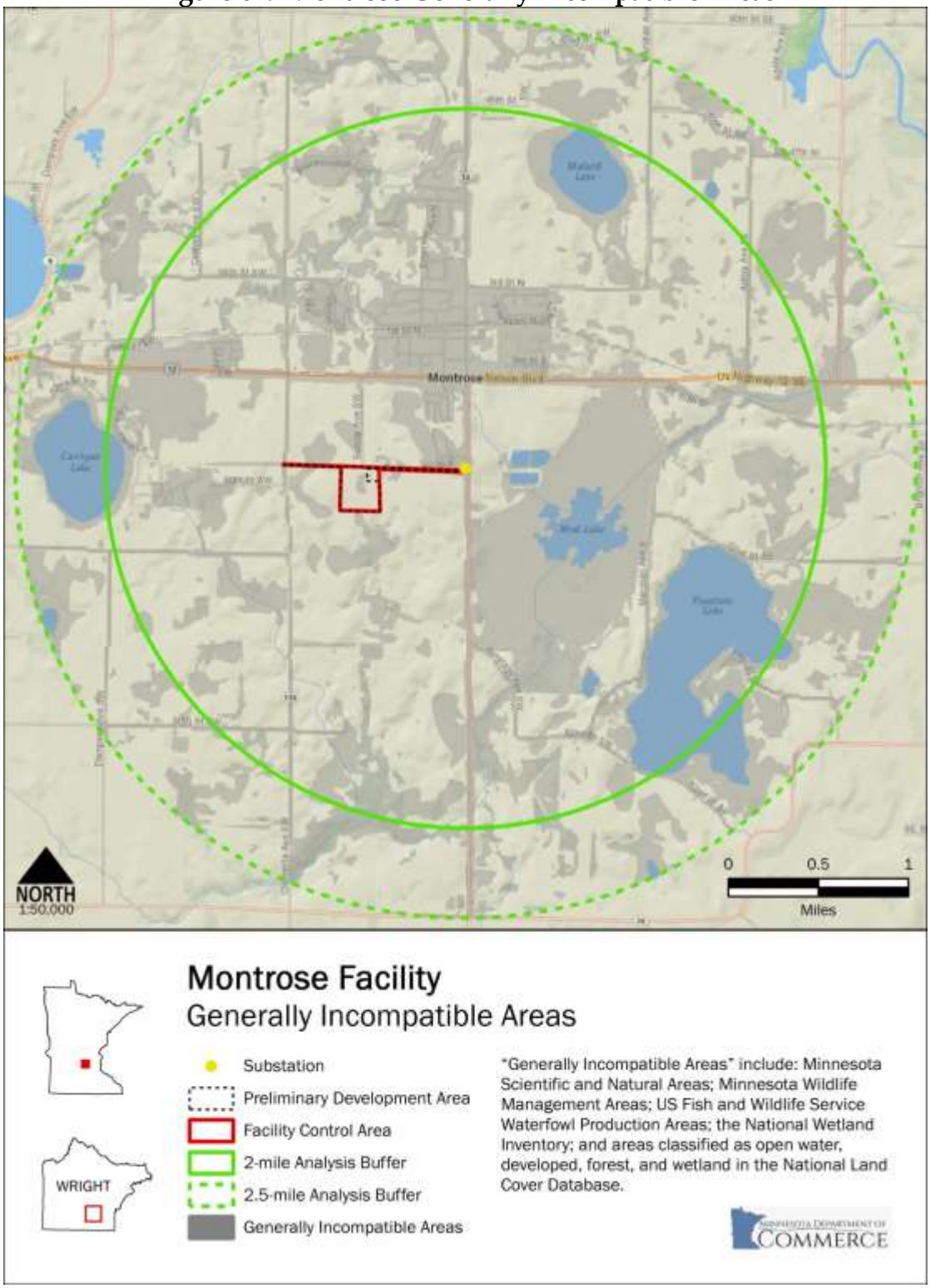
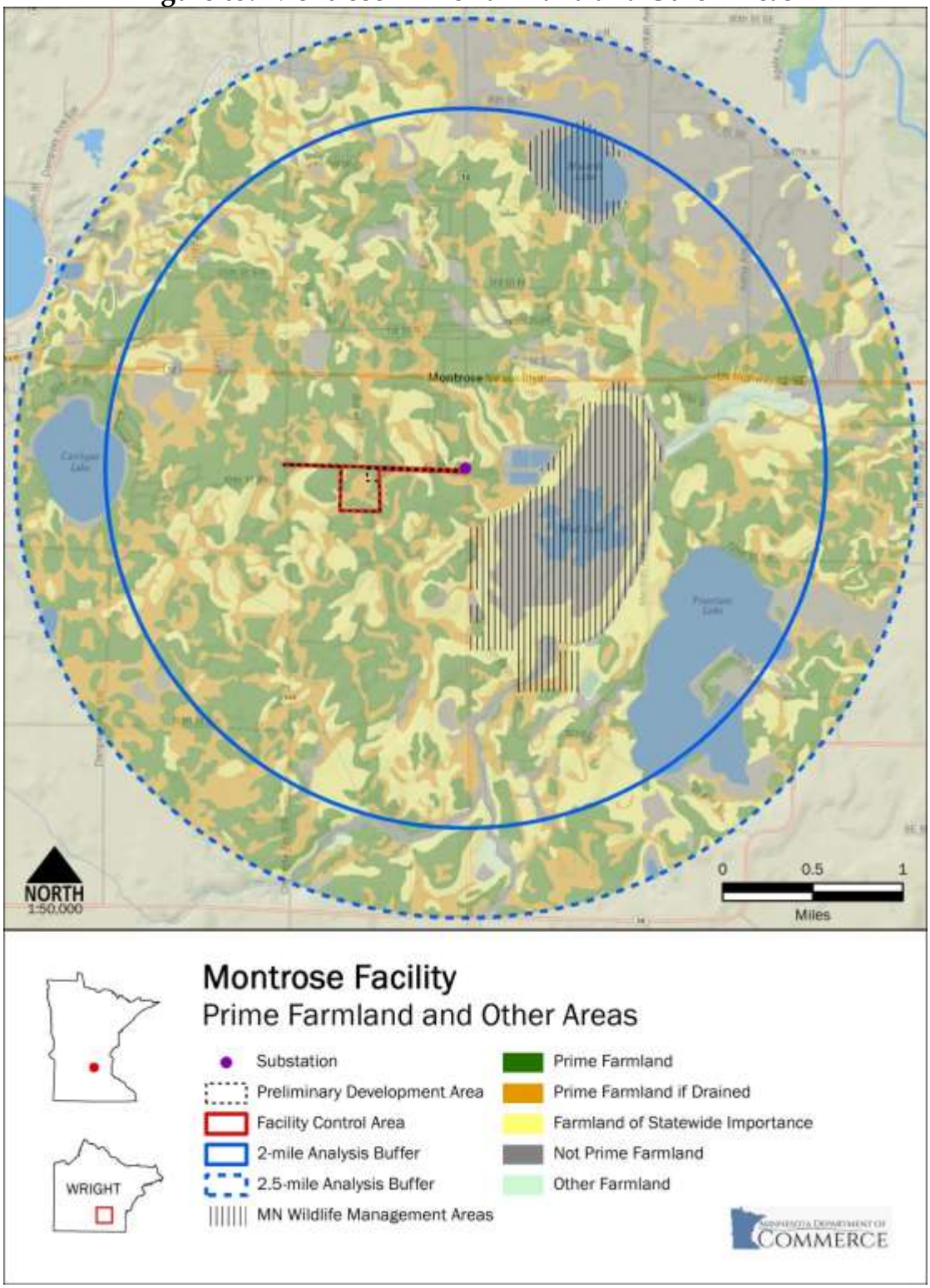


Figure 65: Montrose Prime Farmland and Other Areas



6.16 Paynesville

The proposed Paynesville facility has a capacity of 10.0 MW AC and is located north of Paynesville in Sections 8 and 9 of Paynesville Township in Stearns County. The site is located on either side of 293rd Avenue, north of Minnesota State Highway 23. Aurora anticipates that the western portion of the facility will be accessed through a newly constructed access road off of 293rd Avenue, while the eastern portion of the facility would be accessed through a newly constructed access road off of 185th Street.
Preliminary plans anticipate a development area of approximately 108.4 acres within the 261.9 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Paynesville Substation located approximately 480 feet east of the facility.

The facility is located within the North-Central Glaciated Plains Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 32) is dominated by agricultural vegetation (46.8 percent in cultivated crops and 43.4 percent in pasture and haylands). The proposed facility location avoids the developed area of Paynesville, generally located south of State Highway 23 and the WMAs located to the east and northeast; otherwise the proposed location is similar to the northern portion of the study area around the Paynesville Substation in the dominance of agricultural lands with large wetland complexes (Figure 68).

Table 32: Paynesville Facility

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	231.4	1.8%
Developed, Open Space	8.8	4.0%	4.2	3.9%	560.8	4.5%
Developed, Low Intensity	4.9	2.2%	2.1	2.0%	415.2	3.3%
Developed, Medium Intensity	--	--	--	--	380.2	3.0%
Developed, High Intensity	--	--	--	--	121.4	1.0%
Barren Land	--	--	--	--	9.3	0.1%
Deciduous Forest	27.4	12.2%	1.3	1.2%	983.4	7.8%
Evergreen Forest	--	--	--	--	8.4	0.1%
Mixed Forest	--	--	--	--	4.8	--
Shrub/Scrub	--	--	--	--	11.2	0.1%
Grassland Herbaceous	2.9	1.3%	0.4	0.3%	404.1	3.2%
Pasture/Hay	79.3	35.5%	47.0	43.4%	2,157.5	17.2%
Cultivated Crops	86.1	38.5%	50.8	46.8%	6,804.2	54.2%
Woody Wetlands	6.7	3.0%	2.2	2.0%	97.7	0.8%
Emergent Herbaceous Wetlands	7.4	3.3%	0.5	0.5%	368.4	2.9%
Totals	**223.6**	**100.0%**	**108.0**	**100.0%**	**12,557.8**	**100.0%**

6.16.1 Effects on Human Settlement

The location is a cultivated parcel in a rural area with scattered rural residences located just north of the Paynesville municipal boundary. The nearest home is located approximately 1,405 feet northwest of the preliminary development area. The site is zoned as Transitional District T-20 by Stearns County. The T-20 District was created to provide limited residential development opportunity on marginal farmland. Stearns County considers the T-20 District to be a "closed district" and no additional land will be added to the district. Stearns County has a Solar Energy Ordinance that permits solar farms as a conditional use in certain zoning districts, but solar farms are not allowed in the Transitional T-20 District.[151] The area of site control is designated as Agricultural in the *Stearns County 2030 Comprehensive Plan*.[152]

Construction of the facility would result in the removal of one abandoned home (Figure 66).

[151] Stearns County, *Land Use and Zoning Ordinance#439*. 2014. http://www.co.stearns.mn.us/Portals/0/docs/Document%20Library/ordinances/ord439.pdf, see Section 9.4
[152] *Stearns County 2030 Comprehensive* Plan, March 2008, http://www.co.stearns.mn.us/Government/CountyDevelopment/StearnsCountyComprehensivePlan
See Figure A-4, "Cluster Area 4: South Central: Future Land Use Plan" http://www.co.stearns.mn.us/Portals/0/docs/CompPlan/CompPlanFigureA4.pdf ,

Figure 66: Abandoned Home at Paynesville Site

A snowmobile trail runs along the northwestern edge of the western portion of the preliminary development area.[153] The Spirit Prairie WMA, (Figure 70), is located just northeast of the facility. There are no county, states, or local parks located within one-half mile of the proposed facility. Visitors to the Spirit Prairie WMA may experience noise during construction. Operation of the facility would not impact the use of nearby recreational resources.

6.16.2 Effects on Land Based Economies

The proposed facility would remove approximately 98 acres of farmland from agricultural use. Geronimo Energy has applied to Stearns County for a Conditional Use Permit for the 15 MW Paynesville Community Solar Garden Project on a parcel adjacent and to the north of the proposed Paynesville facility. Geronimo anticipates a developed area of 100 acres for the Paynesville Community Solar Garden Project. Along with the proposed Albany and Brooten facilities that are part of the Aurora Distributed Solar Project, Together the four

[153] Application, at Appendix B

projects would result in the cumulative reduction of approximately 316 acres of agricultural land for at least 25 years.

Approximately 3 acres (2.6 percent) are considered to be prime farmland if drained (Table 13). Within the study area surrounding the Paynesville Substation, approximately 14 percent is considered to be prime farmland and 9 percent is considered to be prime farmland if drained. If the proposed facility were developed to its anticipated design of 10 MW, the facility would use approximately 0.3 acres of prime farmland if drained per MW. As discussed in Section 6.16.4, the presence of wetlands within the area of site control may result in a final design of less than 10 MW. Given the relative scarcity of prime farmland or prime farmland if drained in the study area, it is unlikely that any alternate locations would be sited on prime farmland or prime farmland if drained (Figure 70).

Although there is a gravel pit located northwest of the area of site control, the proposed project would not impact any mining or mineral extraction activity. Construction and operation of the facility would not result in impacts to forest resources of economic importance. The proposed project would not impact tourism or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Paynesville facility.

6.16.3 Effects on Archaeological and Historic Resources

Although one archaeological site was identified in a survey of the Paynesville facility, the SHPO concluded the identified site is not eligible for listing on the NRHP. No mitigation measures beyond those identified in Section 5.4 are identified for the Paynesville facility.

6.16.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Preliminary design information for the Paynesville facility anticipates a grading area of approximately 14.3 acres.[154]

The Spirit Prairie WMA, located immediately northeast of the facility, provides an important wintering area for resident wildlife including deer and pheasants.

Field delineations performed in the summer of 2014 identified approximately 36 acres of wetlands within 108 acre preliminary development area; 6.07 acres of Type 1 (seasonally flooded basins or floodplains, 0.45 acres of Type 2 (wet meadow), 23.63 acres of Type 3 (shallow marsh) and 12.32 acres of Type 6 (shrub swamp).[155]

[154] Application, at Appendix F
[155] Appendix C

The preliminary design for the facility anticipates grading of approximately 16.5 acres of the site during construction.[156]

As noted in Section 5.5.4 of this document, Section 5.2 of the Site Permit Template prepared by Commission staff in this matter prohibits placement of panels and associated facilities in public waters wetlands as defined in Minnesota Statues section 103G.005, subdivision 15(a). Field delineations identified a Type 3 wetland of approximately 13.1 acres (as well as two smaller Type 3 wetlands of approximately 3.7 and 6.7 acres) at the Paynesville location; placement of panels and associated facilities would be precluded in at least the largest of the Type 3 wetlands identified in the delineation.

6.16.5 Effects on Sensitive Natural Resources

There is a narrow strip of floodplain forest, identified in the Minnesota Biological Survey as a Site of High Biodiversity Significance, adjacent to the proposed development area of the Paynesville facility.[157]

A review of the NHIS database did not identify any documented instances of state or federally listed endangered or threatened species within the preliminary development area of the Paynesville facility. The NHIS database review did show records for one state-listed threatened (Wilson's Phalarope (Phalaropus tricolor)), three special concern species (Marbled Godwid (Limosa fedoa), Regal Fritallary (Speyeria idalia) and Small White Lady's-slipper (Cypripedium candidum)), and one tracked species (Upland Sandpiper (Bartramia longicauda)) within one mile of the area of site control for the facility.[158]

Although no NHIS Rare Species are documented within the preliminary development area, the facility does offer suitable habitat. A field survey for the small white lady's slipper at the facility in June 2014 did not document any occurrences of the plant.

As discussed in Section 5.6, a field survey of the Paynesville facility would identify potentially impacted rare or unique natural resources.

[156] Application, at Appendix F
[157] DNR Comment Letter, September 30, 2014,
[158] Application, at p. 81, Appendix I

Figure 67: Paynesville Project Detail

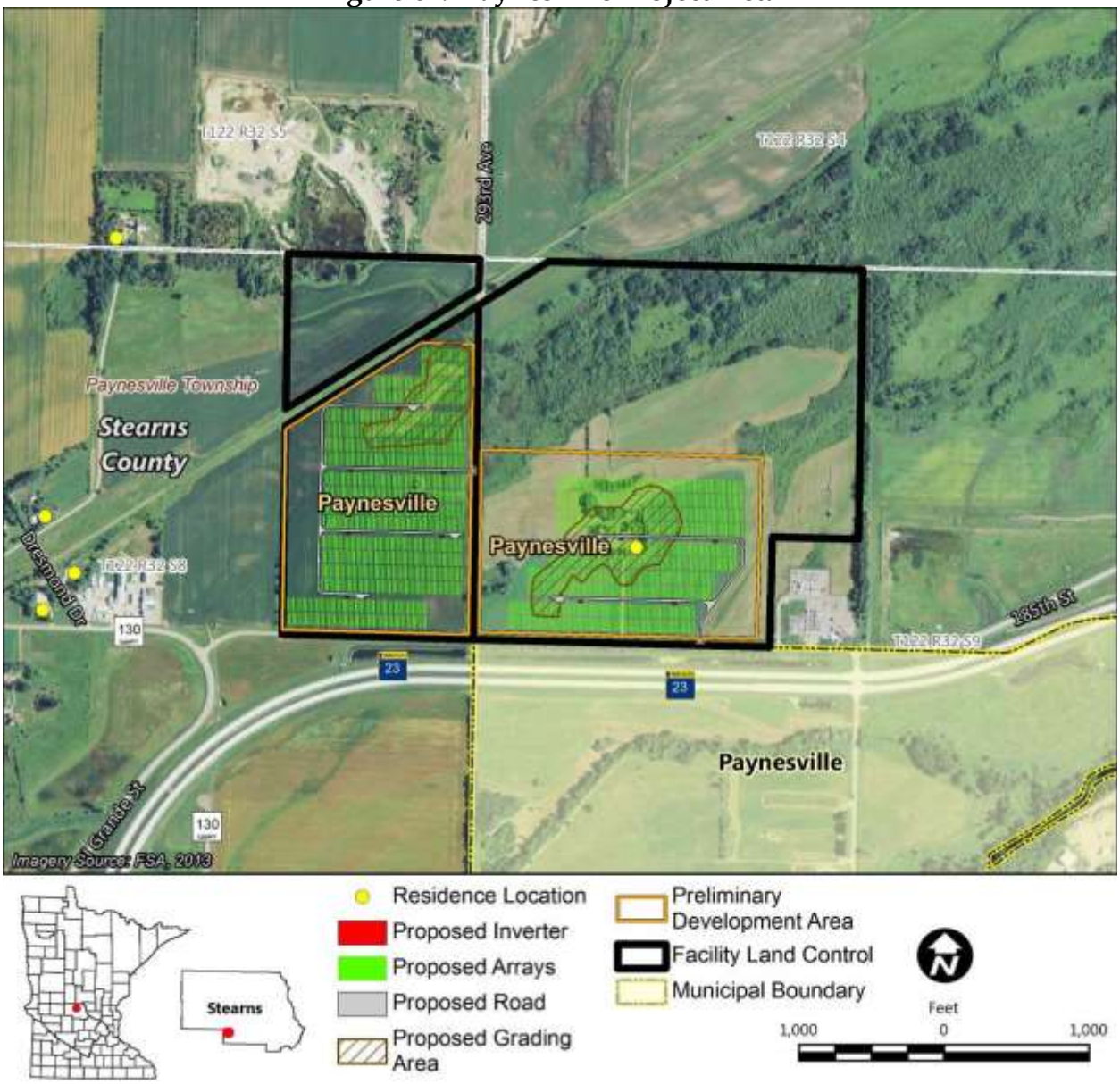


Figure 68: Paynesville Land Cover Overview

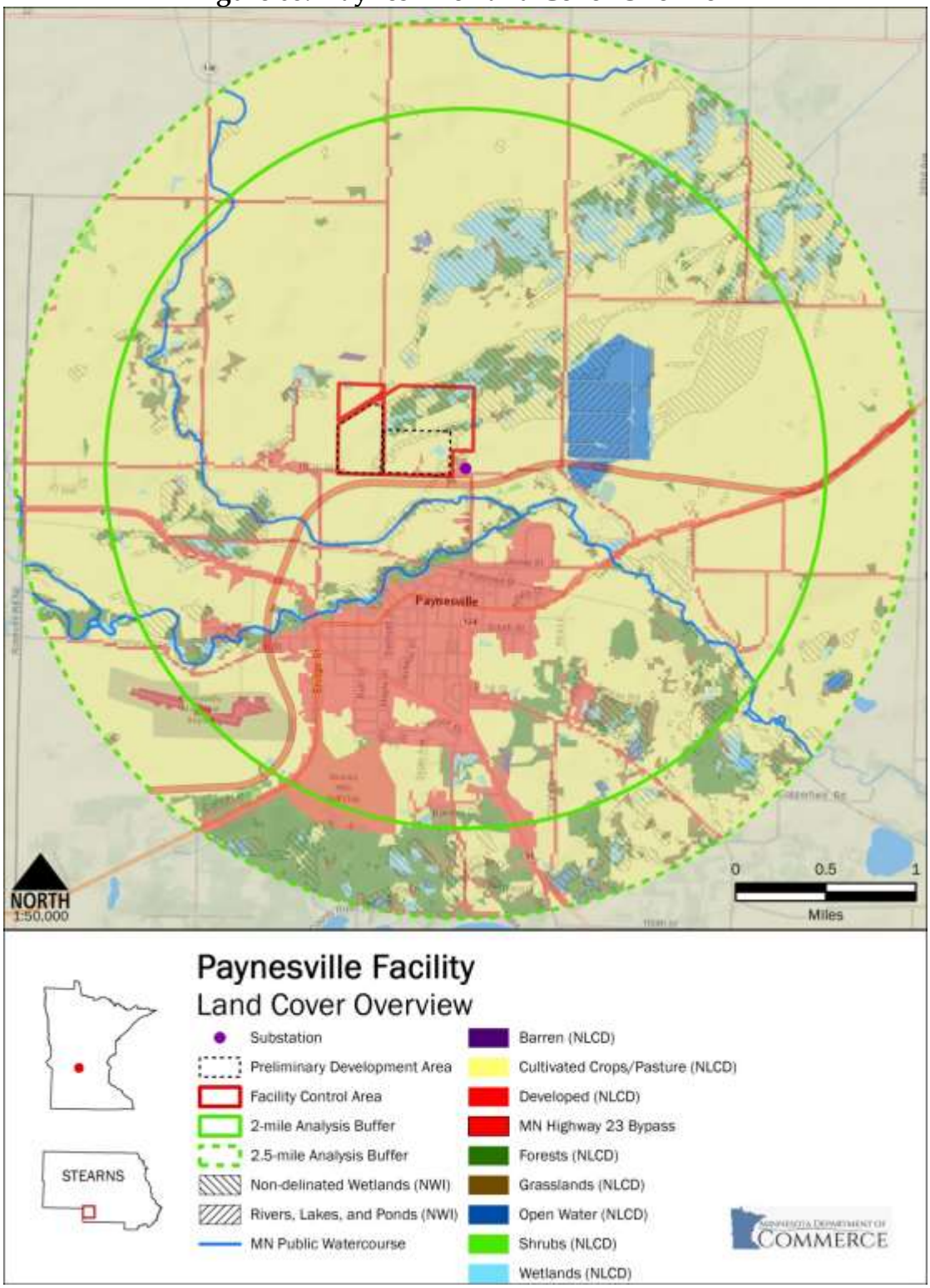


Figure 69: Paynesville Generally Incompatible Areas

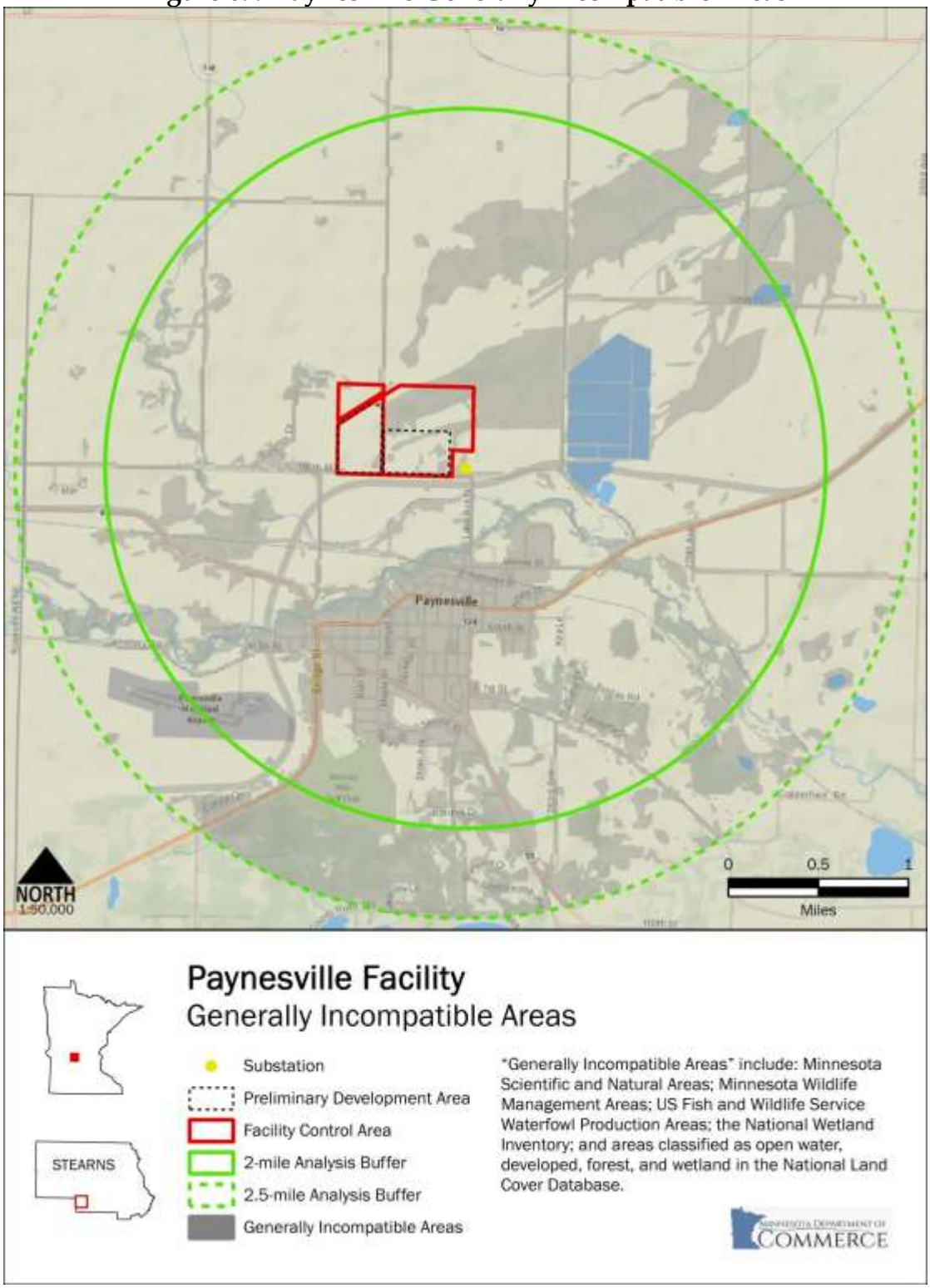
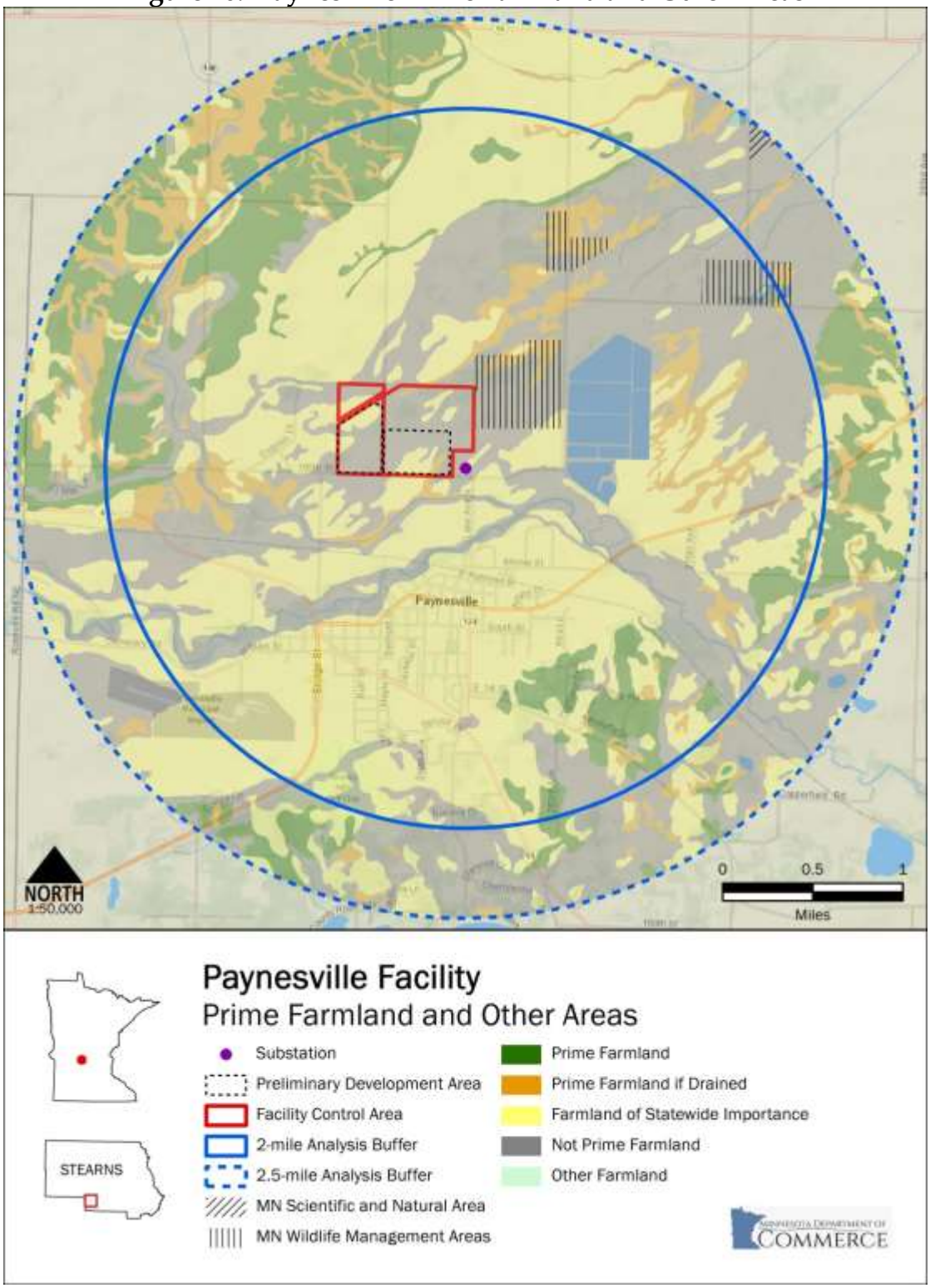


Figure 70: Paynesville Prime Farmland and Other Areas



6.17 Pine Island

The proposed Pine Island facility has a capacity of 4.0 MW AC and is located in the northwestern portion of Pine Island in Goodhue County. The location is between 511th Street and County Highway 27, approximately one-half mile west of 3rd Avenue NW. Aurora anticipates that the facility will be accessed through a newly constructed access road off of 511th Street. Preliminary plans anticipate a development area of approximately 39.6 acres within the 45.9 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Pine Island Substation located approximately one-half mile east of the facility.

The facility is located within the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 33) is dominated by cultivated crops (97.5 percent). The proposed location avoids the developed areas of Pine Island located to the east and south, as well as grassland areas located to the west, but is otherwise similar to the agricultural land cover that is heavily represented in the study area surrounding the Pine Island Substation (Figure 72).

Table 33: Pine Island - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	20.2	0.2%
Developed, Open Space	0.3	0.7%	0.3	0.8%	806.1	6.4%
Developed, Low Intensity	--	--	--	--	711.3	5.7%
Developed, Medium Intensity	--	--	--	--	126.7	1.0%
Developed, High Intensity	--	--	--	--	39.4	0.3%
Barren Land	--	--	--	--	1.2	0.0%
Deciduous Forest	--	--	--	--	700.9	5.6%
Evergreen Forest	--	--	--	--	3.0	--
Mixed Forest	--	--	--	--	--	--
Shrub/Scrub	--	--	--	--	4.9	0.0%
Grassland Herbaceous	3.0	6.5%	0.7	1.7%	1,503.3	12.0%
Pasture/Hay	--	--	--	--	1,310.2	10.4%
Cultivated Crops	43.5	92.8%	41.2	97.5%	6,761.1	53.9%
Woody Wetlands	--	--	--	--	558.6	4.5%
Emergent Herbaceous Wetlands	--	--	--	--	5.50	--
Totals	**46.9**	**100.0%**	**42.2**	**100.0%**	**12,552.4**	**100.0%**

6.17.1 Effects on Human Settlement

The location is on a cultivated parcel south of 511th Street in a rural area with scattered rural residences. The nearest home is located approximately 815 feet northwest of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

The location is currently zoned as Ag (Agriculture District) by the city of Pine Island, but the City's comprehensive plan designates the location as future low-density residential.[159] The City has expressed concern over the view of the proposed facility from nearby homes that are located on a higher elevation and on the proposed facility's impact on the cost and ability to extend utilizes to areas west of the site that may be developed.[160]

Pine Island is in the process of adopting ordinances for solar energy systems, including Solar Farms of the type proposed by Aurora. Under the proposed ordinance, Solar Farms would be allowed as an interim use in areas zoned as agricultural, but are prohibited within Shoreland Districts, wetlands and floodplains.[161]

The southern portion of the preliminary development area appears to be located very close to Pine Island's Shoreland Overlay District surrounding an unidentified PWI south of the facility.[162]

There are no recreational trails, state, county or local parks identified within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2, are identified for the Pine Island facility.

6.17.2 Effects on Land Based Economies

Based on the preliminary site design, the Pine Island facility would remove approximately 41 acres from agricultural use for at least 25 years. Aurora's Zumbrota facility is also located in Goodhue County. If both facilities were developed approximately 70 acres would be removed from agricultural production for at least 25 years.

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[159] City of Pine Island. *Pine Island Comprehensive Plan*. 2010, at Figure 3. http://cc.pineislandmn.com/downloads/final_document_101410_2.pdf
[160] Pine Island Comments, September 26, 2014
[161] Pine Island, Proposed Solar Ordinance, http://cc.pineislandmn.com/downloads/whole_agenda_1132015.pdf
[162] Pine Island Zoning Map, http://cc.pineislandmn.com/downloads/officialzoningmapordinance1132ndseries10182011.pdf

Approximately 18 acres (42 percent) of the developed area are considered to be prime farmland and 6 acres are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Pine Island Substation, approximately 46 percent is considered to be prime farmland and 21 percent (50 percent) is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Pine Island facility as it is within the municipal boundary of Pine Island.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Pine Island facility.

6.17.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Pine Island facility. No mitigation measures beyond those described in Section 5.4, are identified for the Pine Island Facility.

6.17.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. The North Branch Middle Fork Zumbro River is located across 511th Street, approximately 0.1 mile north of the preliminary development area, and an unnamed tributary that flows into the North Branch Middle Fork Zumbro River is located immediately south of the facility (Figure 72). The southern portion of the preliminary development area appears to be located very close to the Shoreland Overlay District of the unnamed tributary. The facility's preliminary development area is located outside of the mapped 100-year Federal Emergency Management Administration (FEMA) floodplain area associated with the Zumbro River.[163] Field delineations performed in the summer of 2014 show approximately 0.7 acres of Type 2 wetlands (wet meadow) within the area of site control.[164]

The preliminary design for the facility does not anticipate any grading of the site during construction.[165]

DNR records show a karst feature located within one-half mile of the Pine Island facility.[166] No impacts are anticipated to the karst feature due to the distance from the facility.

[163] Application, at p. 69
[164] Appendix C
[165] Application, at Appendix F
[166] Application, at p. 67

As discussed in Section 5.5.3, avoiding construction within the Shoreland Overlay district would minimize impacts to surface waters.

No conditions beyond those discussed in Section 5.5, are identified for the Pine Island facility.

6.17.5 Effects on Rare and Unique Natural Resources

The facility is bounded to the south by the North Branch Middle Fork of the Zumbro River. The native plant community surrounding this branch is classified as a Minnesota Biological Survey native plant community "Elm-Ash-Basswood Terrace Forest." A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Pine Island facility. The NHIS database review did show records for one state listed special concern species (Creek Heelsplitter (lamigona compressa)) within the preliminary development area, and two threatened species (Ellipse (Venustaconcha) and Glade Mallow (ellipsiformis Naaea dioca)) and one special concern species (American Brook Lamprey (Lampetra appendix) within one mile of the area of site control for the facility.[167] The Creek Heelsplitter and Ellipse are both mussels and along with the American Brook Lamprey require aquatic habitat that is not present in the developed area, but may be present in the stream located along the southern boundary of the facility.

As discussed in Section 5.6, a field survey of the Pine Island facility would identify potentially impacted rare or unique natural resources. Avoidance of Elm-Ash-Basswood Terrace Forest plant community this area would minimize impacts to the sensitive natural resource.

[167] Application, at p. 81, Appendix I

Figure 71: Pine Island Project Detail

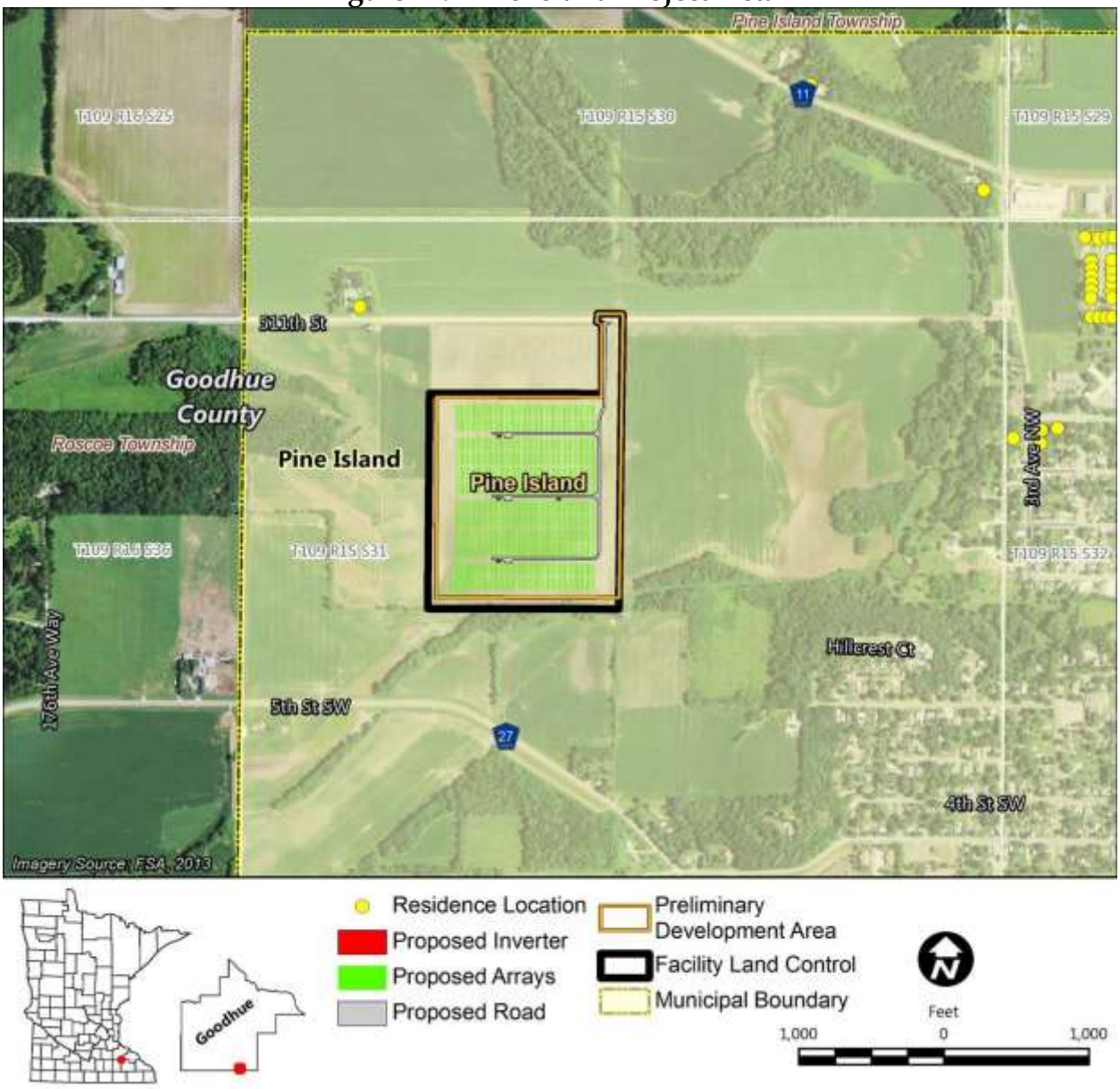


Figure 72: Pine Island Land Cover Overview

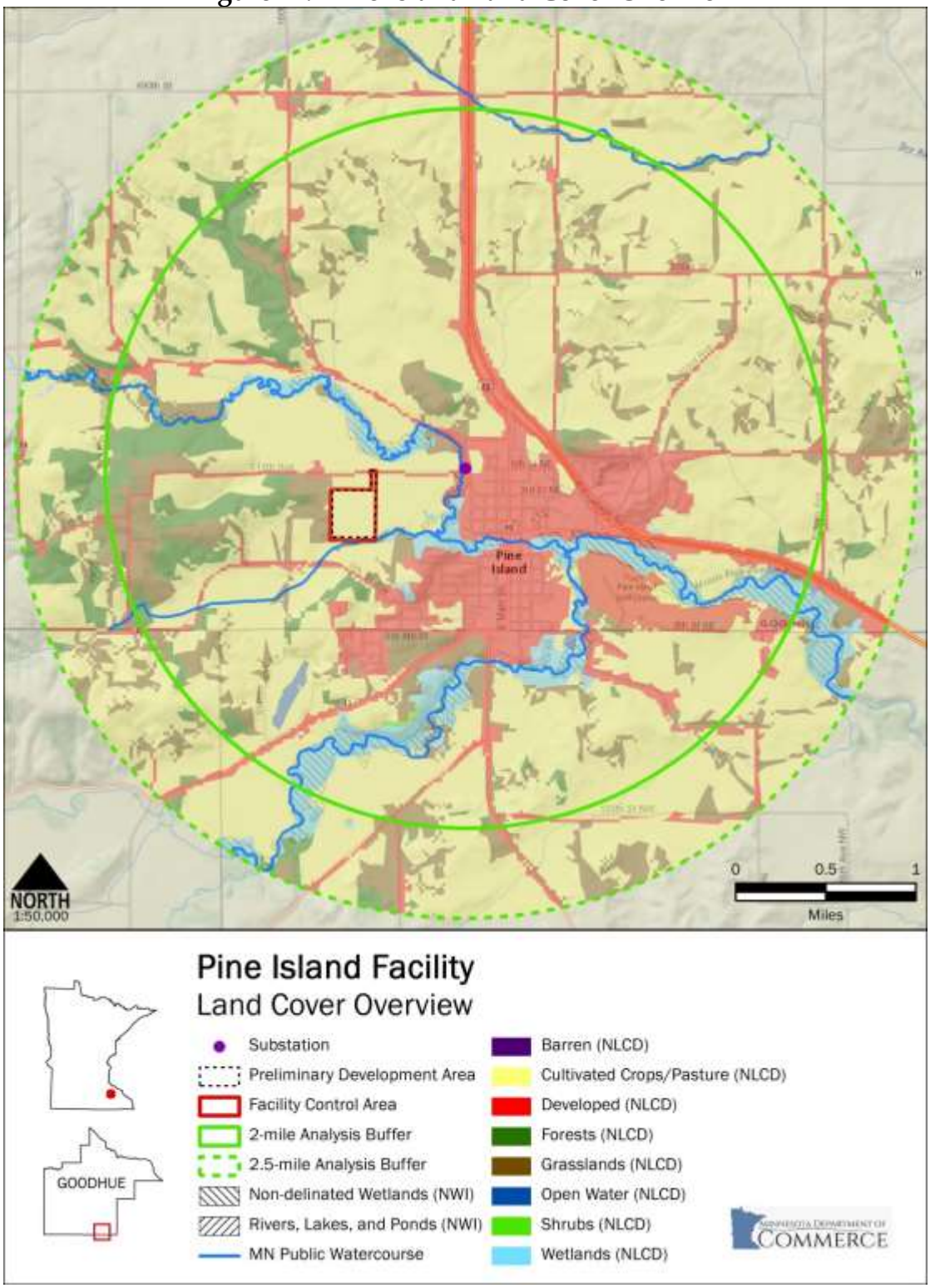


Figure 73: Pine Island Generally Incompatible Areas

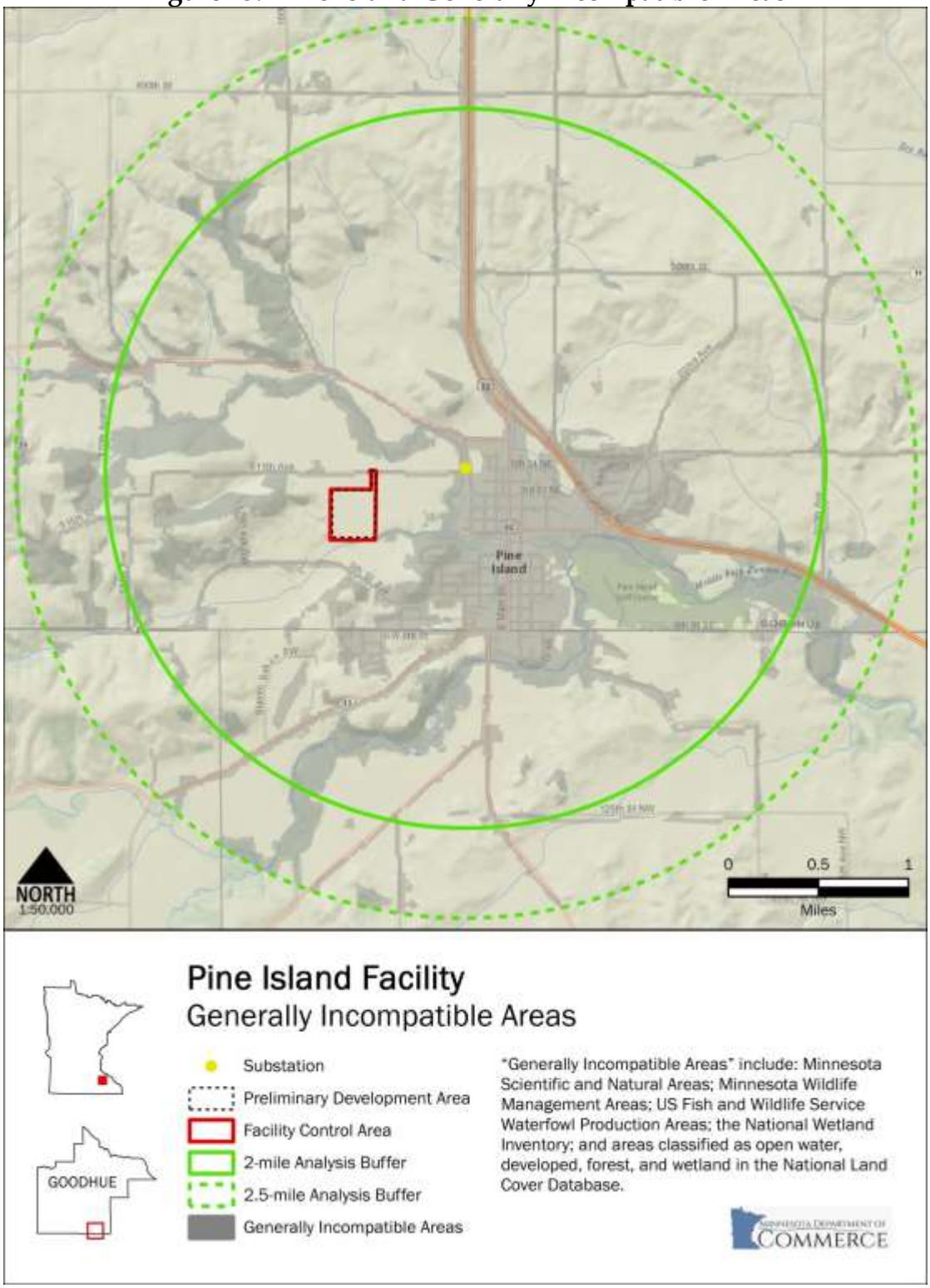
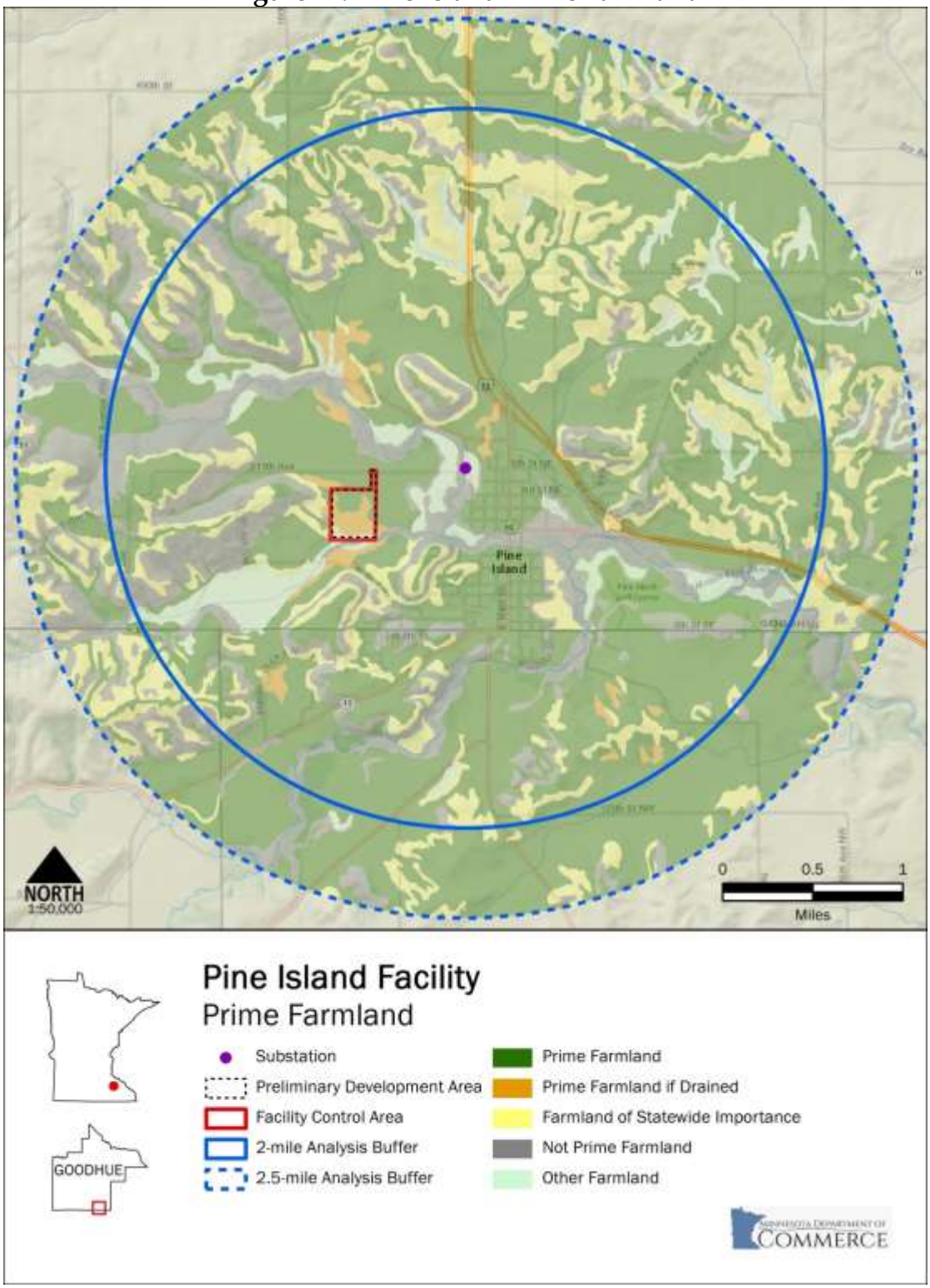


Figure 74: Pine Island Prime Farmland



6.18 Pipestone

The proposed Pipestone facility has a capacity of 2.0 MW AC and straddles the border between Sweet Township and the city of Pipestone in Pipestone County. The site is located in the northwest portion of the city of Pipestone, south of 5th Street NW. Aurora anticipates that the site would be accessed through a new drive off of 5th Street NW. Preliminary plans anticipate a development area of approximately 14.7 acres within the 15.8 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Pipestone Substation located approximately 3,640 feet east of the facility.

The facility is located within the North-Central Glaciated Plain Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 34) is dominated by cultivated crops (98.9 percent). The proposed location avoids the developed area of Pipestone to the south and east of the study area around the Pipestone Substation as well as many of the grassland areas in the area of the Pipestone National Monument (Figure 76).

Table 34: Pipestone Facility – Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	142.3	1.1%
Developed, Open Space	0.1	0.7%	0.1	0.7%	1,184.4	9.4%
Developed, Low Intensity	--	--	--	--	756.7	6.0%
Developed, Medium Intensity	--	--	--	--	349.5	2.8%
Developed, High Intensity	--	--	--	--	108.0	0.9%
Barren Land	--	--	--	--	6.4	0.1%
Deciduous Forest	--	--	--	--	94.1	0.8%
Evergreen Forest	--	--	--	--	--	--
Mixed Forest	--	--	--	--	--	--
Shrub/Scrub	--	--	--	--	--	--
Grassland Herbaceous	0.1	0.7%	0.1	0.4%	1,279.1	10.2%
Pasture/Hay	--	--	--	--	400.4	3.2%
Cultivated Crops	15.5	98.6%	14.5	98.9%	8,171.1	65.0%
Woody Wetlands	--	--	--	--	--	--
Emergent Herbaceous Wetlands	--	--	--	--	82.3	0.6%
Totals	**15.8**	**100.0%**	**14.7**	**100.0%**	**12,574.1**	**100.0%**

6.18.1 Effects on Human Settlement

The located is a cultivated parcel that straddles the northwest portion of the city of Pipestone and the eastern portion of Sweet Township. The nearest home is located approximately 114 feet south of the preliminary development area in the single family residential district immediately south of the proposed location. The location is within an

orderly annexation area. The portion of the proposed location in the city of Pipestone is zoned as R-1, Single Family.[168] The portion of the proposed location located in Sweet Township is zoned as Urban Expansion. The intent of the Orderly Expansion District is to provide for an orderly transition from farm to urban land use.[169] Neither the city nor county ordinances address solar installations; the County anticipates that a solar facility would require a conditional use permit under the Essential Services section of county zoning ordinances.

Construction of the facility will not result in displacement of any homes or businesses. The proposed facility location is, however, located adjacent to residential development immediately north of a single family residential area and would change the visual character of what is currently an agricultural field.

The Pipestone National Monument, the Pipestone Indian WMA and the Pipestone WPA are all located within one mile of the proposed facility. The construction and operation of the Project is not expected to impact the use of the WMA or WPA.

A snowmobile trail runs along the southern border of the area of site control. No impacts to the use of the trail are anticipated.

The Pipestone facility is located approximately half a mile from the southern boundary of the Pipestone National Monument. The Pipestone National Monument is managed by the National Park Service, and offers an opportunity to explore cultural and natural resources that are unique to the area. The Monument contains active quarry pits where Native Americans continue the traditions of quarrying pipestone. The quarries are surrounded with native tallgrass prairies, and there are trails located within the Monument for the public to explore.[170] Aurora has consulted with the Superintendent of the Pipestone National Monument, and the construction and operation of the Project are not anticipated to impact user experience at the Monument.

Westview Park is located approximately 300 feet south of the proposed development area. Park visitors would likely experience noise during the construction of the Project. Once operational, park visitors may be able to see the fence of the facility, but visual impacts are not anticipated to impact the enjoyment of nearby recreational resources.

The Pipestone facility's proximity to the nearby residential neighborhood (see Figure 75) would mean that the aesthetic impacts to nearby housing is likely to be noticeable. A landscaping plan, as identified in Section 5.2.7, could be developed to minimize visual impacts to the residential area south of the facility.

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[168] City of Pipestone Comments, September 23, 2014
[169] Pipestone County Comments, September 23, 2014
[170] National Park Service. *Pipestone National Monument: Plan Your Visit* http://www.nps.gov/pipe/planyourvisit/index.htm

6.18.2 Effects on Land Based Economies

The proposed facility would remove approximately 16 acres of farmland from agricultural use. At this time EERA staff is not aware of other solar facilities announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 10 acres (67 percent) of the developed area are considered to be prime farmland and 5 acres (33 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Pipestone Substation, approximately 68 percent is considered to be prime farmland and 13 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Pipestone facility as it is within the municipal boundary of Pipestone.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3, are identified for the Pipestone facility.

6.18.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Pipestone facility. No mitigation measures beyond those described in Section 5.4, are identified for the Pipestone facility.

6.18.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control Field delineations performed in the summer of 2014 did not identify any wetlands in the area of land control.[171]

The preliminary design for the facility does not anticipate any grading of the site during construction.[172]

No mitigation measures beyond those described in Section 5.5 are identified for the Pipestone facility.

6.18.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Pipestone facility. The NHIS database review did show records for one state listed special concern species

[171] Appendix C
[172] Application, at Appendix F

(Least weasel (Mustela nivalis)) and one state tracked species (Smoothish Orach(Atriplex glabriuscula)) within the preliminary development area. Additionally instances of federally listed endangered (Topeka shiner (Notropis Topeka)), threatened (Western Prairie Fringed Orchid (Platanthera praeclara) and candidate (Dakota Skipper (Hesperia)) species, as well as several instances of state-listed endangered, threatened, special concern and tracked species within one mile of the area of site control for the facility.[173]

Table 35: Pipestone Facility - NHIS Listed Species

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 Mile of Site Control	Records Within Preliminary Development Area
Blackfoot Quillwort	Isoetes melanopoda	Endangered	None	1	--
Dakota Skipper	Hesperia dacotae	Endangered	Candidate	1	--
Hairy Water Clover	Marsilea vestita	Endangered	None	1	--
Henslow's Sparrow	Ammodramus	Endangered	None	1	--
Powesheik Skipper	Henslowii Oarisma poweshiek	Endangered	None	1	--
Western Prairie Fringed Orchid	Platanthera praeclara	Endangered	Listed Threatened	1	--
Mud Plantain	Heteranthera limosa	Threatened	None	1	--
Short-pointed Umbrella- sedge	Cyperus acuminatus	Threatened	None	1	--
Water-hyssop	Bacopa rotundifolia	Threatened	None	1	--
A Species of Lichen	Buellia nigra	Special Concern	None	1	--
Buffalo Grass	Buchloe dactyloides	Special Concern	None	3	--
Least Weasel	Mustela nivalis	Special Concern	None	1	1
Meadow Popcorn-flower	Plagiobothrys scouleri	Special Concern	None	1	--
Mudwort	Limosella aquatica	Special Concern	None	2	--
Plains Prickly Pear	Opuntia macrorhiza	Special Concern	None	1	--
Regal Fritillary	Speyeria idalia	Special Concern	None	1	--
Slender Plantain	Plantago elongata	Special Concern	None	1	--
Three Stamened Waterwort	Elatine triandra	Special Concern	None	1	--
Topeka Shiner	Notropis topeka	Special Concern	Listed	1	--

[173] Application, at p. 81, Appendix I

Common Name	Scientific Name	State Status	Federal Status	Records Within 1 Mile of Site Control	Records Within Preliminary Development Area
			Endangered		
Tumblegrass	Schedonnardus paniculatus	Special Concern	None	1	--
Carolina Foxtail	Alopecurus	Tracked	None	1	--
Forget-me-not	carolinianus Mysotis verna	Tracked	None	2	--
Little Barley	Hordeum pusillum	Tracked	None	1	--
Mouse-ear Chickweed	Cerastium	Tracked	None	2	--
Mousetail	brachypodum Myosurus minimus	Tracked	None	2	--
Smoothish Orach	Atriplex glabriuscula	Tracked	None	2	1

As discussed in Section 5.6, a field survey of the Pipestone facility would identify potentially impacted rare or unique natural resources.

Figure 75: Pipestone Project Detail

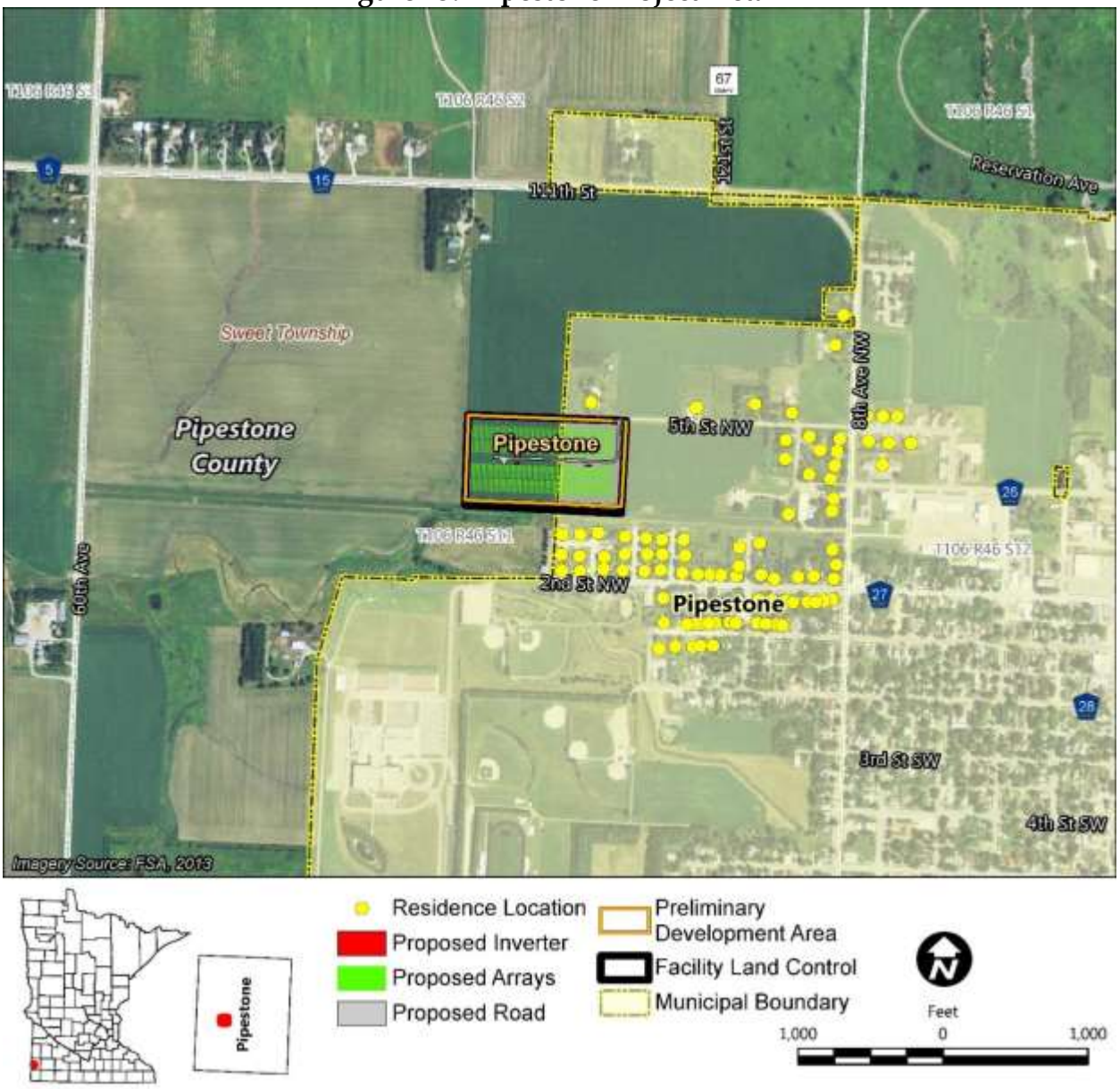


Figure 76: Pipestone Land Cover Overview

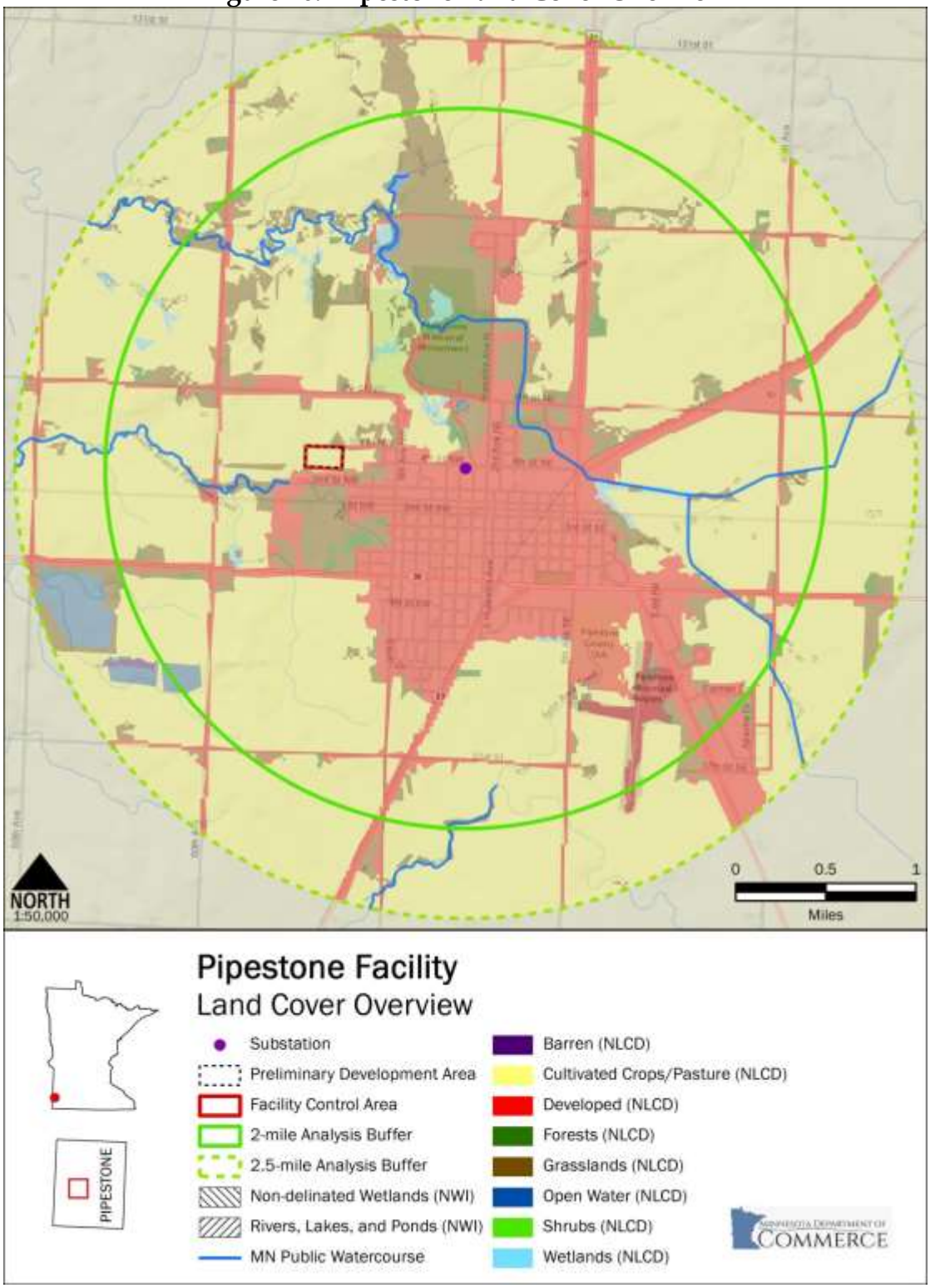


Figure 77: Pipestone Generally Incompatible Areas

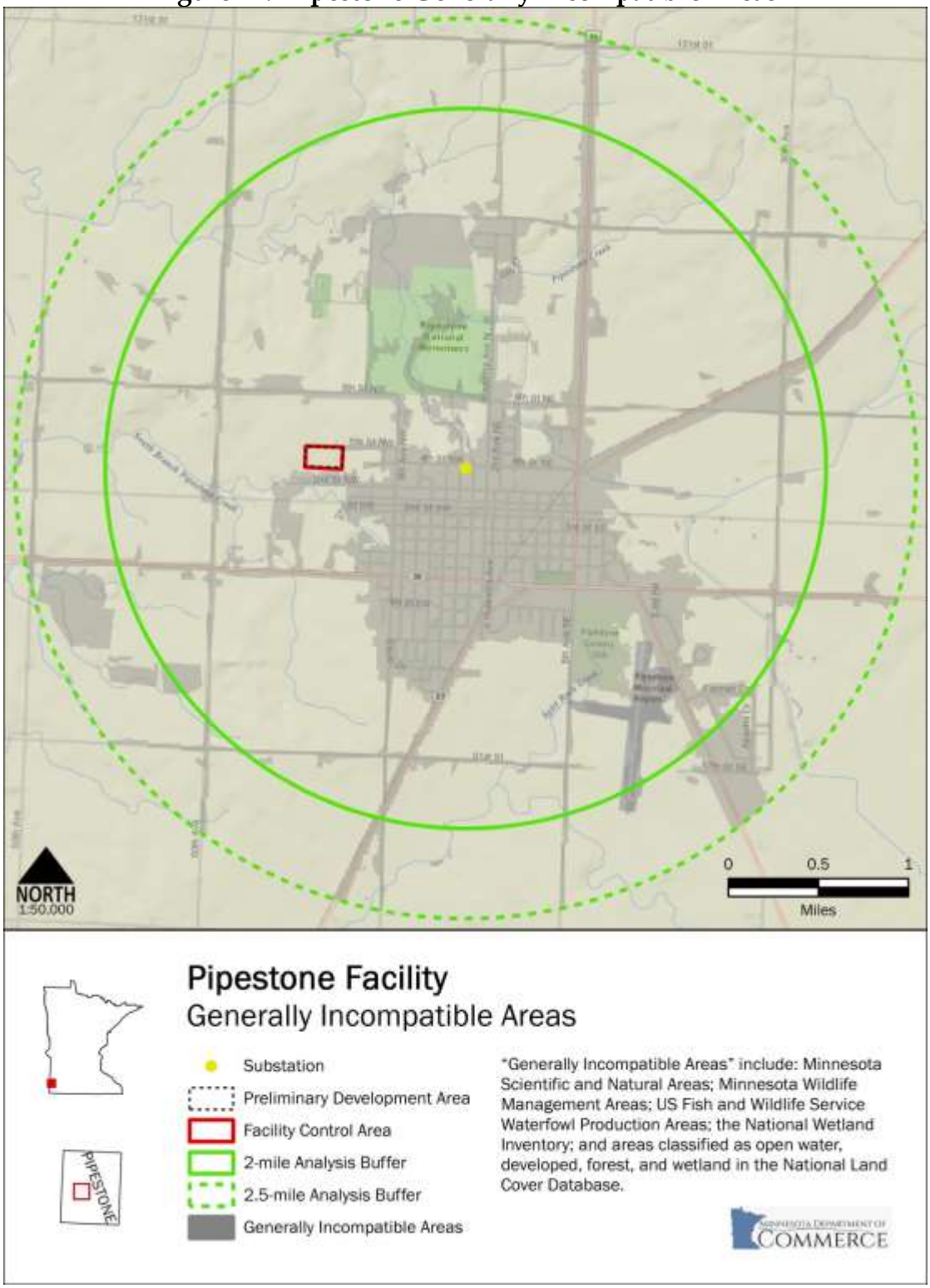
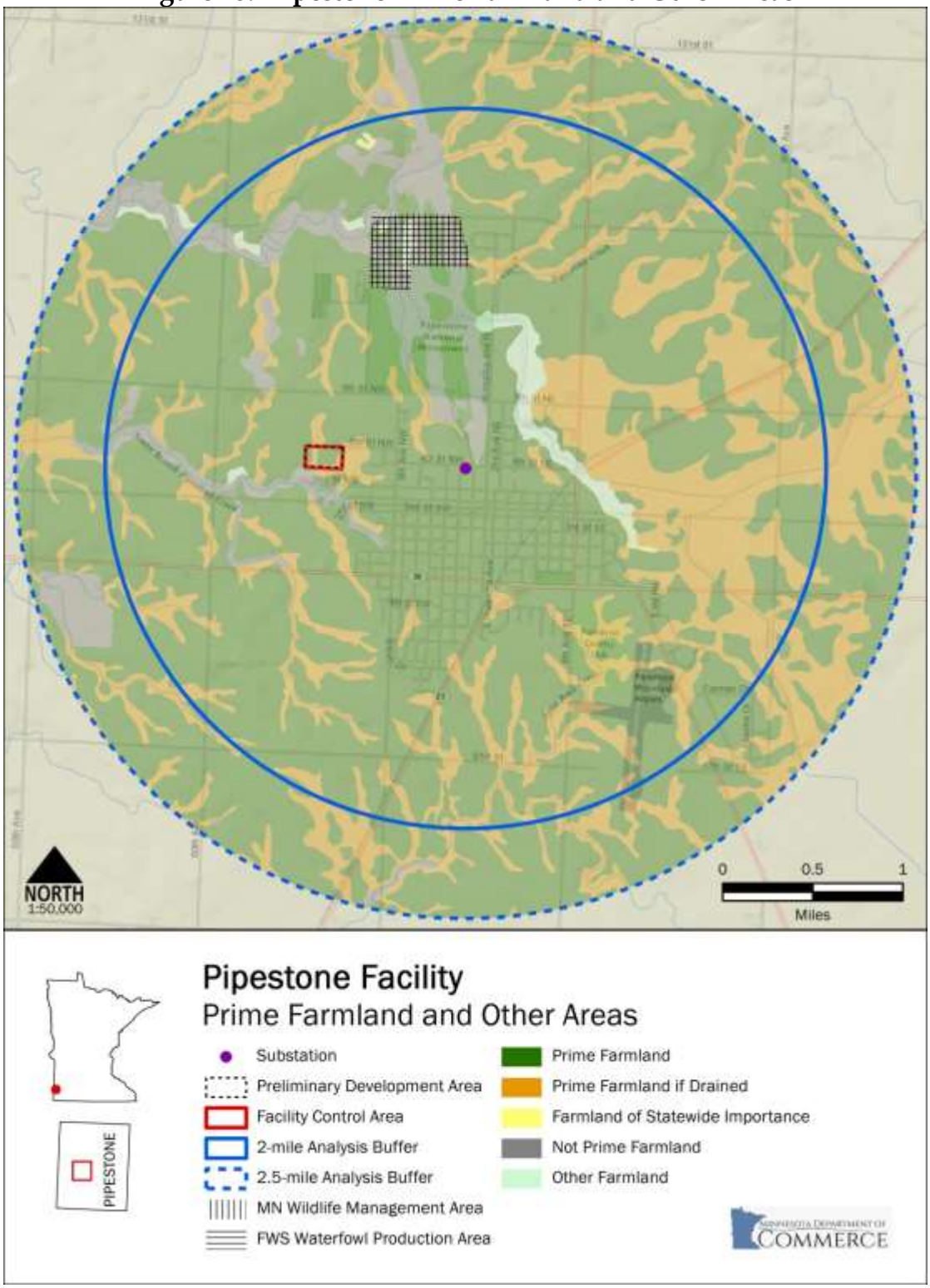


Figure 78: Pipestone Prime Farmland and Other Areas



6.19 Scandia

The proposed Scandia facility has a capacity of 2.5 MW AC and is located in Section 35 of Franconia Township in Chisago County. The site is located north of the city of Scandia, southeast of the intersection of Oldfield Avenue North and County Road 25. Preliminary plans anticipate a development area of approximately 23.3 acres within the 24.4 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Scandia Substation located approximately one-quarter mile north of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Prairie Parkland Province. Land cover within the preliminary development area (Table 36) is dominated by pasture and haylands (96.1 percent) along with developed open space (3.4 percent). The proposed location avoids the forested areas to the west, east and southeast and the scattered water features and wetlands throughout the study area surrounding the Scandia Substation, but is otherwise similar to the agricultural land cover that makes up more than half the land cover in the study area (Figure 80).

Table 36: Scandia Facility - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	529.3	4.2%
Developed, Open Space	0.8	3.3%	0.8	3.4%	581.0	4.6%
Developed, Low Intensity	--	--	--	--	41.8	0.3%
Developed, Medium Intensity	--	--	--	--	6.7	0.1%
Developed, High Intensity	--	--	--	--	--	--
Barren Land	--	--	--	--	--	--
Deciduous Forest	--	--	--	--	2,921.0	23.3%
Evergreen Forest	--	--	--	--	105.3	0.8%
Mixed Forest	--	--	--	--	8.1	0.1%
Shrub/Scrub	--	--	--	--	30.4	0.2%
Grassland Herbaceous	--	--	--	--	851.9	6.8%
Pasture/Hay	23.3	95.8%	22.4	96.1%	3,665.6	29.2%
Cultivated Crops	0.2	1.0%	0.1	0.5%	3,263.8	26.0%
Woody Wetlands	--	--	--	--	37.4	0.3%
Emergent Herbaceous Wetlands	--	--	--	--	510.1	4.1%
Totals	**24.4**	**100.0%**	**23.3**	**100.0%**	**12,552.3**	**100.0%**

6.19.1 Effects on Human Settlement

The proposed location is a parcel that is a mix of pasture and meadow in an area that is a mixture of scattered rural residences and agricultural land. The nearest home is located

approximately 230 feet north of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

The facility is located north of Scandia in an area zoned as Agricultural by Chisago County. The site is not located within an identified orderly annexation area. Solar farms covering up to 20 acres are a permitted use within the Agricultural District; solar farms covering more than 20 acres require a conditional use. Under the Chisago County Zoning Ordinance components of the farm must meet setback, height, and coverage limitations for the district in which the system is located. The ordinance also prohibits solar energy farms in certain areas:

- Shoreland Districts as designated by the Department of Natural Resources (DNR) and the Chisago County Shoreland Management Ordinance
- 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
- Wetlands to the extent prohibited by the Minnesota Wetland Conservation Act, and
- The Floodplain District.

The conditional use permit conditions require some type of visual screening of the facility as well as preservation of natural wildlife, wetland, woodland or other corridors:

The area of site control is designated as Agricultural in the Growth Management portion of the Chisago County Comprehensive Plan.[174]

There are no recreational trails, county, state, or local parks located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

Aurora anticipates that the facility will be accessed through a newly constructed access road off of Olinda Trail (County State Aid Highway 25).

No mitigation measures beyond those described in Section 5.2 are identified for the Scandia facility.

6.19.2 Effects on Land Based Economies

The proposed facility would remove approximately 22 acres from agricultural use. In addition to the Scandia facility, Aurora's Chisago, Lawrence Creek, and Wyoming facilities, as well as the North Star Solar Project, a 100 MW PV project proposed by North Star Solar PV LLC are all proposed in Chisago County. If all of the proposed facilities are developed,

[174] Chisago County. Chisago County Comprehensive Plan. 2010, at Figure 13: Growth Management Plan. http://www.co.chisago.mn.us/DocumentCenter/View/4328

the five facilities would result in a cumulative reduction of approximately 970 acres from agricultural use in Chisago County for at least 25 years.

Approximately 1 acre is considered to be prime farmland if drained (Table 13). Within the study area surrounding the Scandia Substation, approximately 31 percent is considered to be prime farmland and 10 percent is considered to be prime farmland if drained. If the proposed facility were developed to its anticipated design of 2.5 MW, the facility would use approximately 0.4 acres of prime farmland if drained per MW.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Scandia facility.

6.19.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Scandia facility. No mitigation measures beyond those described in Section 5.4 are identified for the Scandia facility.

6.19.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 did not identify any wetlands in the preliminary development area.[175]

The preliminary design for the facility anticipates grading of approximately 16.0 acres of the site during construction.[176]

No mitigation measures beyond those described in Section 5.5 are identified for the Scandia facility.

6.19.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the Scandia facility.[177]

No mitigation measures beyond the field survey described in Section 5.6, are identified for the Scandia facility.

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[175] Appendix C
[176] Application, at Appendix F
[177] Application, at p. 81

Figure 79: Scandia Project Detail

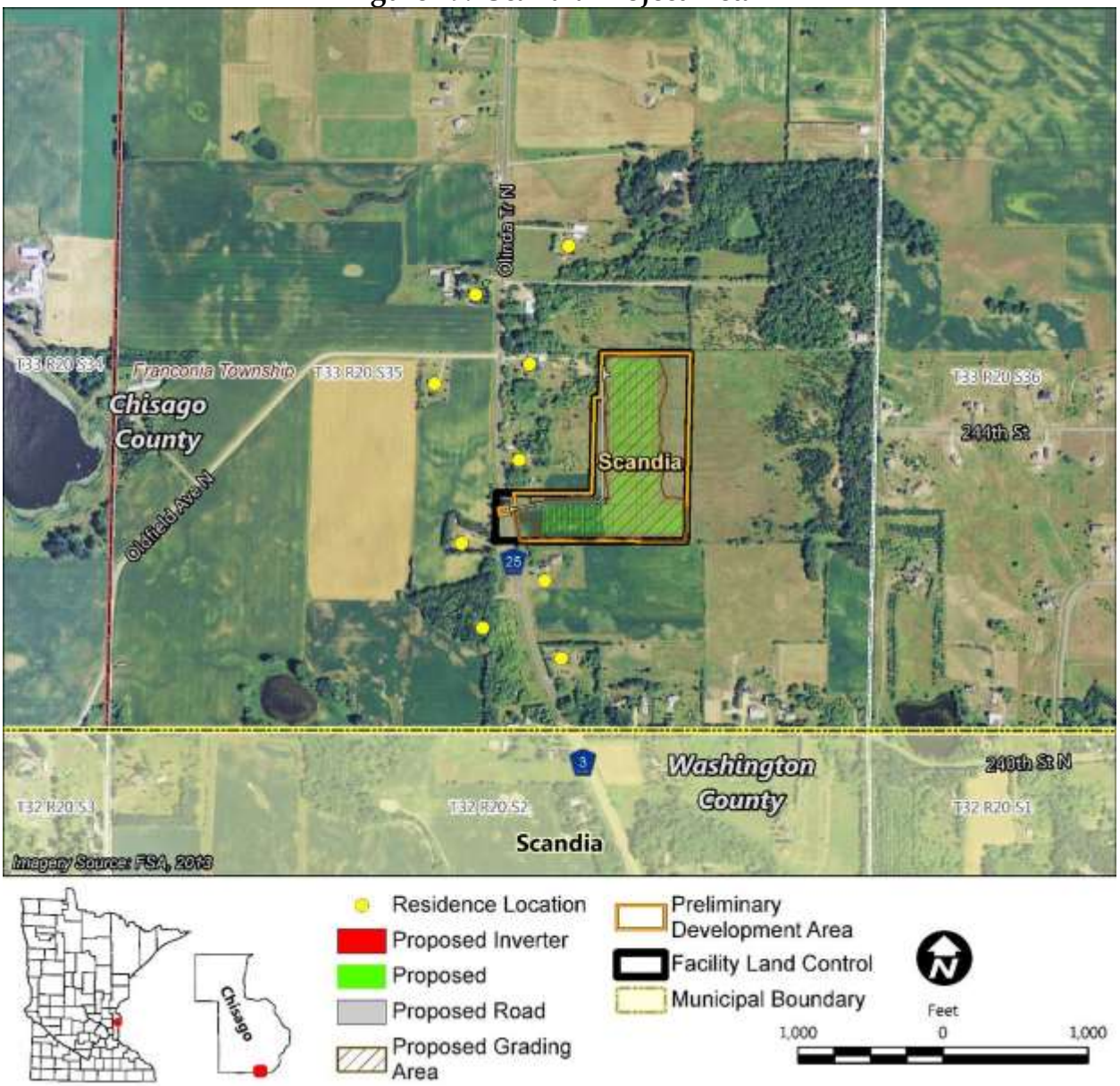


Figure 80: Scandia Land Cover Overview

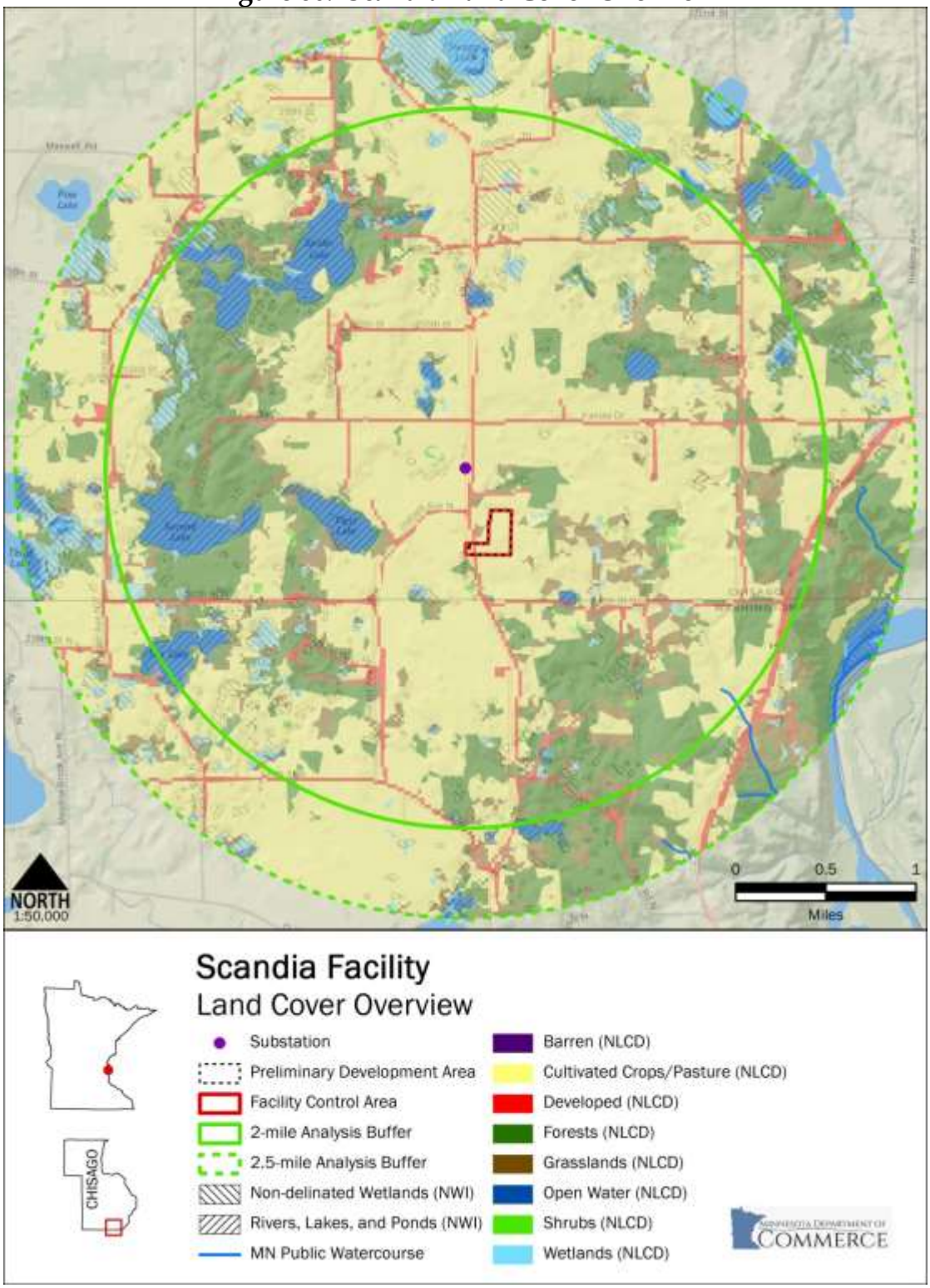


Figure 81: Scandia Generally Incompatible Areas

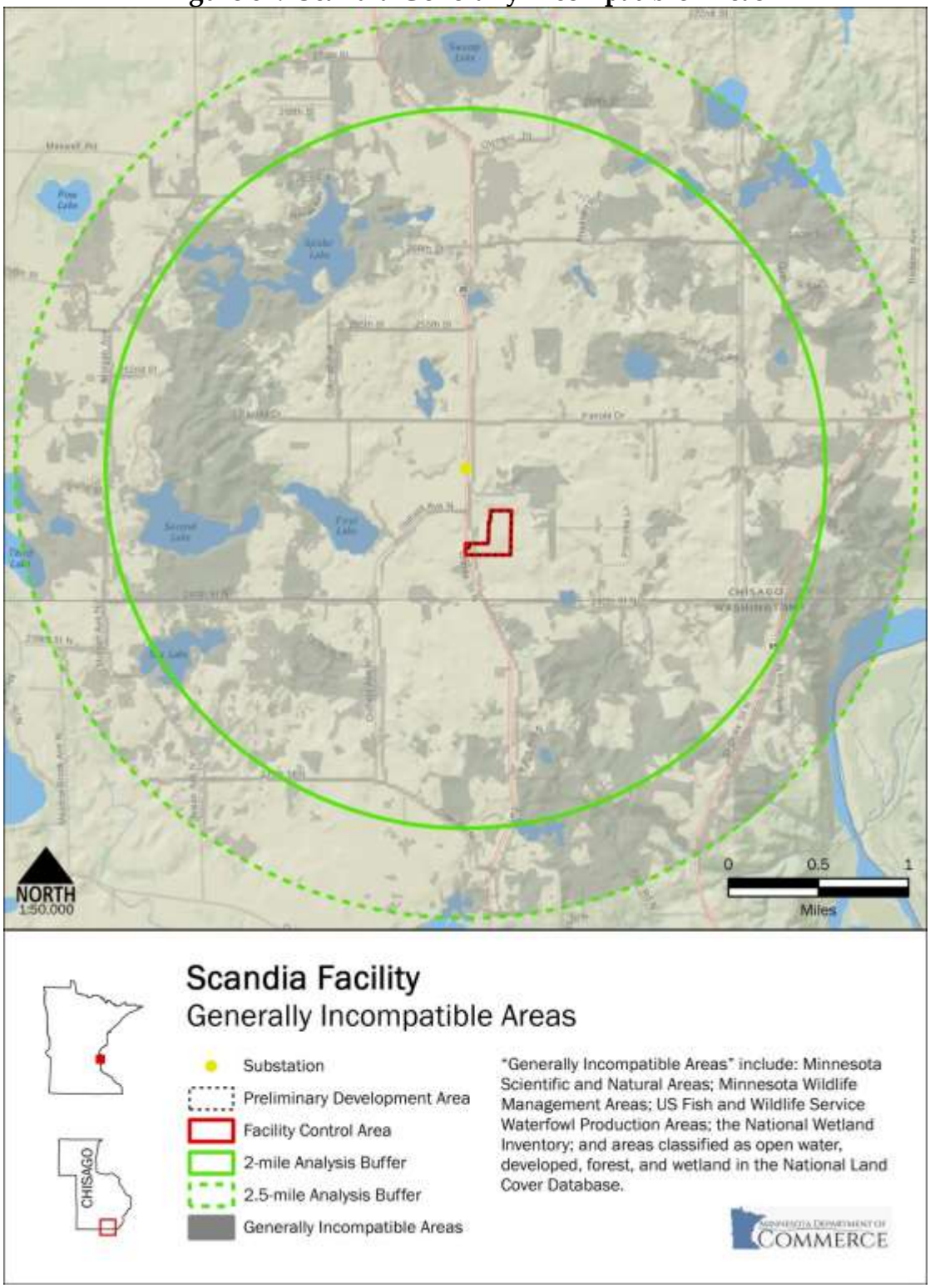
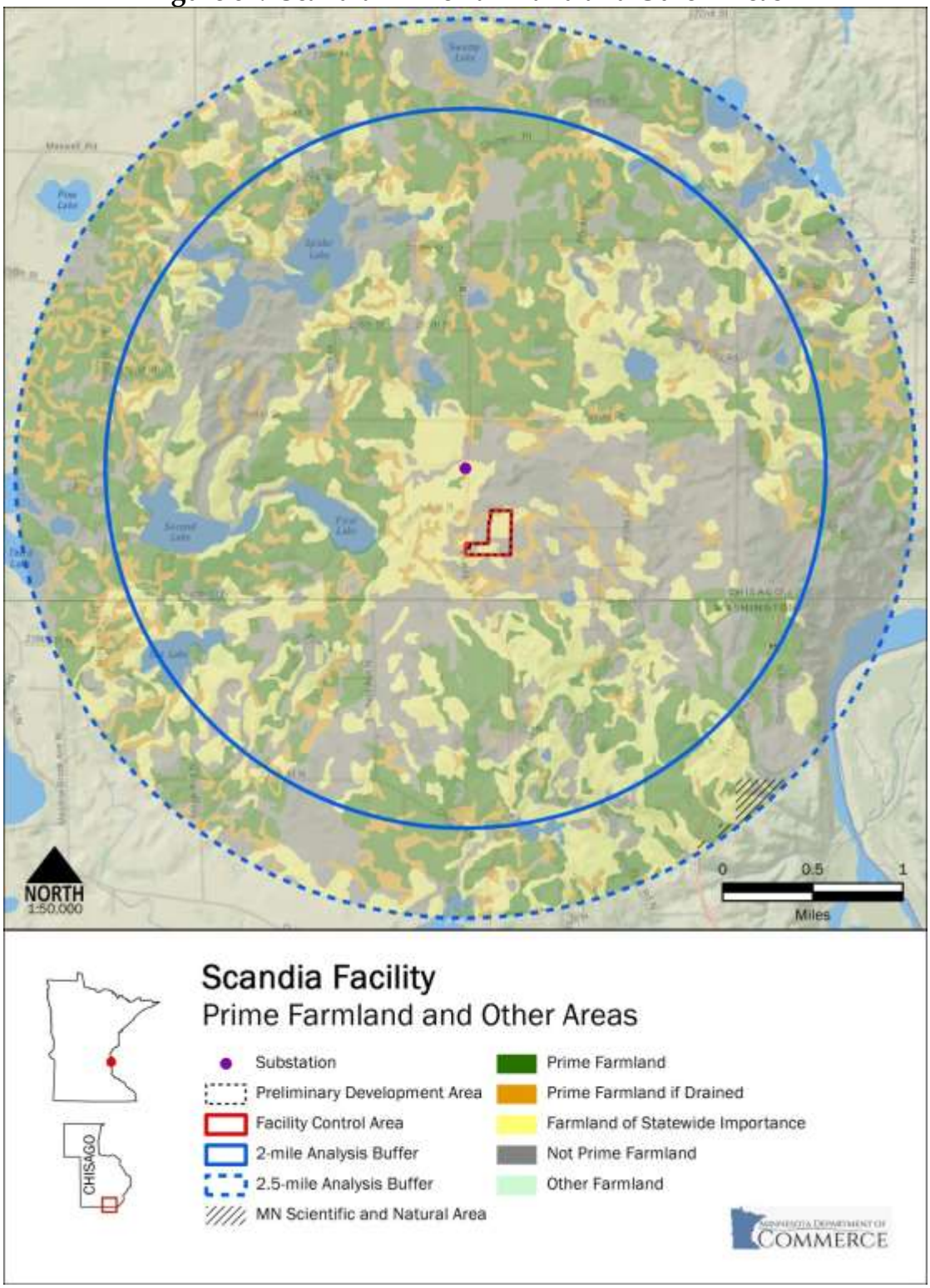


Figure 82: Scandia Prime Farmland and Other Areas



6.20 Waseca

The proposed Waseca facility has a capacity of 10 MW AC and is located in Section 12 of St. Mary Township in Waseca County. The site is located northwest of the city of Waseca on the west side of 120th Street. Aurora anticipates that the facility will be accessed through an extension of an existing farm access road off of 120th Street. Preliminary plans anticipate a development area of approximately 85.2 acres within the 89.2 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Waseca Substation located approximately 1.1 miles southeast of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 37) is comprised entirely of cultivated crops. The proposed location avoids the developed areas of Waseca to the east, but is otherwise similar to the agricultural land cover that is dominant in the western and southern portion of the study area surrounding the Waseca Substation (Figure 84).

Table 37: Waseca Facility - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	799.9	6.4%
Developed, Open Space	--	--	--	--	1,627.5	13.0%
Developed, Low Intensity	--	--	--	--	1,405.4	11.2%
Developed, Medium Intensity	--	--	--	--	506.2	4.0%
Developed, High Intensity	--	--	--	--	229.2	1.8%
Barren Land	--	--	--	--	--	--
Deciduous Forest	--	--	--	--	65.4	0.5%
Evergreen Forest	--	--	--	--	0.0	0.0%
Mixed Forest	--	--	--	--	1.4	0.0%
Shrub/Scrub	--	--	--	--	--	--
Grassland Herbaceous	--	--	--	--	320.1	2.6%
Pasture/Hay	--	--	--	--	750.0	6.0%
Cultivated Crops	89.3	100.0%	85.2	100.0	6,408.7	51.1%
Woody Wetlands	0.0	0.0%	0.0	0.0%	88.3	0.7%
Emergent Herbaceous Wetlands	0.0	0.0%	0.0	0.0%	350.7	2.8%
Totals	**89.3**	**100.0%**	**85.2**	**100.0%**	**12,552.7**	**100.0%**

6.20.1 Effects on Human Settlement

The location is a cultivated parcel northwest of Waseca in a rural area with scattered rural residences. The nearest home is located approximately 130 feet south of the preliminary development area. Construction of the facility will not result in displacement of any homes

or businesses. The location is zoned as Agricultural Protection District A-1 by Waseca County. Solar farms would require a conditional use permit if permitted by the County.[178] The area of site control is designated as Agricultural in the 2005 *Waseca County Comprehensive Plan*.[179]

A snowmobile trail follows the section line along the northwestern portion of the facility. The City Nature Area and Loon Lake Park and a local bike trail are located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those discussed in Section 5.2 are identified for the Waseca facility.

6.20.2 Effects on Land Based Economies

The proposed facility would remove approximately 85 acres from agricultural use for at least 25 years. At this time EERA staff is not aware of other solar facilities in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

Approximately 16 acres (19 percent) of the developed area are considered to be prime farmland and 29 acres (34 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Waseca Substation, approximately 34 percent is considered to be prime farmland and 39 percent is considered to be prime farmland if drained. It is likely that any alternate locations that avoided the developed area around Waseca would also be sited on prime farmland if drained (Figure 86).

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those discussed in Section 5.3 are identified for the Waseca facility.

6.20.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Waseca facility. No mitigation measures beyond those identified in Section 5.4 are proposed for the Waseca facility.

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[178] Waseca County Comments, August 27, 2014
[179] Waseca County, *Waseca County Comprehensive Plan*. 2005. http://www.co.waseca.mn.us/DocumentCenter/View/127, at *Draft Waseca Area Future Land Use Map*

6.20.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Although a ditch is shown crossing the Waseca Facility in some maps, aerial photography and site visits indicate that a stream feature is not present. Field delineations performed in the summer of 2014 did not identify any wetlands in the area of land control.[180]

The preliminary design for the facility anticipates grading of approximately 43.6 acres of the site during construction.[181]

No mitigation measures beyond those described in Section 5.5 are identified for the Waseca facility.

6.20.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered or threatened species within the preliminary development area of the Waseca facility. The NHIS database review did show records for three state listed threatened species (Sullivant's Milkweed (Asclepias sullivantii), Tuberous Indian-plantain (Arnoglossum plantagineum) and Valerian (Valeriana edulis var. ciliate)), one state listed special concern species (Rattlesnake-master (Eryngium yuccifolium)) and one state listed tracked species (Cowbane (Oxypolis rigidior)) within one mile of the area of site control for the facility.[182]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Waseca facility.

[180] Appendix C
[181] Application, at Appendix F
[182] Application, at p. 81, Appendix I

Figure 83: Waseca Project Detail

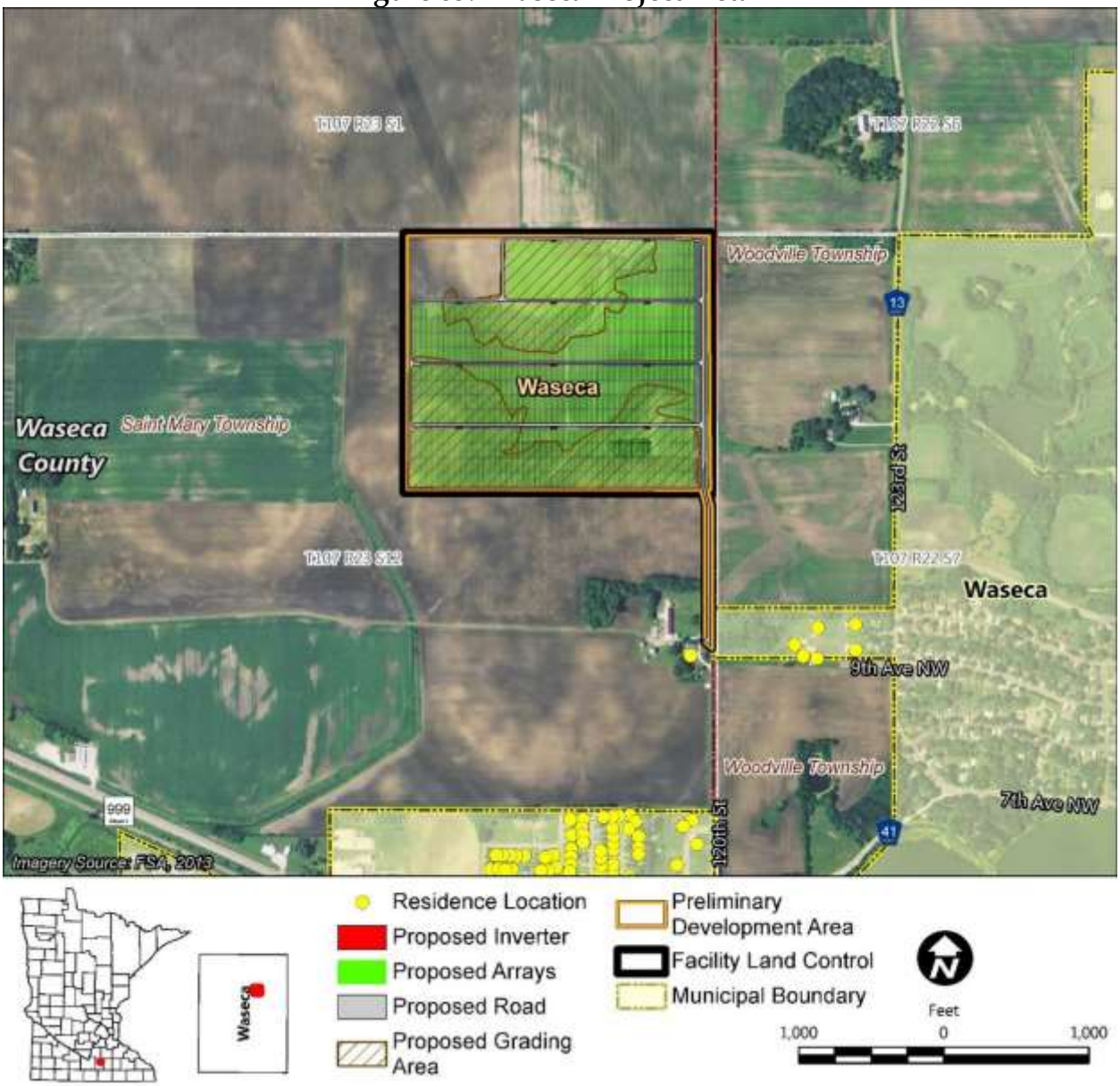


Figure 84: Waseca Land Cover Overview

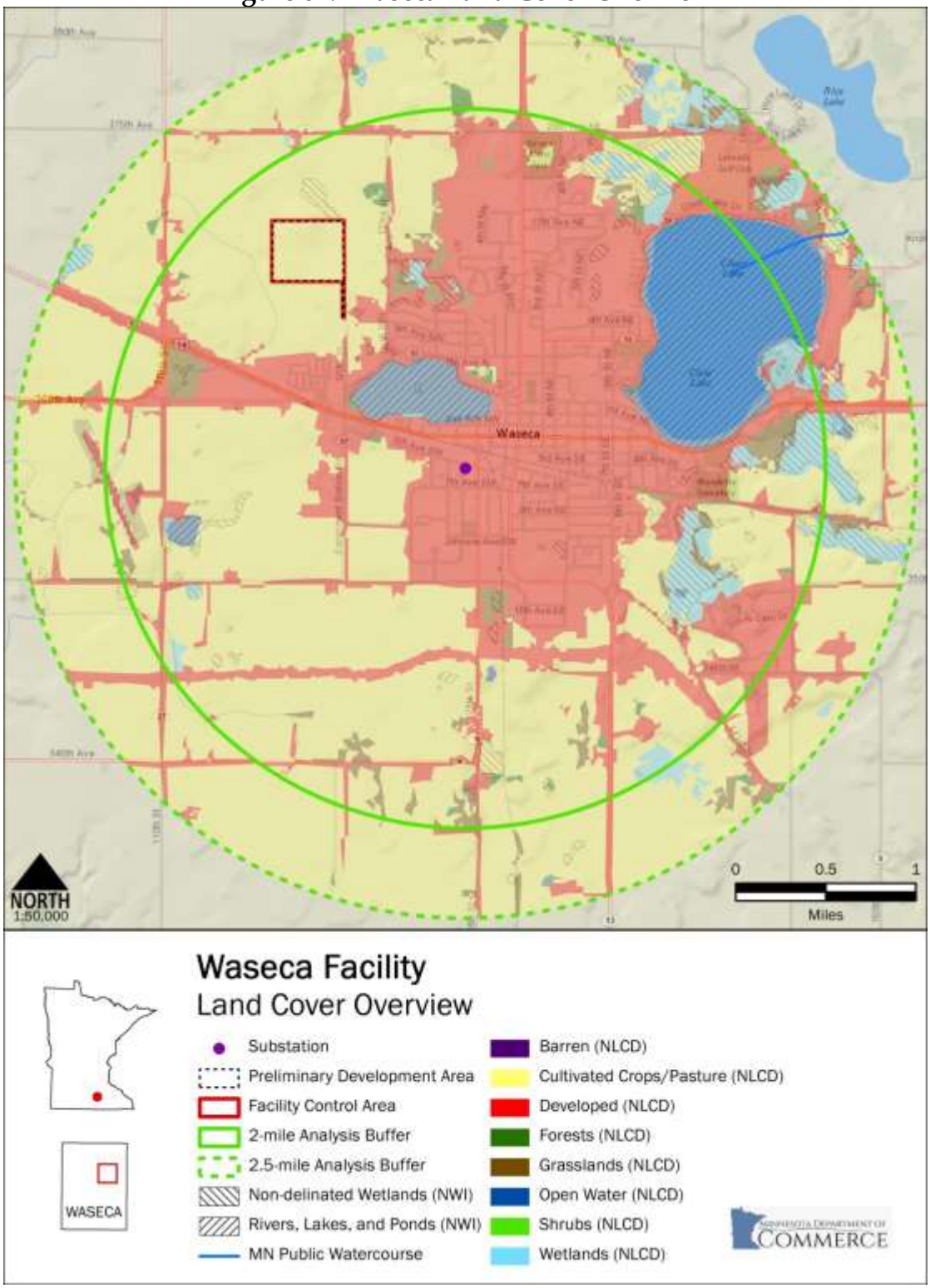


Figure 85: Waseca Generally Incompatible Areas

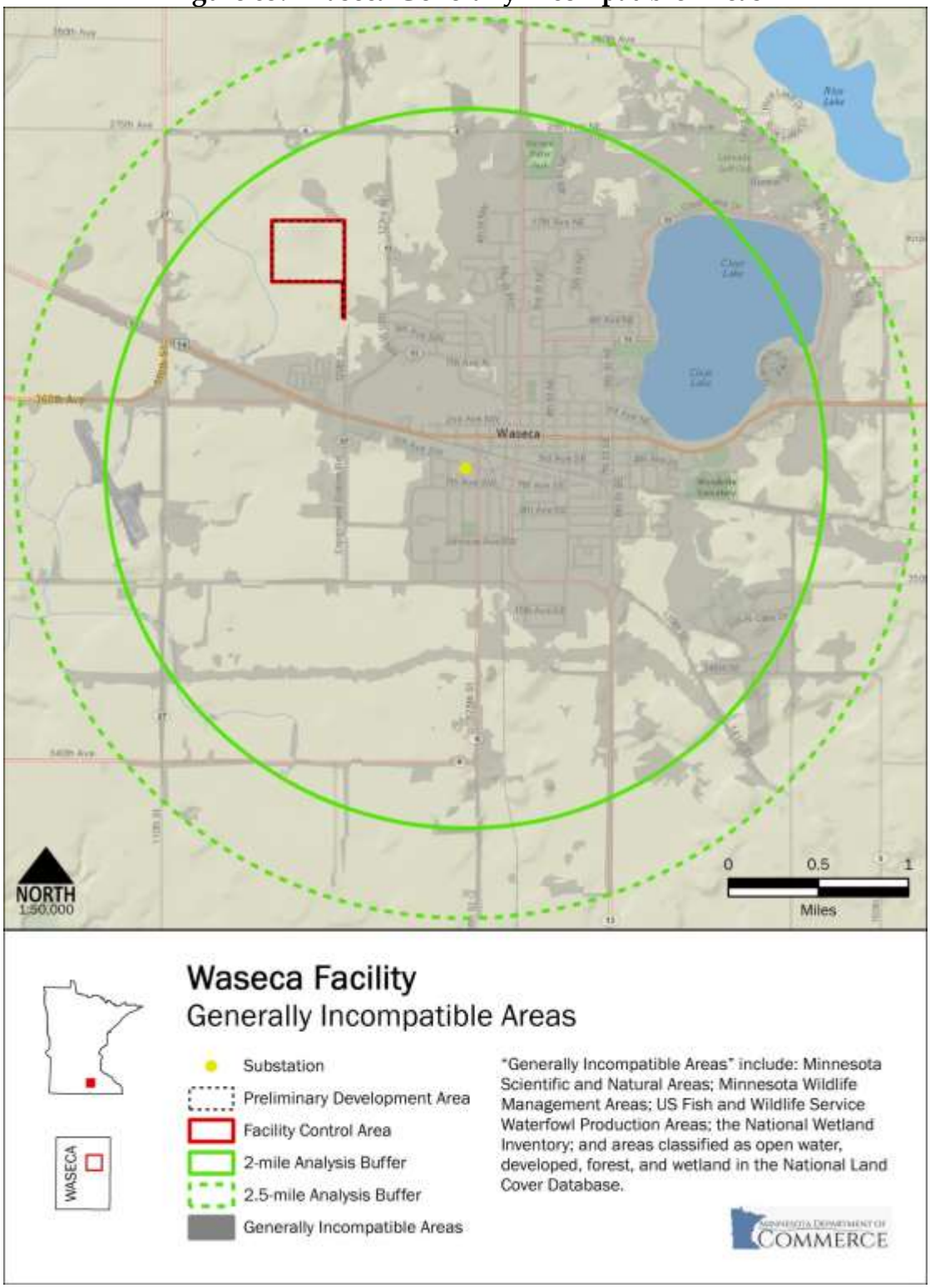
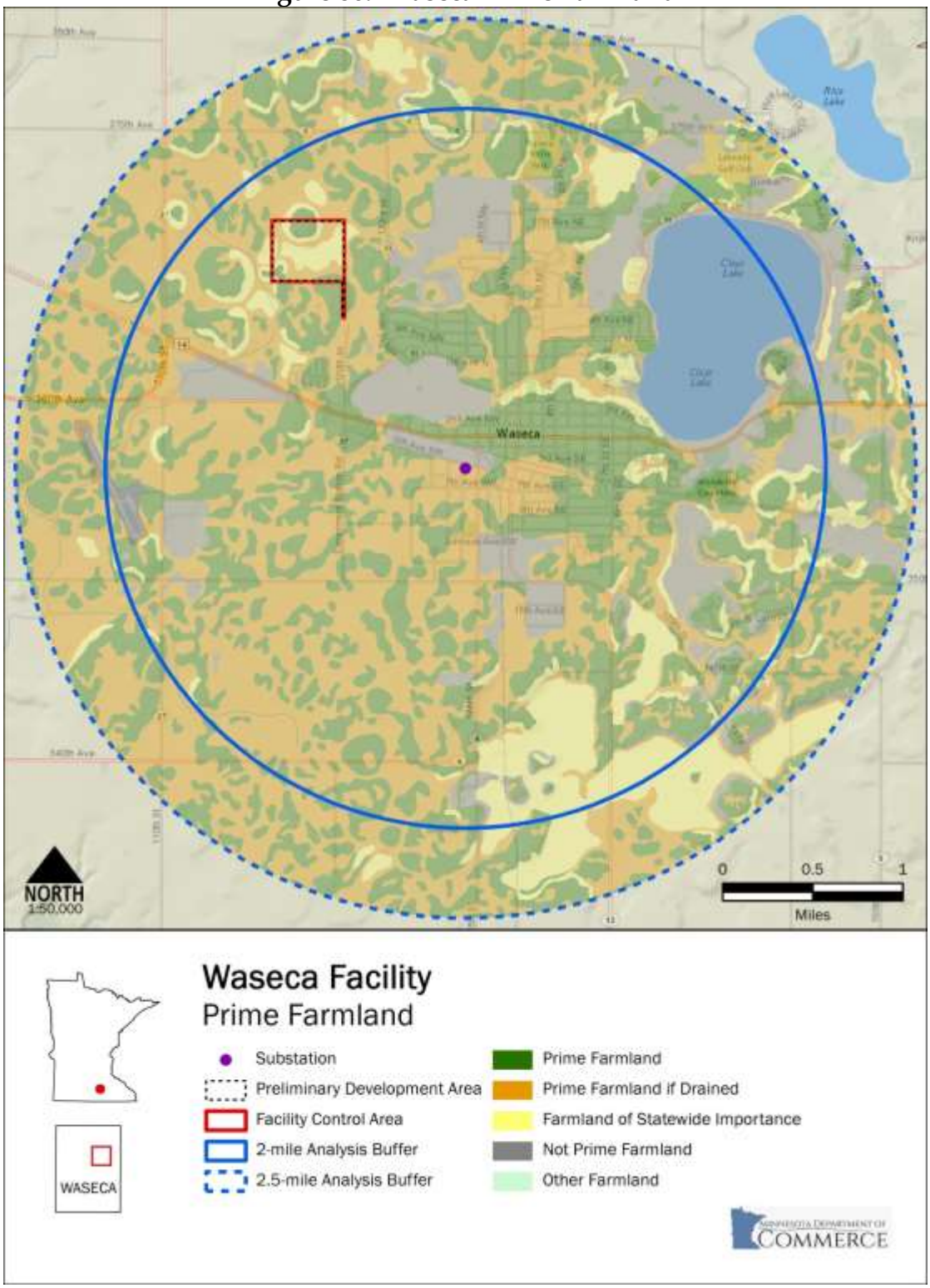


Figure 86: Waseca Prime Farmland



6.21 West Faribault

The proposed West Faribault facility has a capacity of 5.5 MW AC and is located in Section 2 of Warsaw Township in Rice County. The site is located west across Interstate 35 west from the city of Faribault, west of Bagley Avenue. Aurora anticipates that the facility will be accessed through an existing access from Bagley Avenue. Preliminary plans anticipate a development area of approximately 59.4 acres within the 85.5 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's West Faribault Substation located approximately 2.75 miles northeast of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Province. Land cover within the preliminary development area (Table 38) is dominated by cultivated crops (84.6 percent) with areas of deciduous forest (12.8 percent) also present along the eastern edge of the area of site control, outside of the preliminary development area. The West Faribault facility is located further than 2.5 miles from the West Faribault Substation, outside of the 2.5 mile area around the substation that comprises the study area. Generally the proposed location avoids the developed area of Faribault that is located to the east of Interstate 35 (Figure 88).

Table 38: West Faribault Facility - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	345.6	2.8%
Developed, Open Space	--	--	--	--	1,943.5	15.5%
Developed, Low Intensity	--	--	--	--	1,939.1	15.5%
Developed, Medium Intensity	--	--	--	--	1,259.7	10.0%
Developed, High Intensity	--	--	--	--	474.2	3.8%
Barren Land	--	--	--	--	15.6	0.1%
Deciduous Forest	13.2	15.4%	7.61	12.8%	1,287.6	10.3%
Evergreen Forest	--	--	--	--	5.8	0.1%
Mixed Forest	--	--	--	--	0.9	--
Shrub/Scrub	--	--	--	--	82.8	0.7%
Grassland Herbaceous	3.1	3.7%	0.57	1.0%	502.1	4.0%
Pasture/Hay	5.6	6.6%	1.00	1.7%	1,195.6	9.5%
Cultivated Crops	63.4	74.2%	50.21	84.6%	3,120.5	24.9%
Woody Wetlands	--	--	--	--	206.3	1.6%
Emergent Herbaceous Wetlands	--	--	--	--	173.1	1.4%
Totals	**85.5**	**100.0 %**	**59.4**	**100.0%**	**12,552.4**	**100.0%**

6.21.1 Effects on Human Settlement

The location is a cultivated parcel located west of Faribault, in a rural area with scattered rural residences. The nearest residence is located approximately 190 feet east of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses.

Most of the developed area in Faribault is on the eastern side of Interstate 35. The location is not located in an orderly annexation area and is zoned as Urban Reserve by Rice County. Rice County zoning does not address solar facilities; zoning regulations for other types of generation facilities require that onsite lighting is minimized and that connecting power lines are buried.[183]

Camp Faribo Campground and Seasonal RV Park is located across Bagley Avenue and approximately 300 feet south of the boundary of site control. Because of the screening from trees, along Bagley Avenue at both the proposed facility and the campground impacts from construction and operation of the facility are not expected.

The Faribo Sno-Go Trail, operated by the Sno-Go club, crosses the location. The trail operates through the property with the cooperation of the landowner, and would need to be relocated in this area if the facility were to be constructed. The Spring Greenway Park and trail are located within one-half mile of the proposed facility, across Interstate 35. Construction and operation of the facility would not impact the use of the park or trail.

No mitigation measures beyond those described in Section 5.2 are identified for the West Faribault facility.

6.21.2 Effects on Land Based Economies

The proposed facility would remove approximately 51 acres from agricultural use. At this time EERA staff is not aware of other solar facilities announced in the area of the proposed facility, so there is no indication that the conversion of land from agricultural uses would be part of a cumulative reduction of available land for crops or pasture.

42 acres (65 percent) of the developed area are considered to be prime farmland and 10 acres (17 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the West Faribault Substation, approximately 36 percent is considered to be prime farmland and 9 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the West Faribault facility as it is within two miles of Faribault.

[183] Rice County Comments

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those discussed in Section 5.3 are identified for the West Faribault facility.

6.21.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the West Faribault facility. No mitigation measures beyond those identified in Section 5.4 are proposed for the West Faribault facility.

6.21.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 0.02 acres of Type 6 (shrub swamp) in the preliminary development area.[184]

There is a wooded area in the eastern portion of the area of site control. Aurora anticipates limited tree clearing in the northeastern portion of the area of site control to establish the interconnection with the Xcel Energy distribution system (Appendix D) and for construction of the acces road to the site will likely result in limited tree clearing.

The preliminary design for the facility anticipates grading of approximately 37.0 acres of the site during construction.[185]

No mitigation measures beyond those described in Section 5.5 are identified for the West Faribault facility.

6.21.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered or threatened species within the preliminary development area of the West Faribault facility. The NHIS database review did show records for one state listed special concern species (Rattlesnake-master (Eryngium yuccifolium)) within one mile of the area of site control for the facility.[186]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the West Faribault facility.

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[184] Appendix C
[185] Application, at Appendix F
[186] Application, at p. 81, Appendix I

Figure 87: West Faribault Project Detail

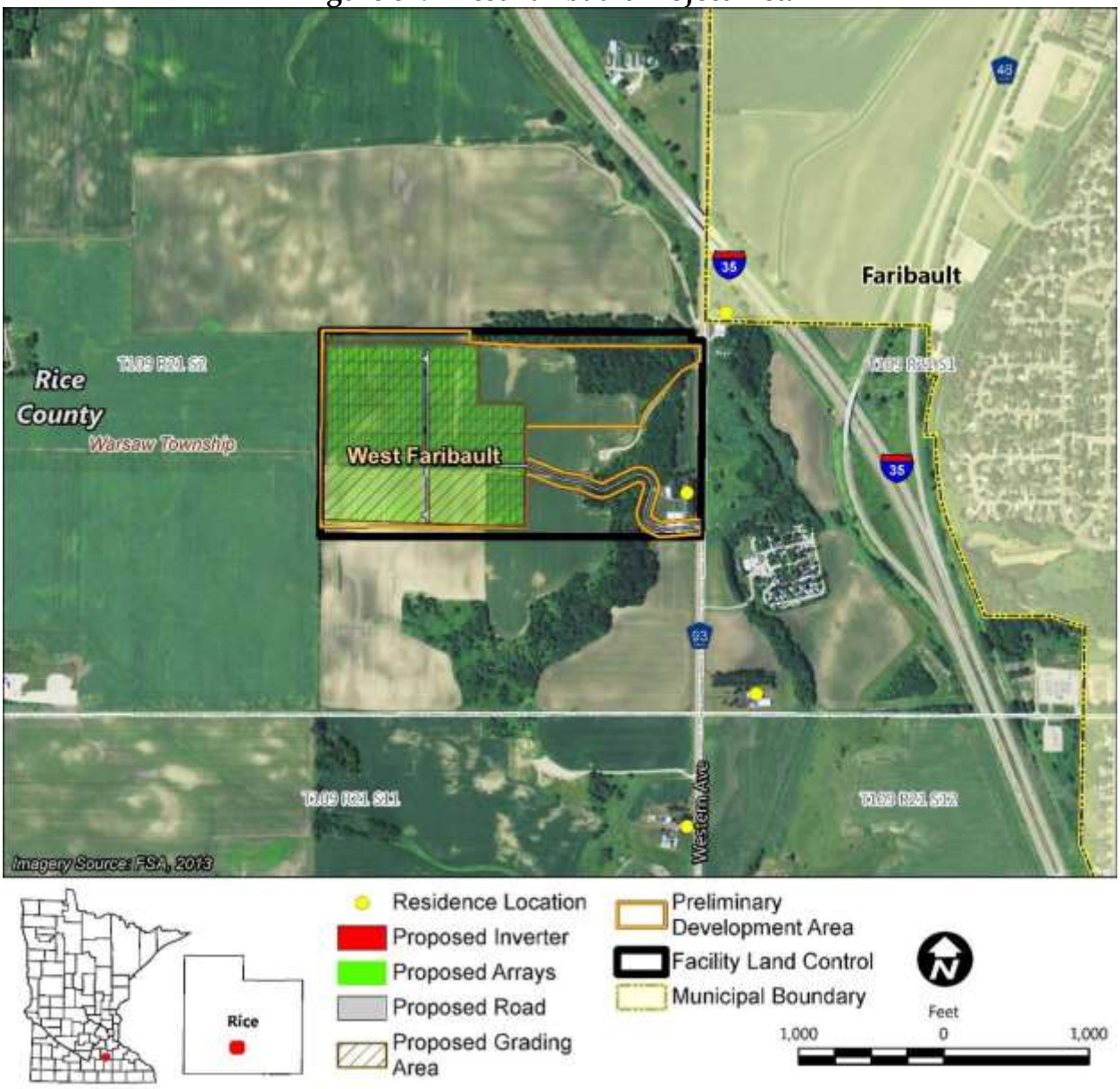


Figure 88: West Faribault Land Cover Overview

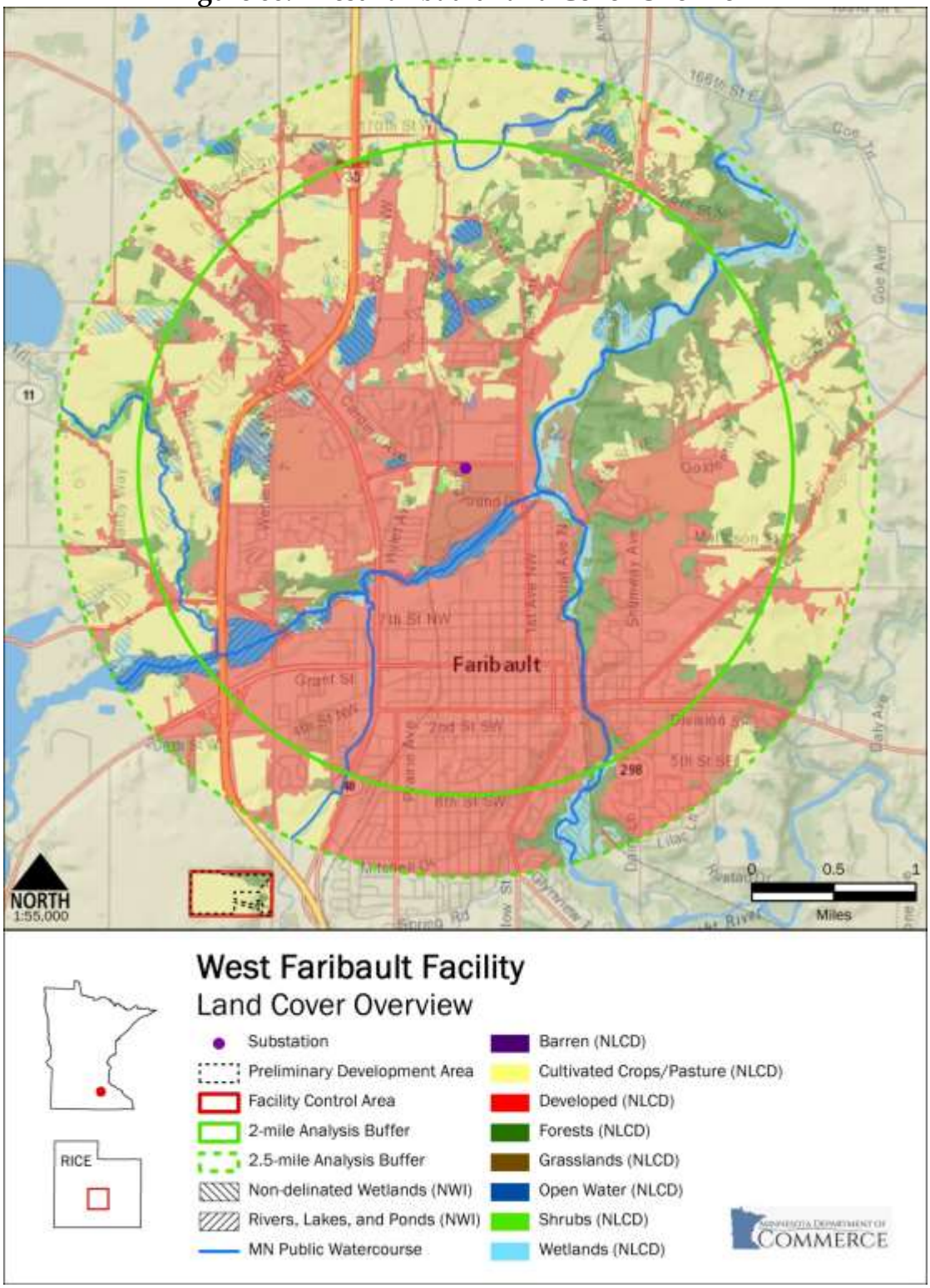


Figure 89: West Faribault Generally Incompatible Areas

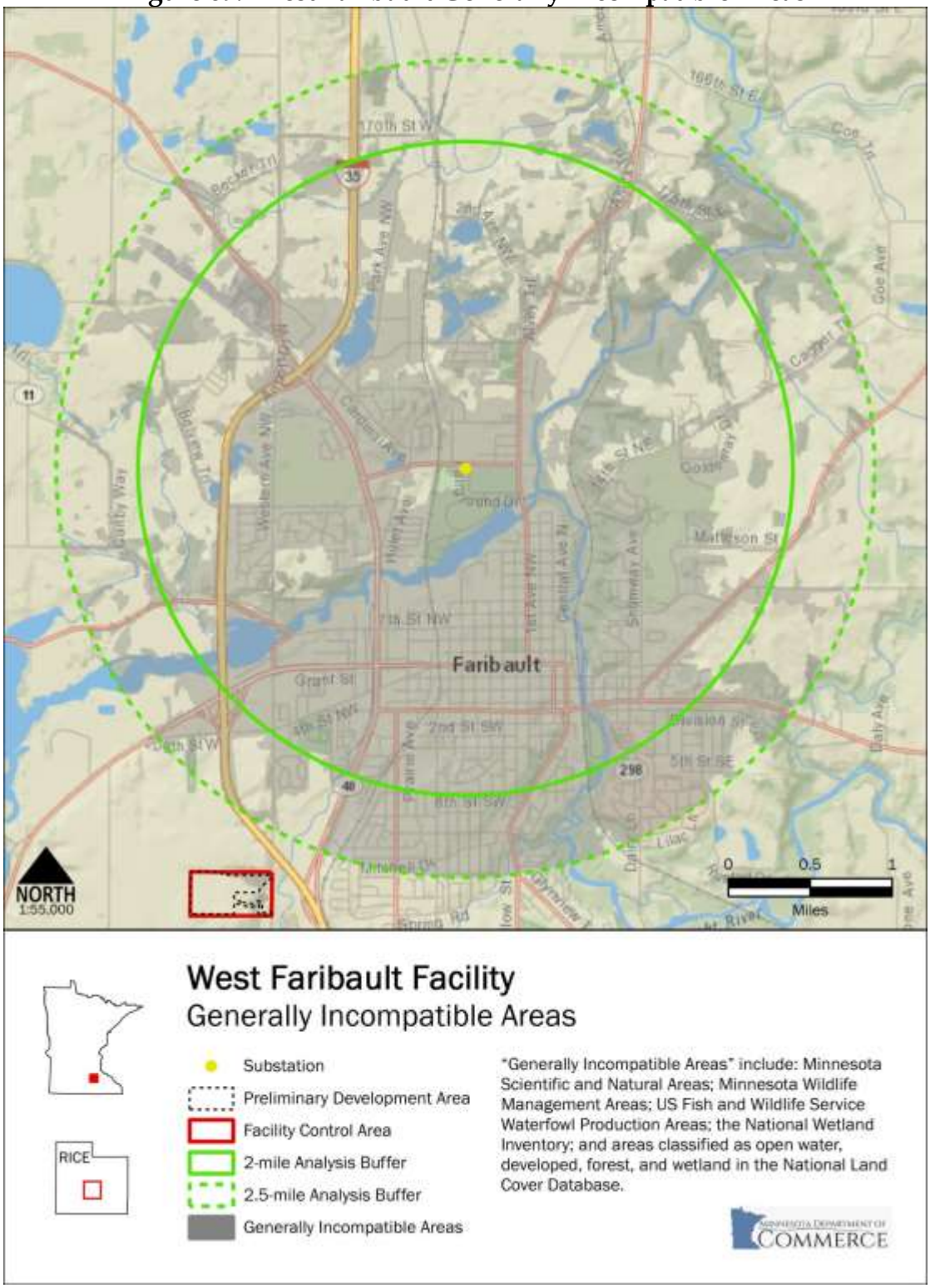
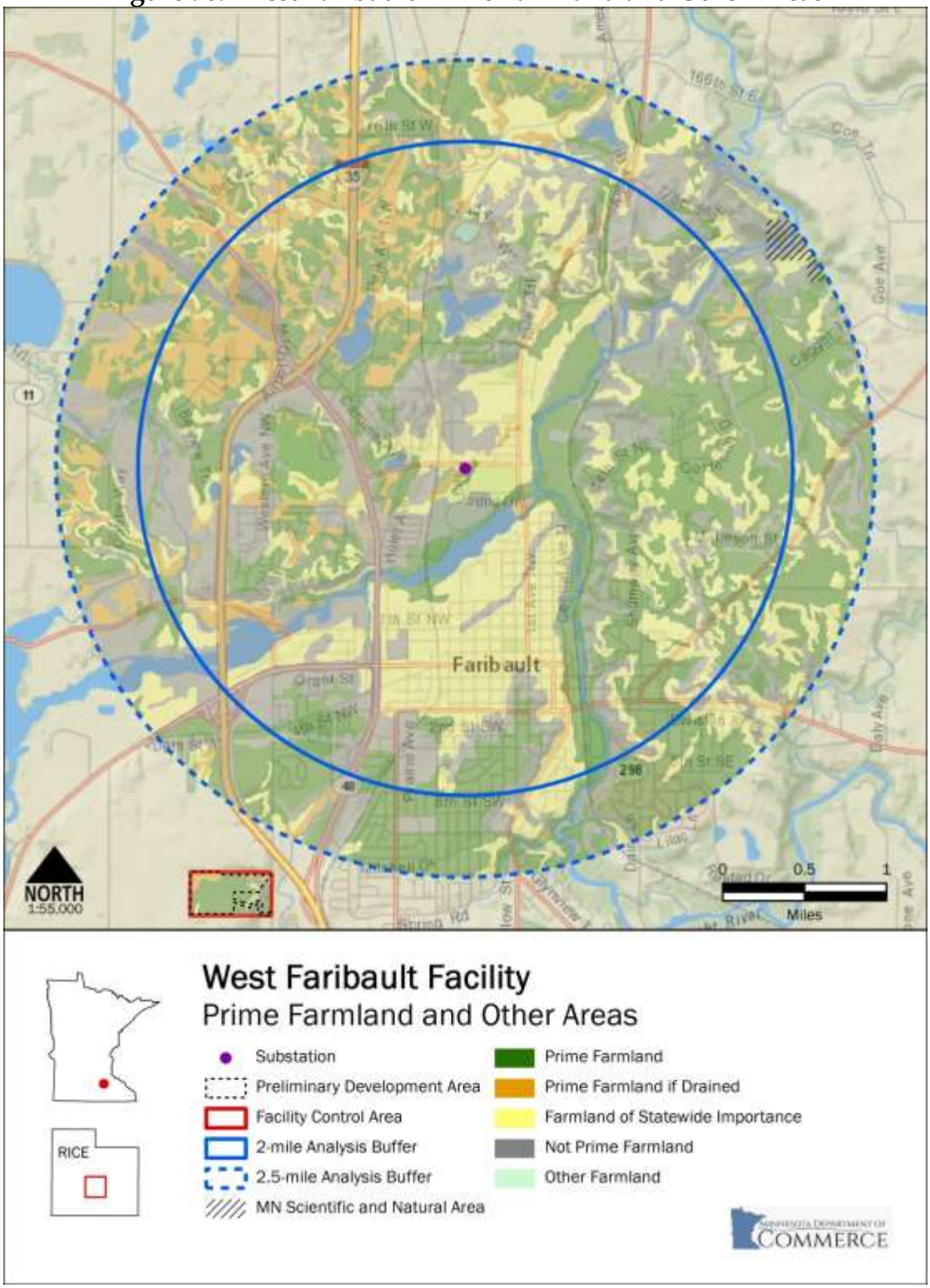


Figure 90: West Faribault Prime Farmland and Other Areas



6.22 West Waconia

The proposed West Waconia facility has a capacity of 8.5 MW AC and is located in Section 1 of Young America Township in Carver County. The site is located north/northeast of the city of Young America, northeast of the intersection of 118th Street and State Highway 25. Preliminary design anticipates access to the facility from a newly constructed drive off of 118th Street. Aurora's site control is 75.7 acres. Preliminary plans anticipate a development area of approximately 78.1 acres. The preliminary development area is larger than the land control to accommodate possible interconnection in the public ROW on the north side of Highway 5/25. Electricity from the facility would be delivered to Xcel Energy's West Waconia Substation located approximately 1.7 miles northeast of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 39) is dominated by cultivated crops (92.4 percent). The proposed location avoids the developed area of Norwood Young America to the southwest, but is otherwise comparable in land cover to the agricultural cover that dominates the study area around the West Waconia Substation (Figure 92).

Table 39: West Waconia Facility - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	771.2	6.1%
Developed, Open Space	2.3	3.0%	1.6	2.0%	457.6	3.7%
Developed, Low Intensity	0.5	0.7%	3.4	4.4%	175.0	1.4%
Developed, Medium Intensity	--	--	--	--	10.8	0.1%
Developed, High Intensity	--	--	--	--	--	--
Barren Land	--	--	--	--	--	--
Deciduous Forest	0.4	0.5%	0.4	0.5%	737.6	5.9%
Evergreen Forest	--	--	--	--	22.6	0.2%
Mixed Forest	--	--	--	--	11.1	0.1%
Shrub/Scrub	--	--	--	--	262.1	2.1%
Grassland Herbaceous	--	--	--	--	66.6	0.5%
Pasture/Hay	0.5	0.7%	0.5	0.7%	2,529.6	20.2%
Cultivated Crops	72.1	95.1%	72.1	92.4%	6,769.7	53.9%
Woody Wetlands	--	--	--	--	1.1	0.0%
Emergent Herbaceous Wetlands	--	--	--	--	738.8	5.9%
Totals	**75.7**	**100.0%**	**78.1**	**100.0%**	**12,553.7**	**100.0%**

6.22.1 Effects on Human Settlement

The location is a cultivated parcel located in rural area with scattered rural residences. The nearest home is located approximately 440 feet northwest of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The site has not been identified as being within an orderly annexation area and is located in Carver County's "A" Agricultural District. Under Chapter 152 of the Carver County Code, a minimum setback of 15 feet from any property line and 35 feet from existing or planned road right-of-way for any structure or fence of greater than six feet in height. Solar farms are a conditional use in the Agricultural District; electrical lines are required to be buried.[187] The area of site control is designated as Agriculture in the Carver County 2030 Land Use Plan.[188]

A snowmobile trail follows the ditch along State Highway 25 along the northern portion of the facility. No other recreational trails, county, state or local parks identified within one-have mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

The site is adjacent to State Highway 25; MnDOT has requested that the site be designed to provide an adequate clear zone from Minnesota Highway 25.[189]

No mitigation measures beyond those described in Section 5.2 are identified for the West Waconia facility.

6.22.2 Effects on Land Based Economies

The proposed facility would remove approximately 73 acres from agricultural use for at least 25 years. Aurora's proposed Lester Prairie facility is located within 10 miles of the West Waconia facility. Together the two facilities would remove approximately 97 acres from agricultural production for at least 25 years.

Approximately 40 acres (51 percent) of the developed area are considered to be prime farmland and 22 acres (28 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the West Waconia Substation, approximately 36 percent is considered to be prime farmland and 24 percent is considered to be prime farmland if drained. Given that prime farmland or prime farmland if drained comprise the majority of the study area, it is likely that any alternate locations would also be sited on prime farmland or prime farmland if drained (Figure 94).

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[187] Carver County Ordinance, Section 152, http://www.co.carver.mn.us/departments/LWS/docs/Code_Title_15.PDF
[188] Carver County 2030 Comprehensive Plan, Land Use – Young America Township. http://www.co.carver.mn.us/departments/LWS/docs/YoungAmericaTWP_100427.pdf
[189] MnDOT Comments, September 30, 2014, at p. 2

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the West Waconia facility.

6.22.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the West Waconia facility. No mitigation measures beyond those described in Section 5.4 are identified for the West Waconia facility.

6.22.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 identified approximately 1.5 acres of Type 3 wetlands (shallow marsh) in the area of land control.[190]

The preliminary design for the facility anticipates grading of approximately 59.7 acres of the site during construction.[191]

No mitigation measures beyond those described in Section 5.5 are identified for the West Waconia facility.

6.22.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered, threatened or special concern species within one mile of the area of site control for the West Waconia facility.[192]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the West Waconia facility.

[190] Appendix C
[191] Application, at Appendix F
[192] Application, at p. 81

Figure 91: West Waconia Project Detail

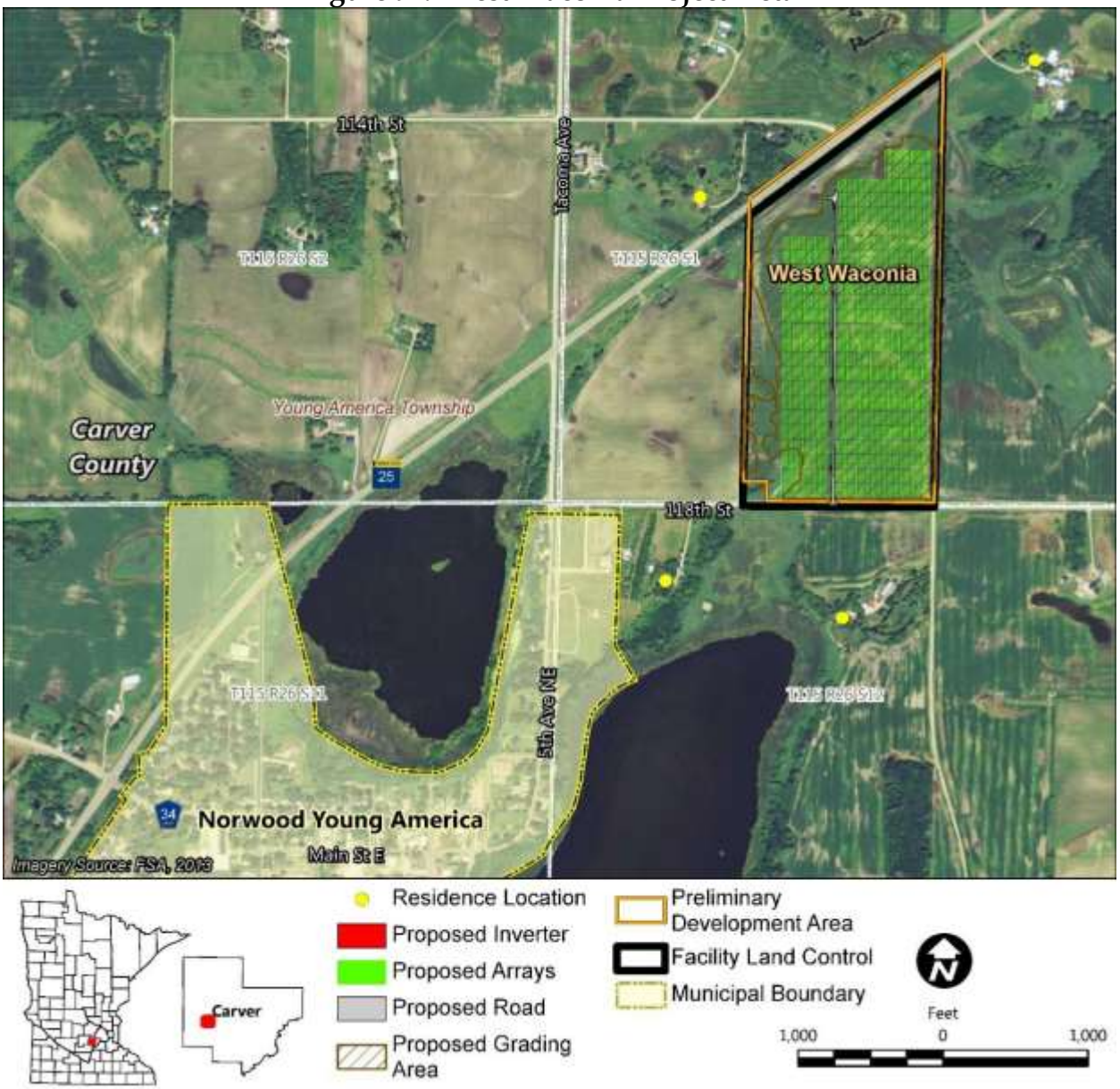


Figure 92: West Waconia Land Cover Overview

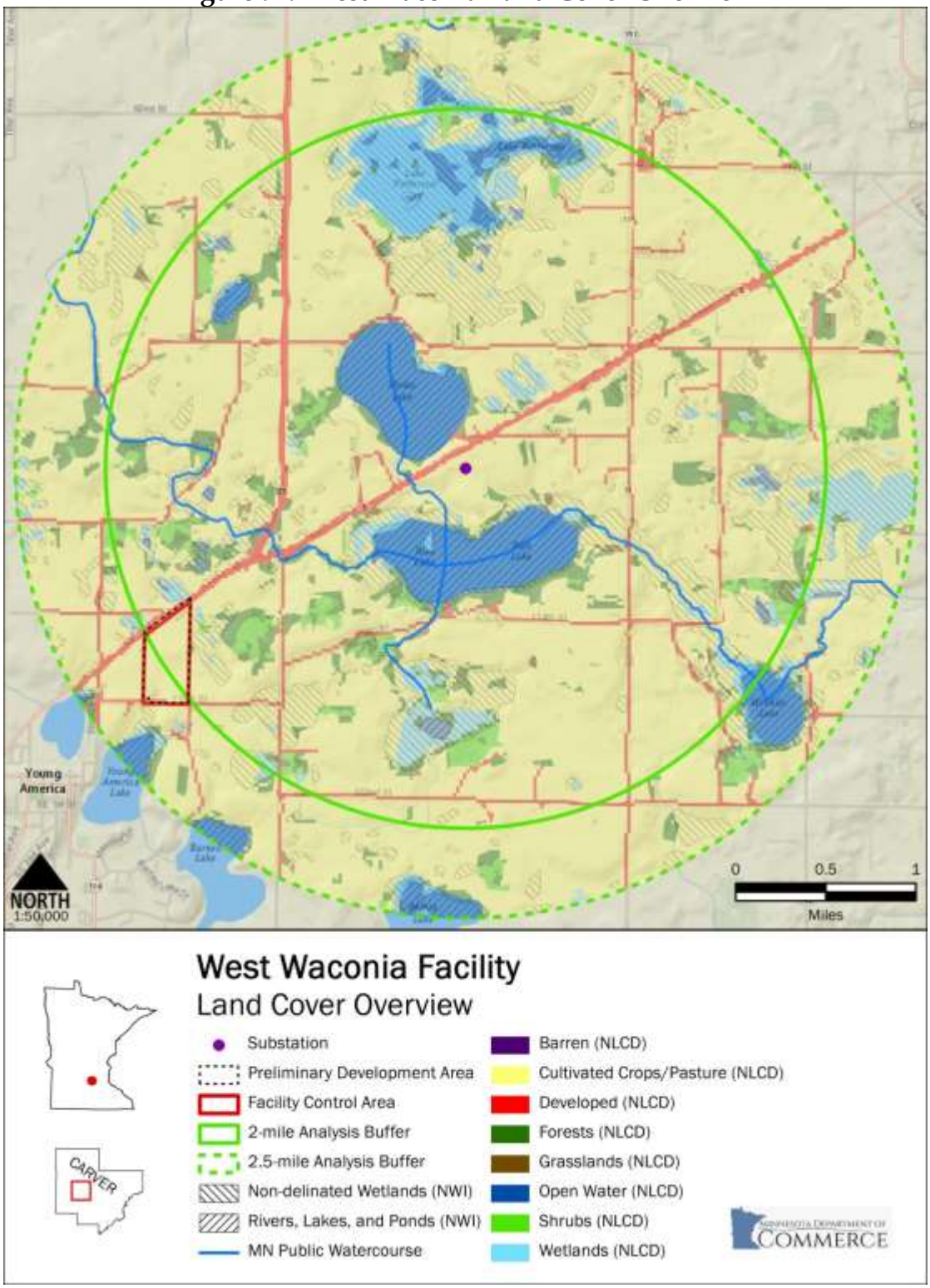


Figure 93: West Waconia Generally Incompatbiel Areas

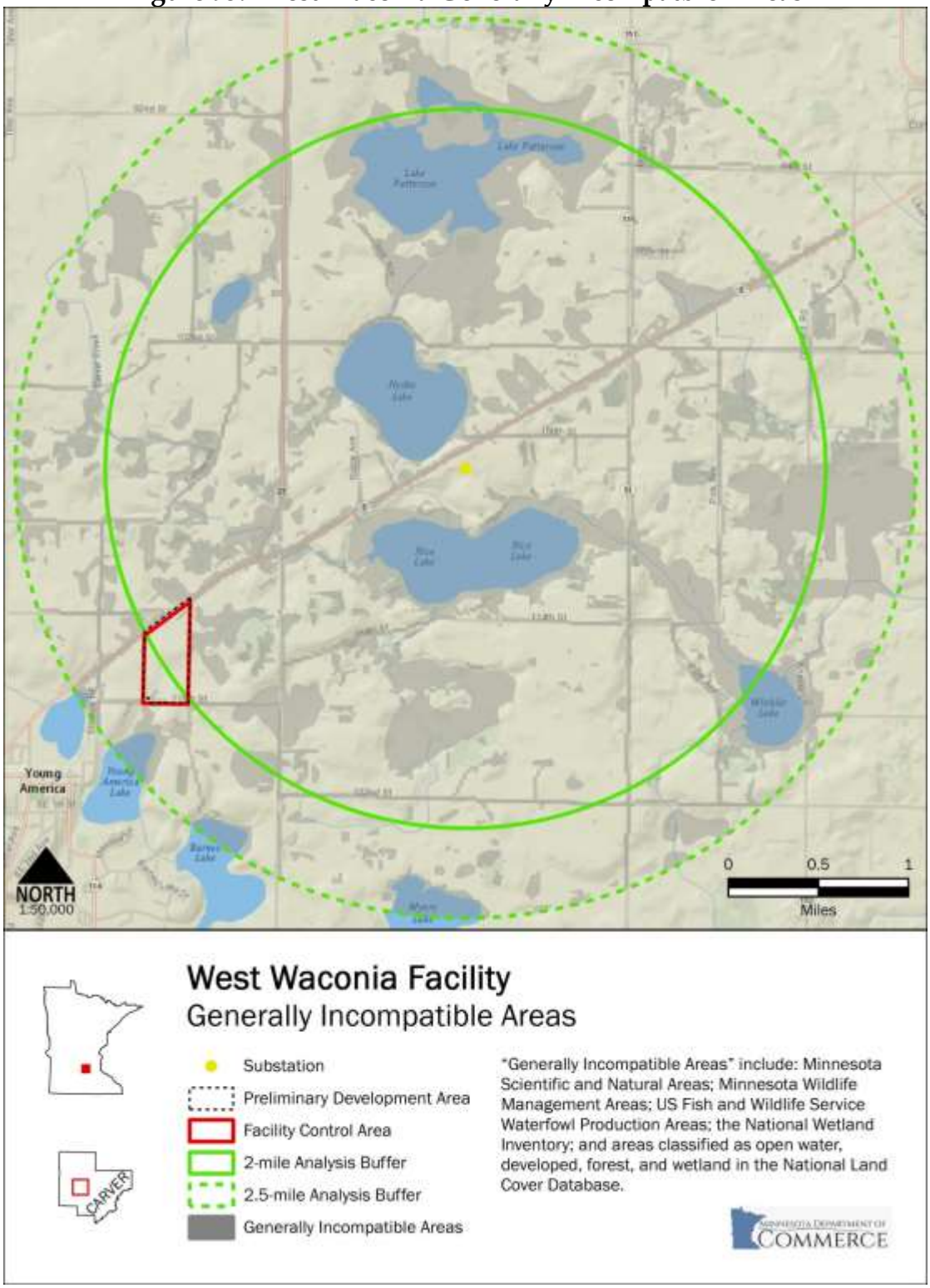
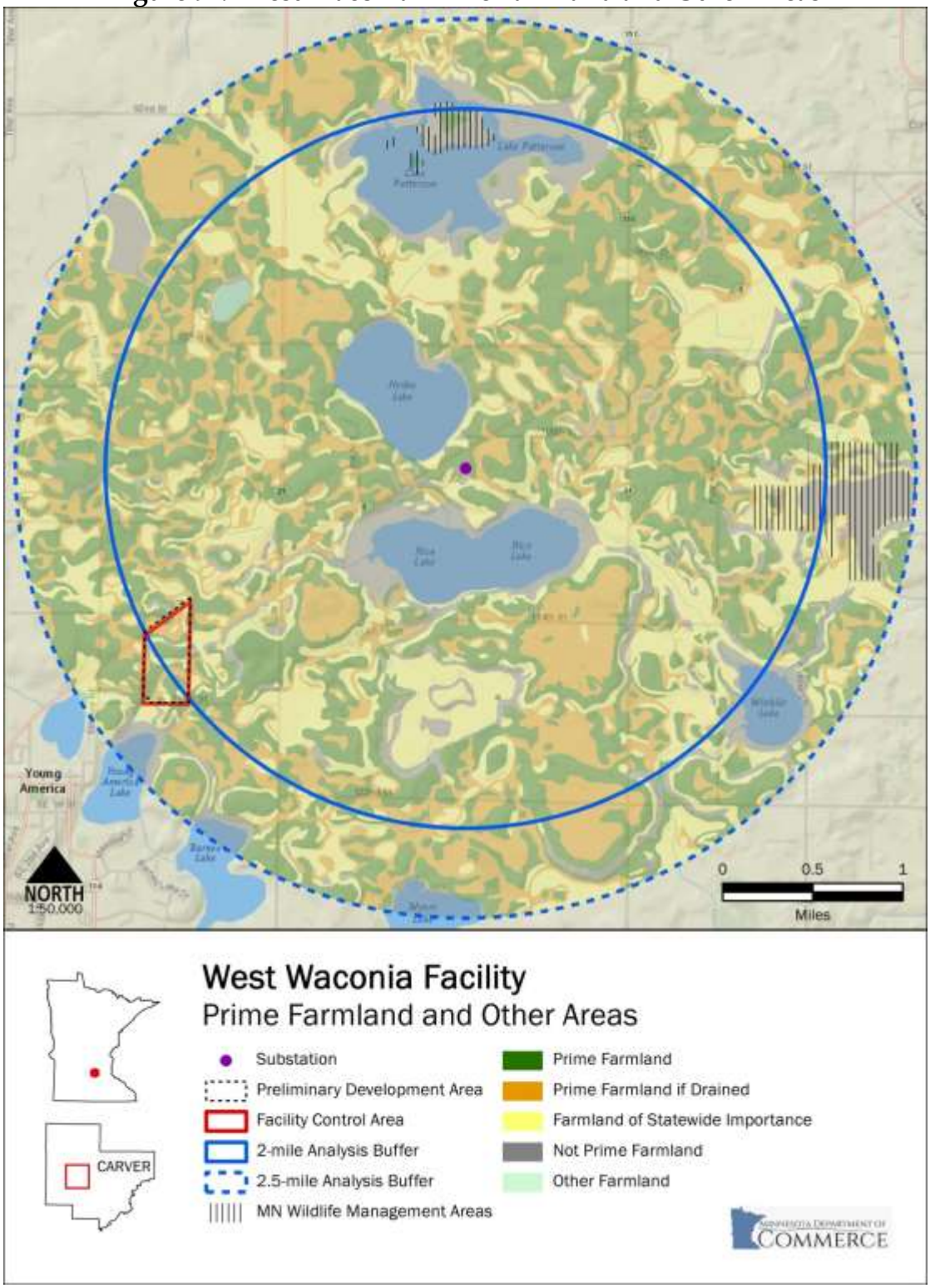


Figure 94: West Waconia Prime Farmland and Other Areas



6.23 Wyoming

The proposed Wyoming facility has a capacity of 7.0 MW AC and is located in the city of Wyoming in Chisago County, southeast of the intersection of 250th Street North and Highway 61. Aurora anticipates that the facility will be accessed through a newly constructed drive off of Forest Boulevard North (US Highway 61). Preliminary plans anticipate a development area of approximately 62 acres within the 67x acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Wyoming Substation located approximately 740 feet west of the facility.

The facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 40) is dominated by cultivated crops (90.5 percent) and an additional 8.7 percent in developed cover (6.3 percent in open space, 1.5 percent in low-intensity and 0.8 percent in medium intensity). The proposed location avoids the developed areas of Wyoming and Forest Lake located to the north and south, as well as the scattered surface waters and wetlands that comprise approximately 24 percent of the land cover of the study area surrounding the Wyoming Substation (Figure 96).

Table 40: Wyoming Facility - Land Cover

Land Cover	Control Area		Development Area		Study Area	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	1,274.0	10.2%
Developed, Open Space	4.2	6.3%%	3.9	6.3%	1,802.5	14.4%
Developed, Low Intensity	0.9	1.4%	0.9	1.5%	903.9	7.2%
Developed, Medium Intensity	0.51	0.8%	05	0.8%	444.9	3.5%
Developed, High Intensity	--	--	--	--	257.4	2.1%
Barren Land	--	--	--	--	--	--
Deciduous Forest	--	--	--	--	2,338.6	18.6%
Evergreen Forest	--	--	--	--	163.9	1.3%
Mixed Forest	--	--	--	--	6.2	0.1%
Shrub/Scrub	--	--	--	--	35.2	0.3%
Grassland Herbaceous	--	--	--	--	529.5	4.2%
Pasture/Hay	0.8	1.2%	0.5	0.9%	1,539.8	12.3%
Cultivated Crops	60.8	90.3%	56.1	90.5%	1,529.9	12.2%
Woody Wetlands	--	--	--	--	193.4	1.5%
Emergent Herbaceous Wetlands	--	--	--	--	1,533.2	12.2%
Totals	**67.3**	**100.0%**	**62.0**	**100.0%**	**12,552.2**	**100.0%**

6.23.1 Effects on Human Settlement

The location is a cultivated parcel in rural area with a mixture of farmland and some rural residences. The nearest home is located approximately 87 feet north of the preliminary development area, across 250th Street North. Construction of the facility will not result in displacement of any homes or businesses. The facility is located in an area zoned by the city of Wyoming as R-2, Rural Residential. Solar farms are not specifically addressed in the Wyoming Zoning Code.

A Snowmobile trail, Banta Park and the Sunrise Trail are all located within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

No mitigation measures beyond those described in Section 5.2 are identified for the Wyoming facility.

6.23.2 Effects on Land Based Economies

Based on the preliminary site design, the Wyoming facility would remove approximately 57 acres from agricultural use. In addition to the Wyoming facility, Aurora's Chisago, Lawrence Creek, and Scandia facilities, as well as the North Star Solar Project, a 100 MW PV project proposed by North Star Solar PV LLC are all proposed in Chisago County If all of the proposed facilities are developed, the five facilities would result in a cumulative reduction of approximately 970 acres from agricultural use in Chisago County for at least 25 years.

None of the developed area is considered to be either prime farmland or prime farmland if drained (Table 13). Within the comparison area surrounding the Wyoming Substation, approximately 6 percent is considered to be prime farmland and 2 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Wyoming facility as it is within the municipal boundary of Wyoming.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

No mitigation measures beyond those described in Section 5.3 are identified for the Wyoming facility.

6.23.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Wyoming facility. No mitigation measures beyond those described in Section 5.4 are identified for the Wyoming facility.

6.23.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. Field delineations performed in the summer of 2014 show approximately 1.1 acres of wetlands within the area of site control; 0.94 acres of Type 1 (seasonally flooded basins or floodplains and 0.19 acres of Type 3 (shallow marsh).[193]

The preliminary design for the facility anticipates grading of approximately 9.5 acres of the site during construction.[194]

No mitigation measures beyond those described in Section 5.5 are identified for the Wyoming facility.

6.23.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of state or federally listed endangered or threatened species within the preliminary development area of the Wyoming facility. The NHIS database review did show records for one state listed threatened species (Blanding's Turtle (Emydoidea blandingii)) and a Colonial Waterbird Nesting Site within one mile of the area of site control for the facility.[195]

No specific mitigation is proposed for the Colonial Waterbird Nesting Site, as impacts from the proposed facility are not anticipated.

No mitigation measures beyond the field survey and Blanding's Turtle Special Condition described in Section 5.6 are identified for the Wyoming facility.

[193] Appendix C
[194] Application, at Appendix F
[195] Application, at p. 81, Appendix I

Figure 95: Wyoming Project Detail

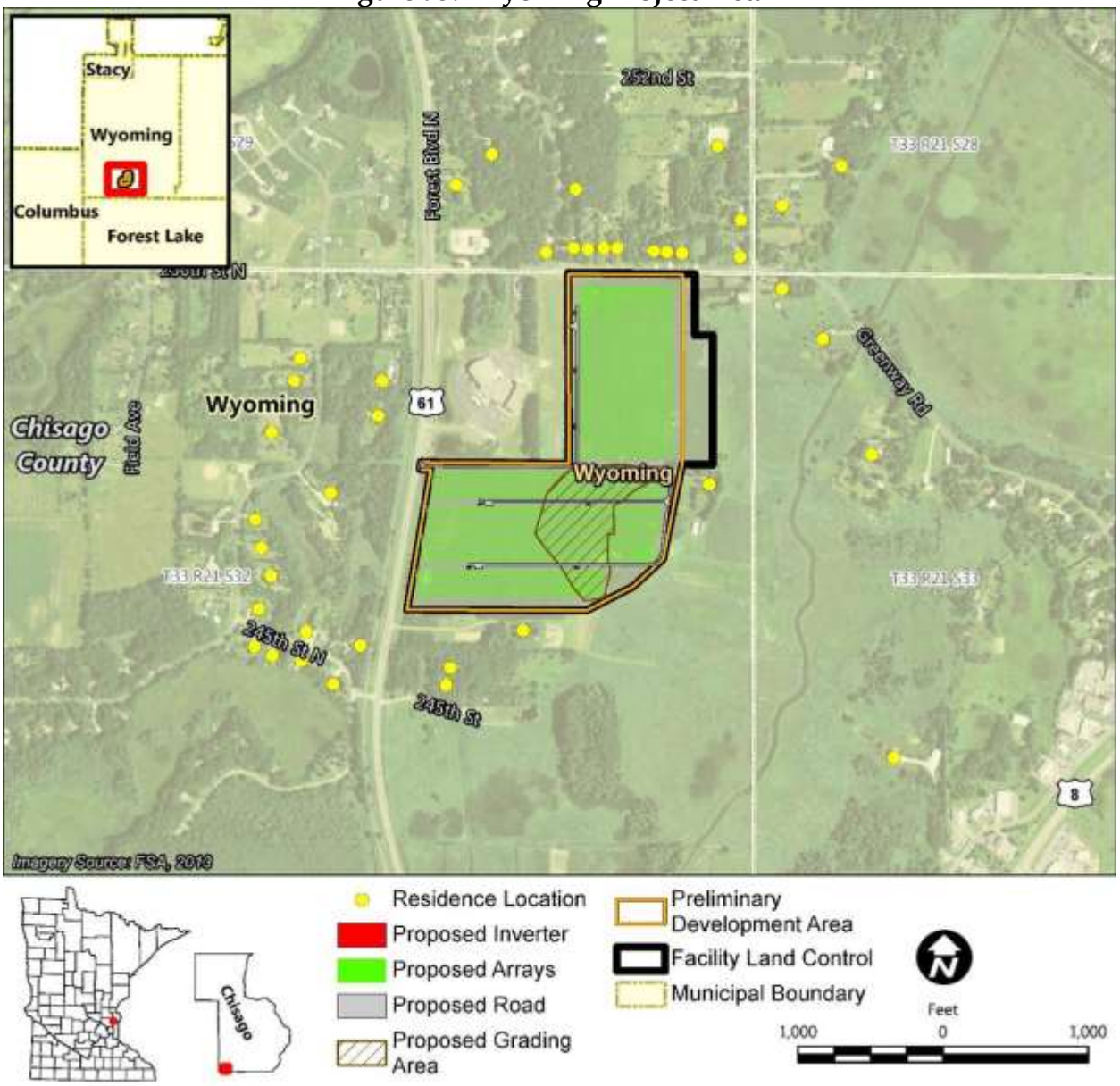


Figure 96: Wyoming Land Cover Overview

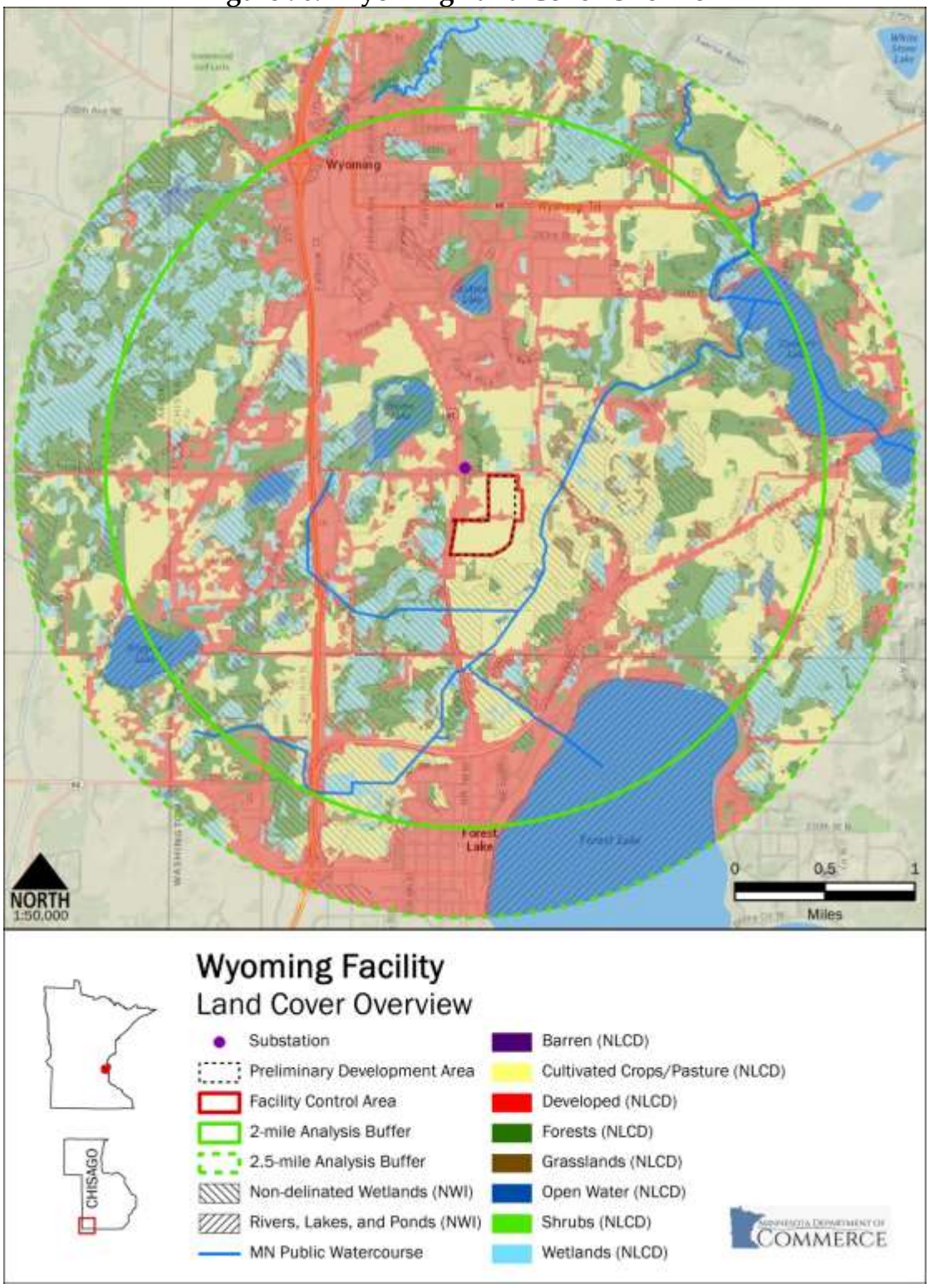


Figure 97: Wyoming Generally Incompatible Areas

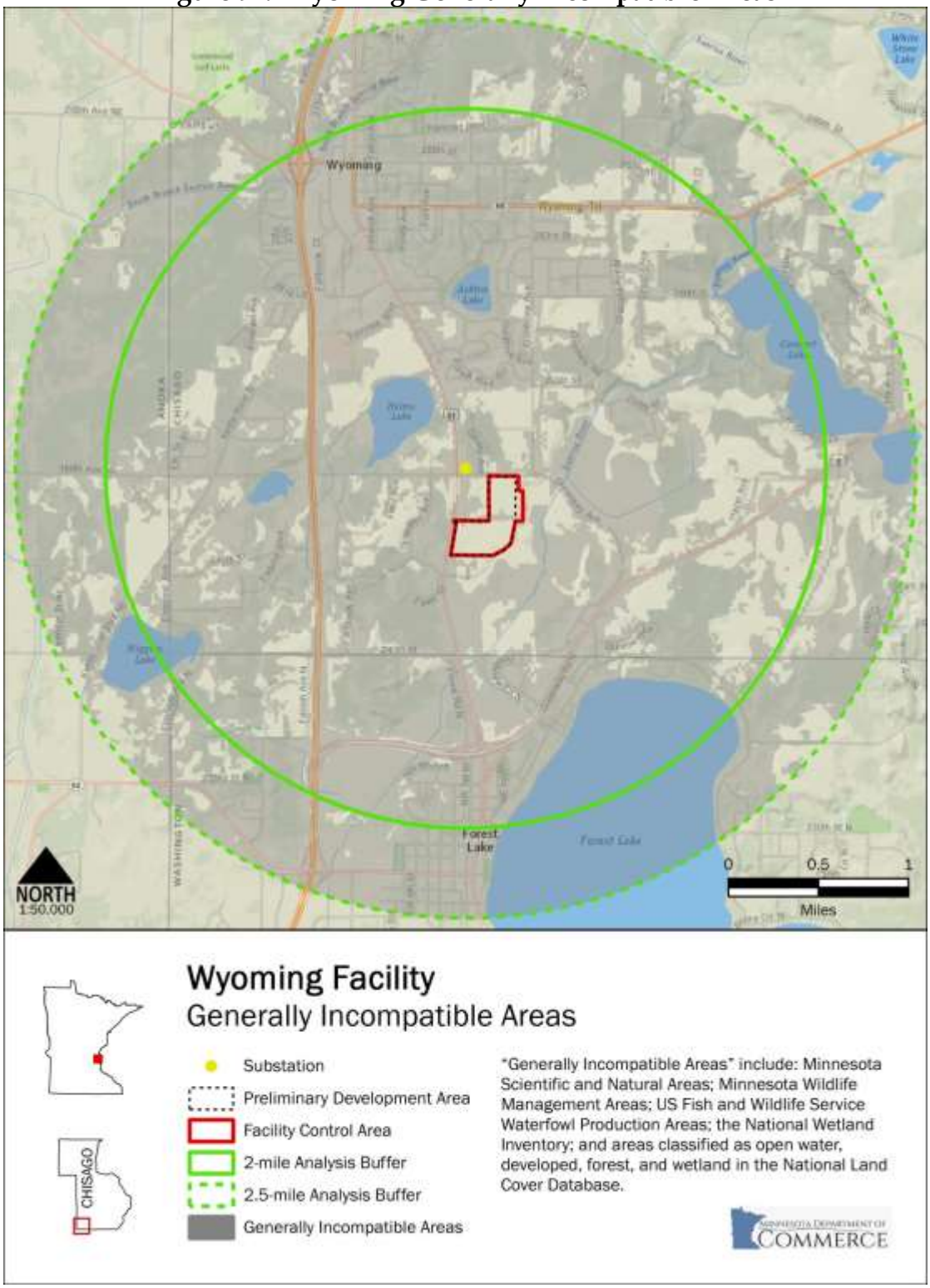
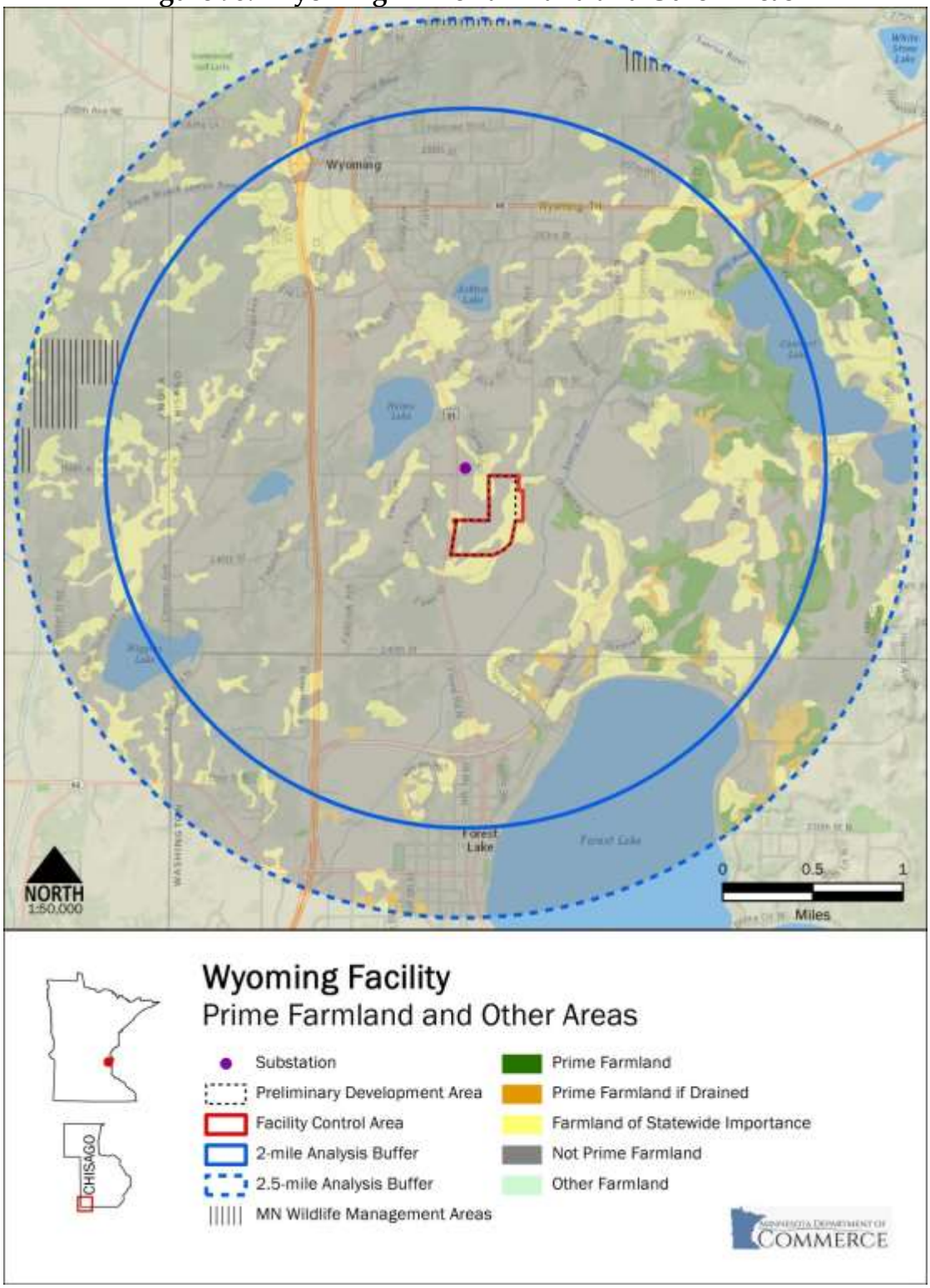


Figure 98: Wyoming Prime Farmland and Other Areas



6.24 Zumbrota

The proposed Zumbrota facility has a capacity of 3.5 MW AC and is located in Section 25 of Minneola Township in Goodhue County. The site is located just west across US Highway 52 of the city of Zumbrota, south of 445th Street. Aurora anticipates that the facility will be accessed through a newly constructed drive off of 445th Street.[196] Preliminary plans anticipate a development area of approximately 31.9 acres within the 35.6 acres of Aurora's site control. Electricity from the facility would be delivered to Xcel Energy's Zumbrota Substation located approximately 0.4 miles east of the facility.

The facility is located within the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province. Land cover within the preliminary development area (Table 41) is dominated by cultivated crops (91.7 percent), with areas of developed open space (5.3 percent) and grasslands (2.3 percent) also present. The proposed location avoids the developed area of Zumbrota, located east of US Highway 52, and most of the grassland areas that are scattered throughout the study area surrounding the Zumbrota Substation (Figure 100).

Table 41: Zumbrota Facility - Land Cover

Land Cover	Control Area		Development Area		2.5 Mile Buffer	
	Acres	Percent	Acres	Percent	Acres	Percent
Open Water	--	--	--	--	27.1	0.2%
Developed, Open Space	1.7	4.9%	1.7	5.3%	945.2	7.5%
Developed, Low Intensity	0.2	0.5%	0.2	0.5%	725.4	5.8%
Developed, Medium Intensity	0.1	0.2%	0.1	0.2%	188.1	1.5%
Developed, High Intensity	--	--	--	--	54.2	0.4%
Barren Land	--	--	--	--	12.1	0.1%
Deciduous Forest	--	--	--	--	661.0	5.3%
Evergreen Forest	--	--	--	--	3.8	0.0%
Mixed Forest	--	--	--	--	--	--
Shrub/Scrub	--	--	--	--	--	--
Grassland Herbaceous	1.3	3.5%	0.7	2.3%	2,181.5	17.4%
Pasture/Hay	0.0	0.0%	0.0	0.0%	1,880.5	15.0%
Cultivated Crops	32.4	91.0%	29.2	91.7%	5,673.9	45.2%
Woody Wetlands	--	--	--	--	175.3	1.4%
Emergent Herbaceous Wetlands	--	--	--	--	24.2	0.2%
Totals	**35.6**	**100.0%**	**31.9**	**100.0%**	**12,552.4**	**100.0%**

[196] Appendix C

6.24.1 Effects on Human Settlement

The facility is located in a rural area with scattered rural residences, including a residential development to the south of the proposed facility. The facility location is currently cultivated and the nearest home is located approximately 290 feet south of the preliminary development area. Construction of the facility will not result in displacement of any homes or businesses. The facility is located within Zumbrota's orderly annexation area. The facility is located in Goodhue County's Agricultural A-3 Urban Fringe. The A-3 zoning classification is designated to identify areas where development should be limited to avoid creating obstacles to future urbanization[197]. The facility would be classified as a "Solar Energy System" in Section 19 of the *Goodhue County Zoning Ordinance*, and would be considered as either a conditional use or interim permitted use in the A-3 Zoning area. [198]

There is a snowmobile trail north of the facility along 455th Street; the snowmobile trail does not cross the development area. No other recreational trails, county state or local parks within one-half mile of the proposed facility. Construction and operation of the facility would not impact the use of nearby recreational resources.

The Zumbrota facility's proximity to the nearby residential neighborhood (see Figure 99) would mean that the aesthetic impacts to nearby housing is likely to be noticeable. A landscaping plan as described in Section 5.2.7 could be developed to minimize visual impacts to the residential area south of the facility.

6.24.2 Effects on Land Based Economies

Based on the preliminary site design, the Zumbrota facility would remove approximately 29.2 acres from agricultural use. Aurora's Pine Island facility is also located in Goodhue County. Based on the preliminary site design, Aurora anticipates that the Pine Island Facility would remove approximately 41.2 acres from agricultural use, resulting in a cumulative decrease of 70.4 acres.

Approximately 21 acres (65 percent) of the developed area are considered to be prime farmland and 6 acres (17 percent) are considered to be prime farmland if drained (Table 13). Within the comparison area surrounding the Zumbrota Substation, approximately 47 percent is considered to be prime farmland and 7 percent is considered to be prime farmland if drained. The prime farmland exclusion in Minnesota Rule 7850.4400, Subpart 4 does not apply to the Zumbrota facility as it is within an orderly annexation area.

The proposed project would not impact tourism, mining or mineral extraction activity, or forest resources of economic importance.

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[197] Goodhue County Comments
[198] *Goodhue County Zoning Ordinance: Article 19, Solar Energy System (SES) Regulations*. (Amended September 16, 2014)http://www.co.goodhue.mn.us/DocumentCenter/View/2428

No mitigation measures beyond those described in Section 5.5 are identified for the Zumbrota facility.

6.24.3 Effects on Archaeological and Historic Resources

No archaeological sites were identified in a survey of the Zumbrota facility. No mitigation measures beyond those described in Section 5.4 are identified for the Zumbrota facility.

6.24.4 Effects on Natural Environment

There are no rivers, streams or lakes within the area of facility site control. An unnamed tributary that flows into the North Fork of the Zumbro River abuts the southern boundary of the facility.

Field delineations performed in the summer of 2014 show approximately 0.3 acres of Type 7 (wooded swamp) wetlands within the area of land control.[199]

The preliminary design for the facility anticipates grading of approximately 4.6 acres of the site during construction.[200]

No mitigation measures beyond those described in Section 5.5 are identified for the Zumbrota facility.

6.24.5 Effects on Rare and Unique Natural Resources

A review of the NHIS database did not identify any documented instances of federally listed endangered or threatened species within the land control boundary of the Zumbrota facility. The NHIS database review did show records for one state listed threatened species (Tubercled Rein-orchid (Platanthera flava var. herbiola)) and one state listed special concern species (White Wild Indigo (Baptisia lactea var. lactea)) within the preliminary development area, and one state listed threatened species Valerian (Valeriana edulis var. ciliata))within one mile of the area of site control for the facility.[201]

No mitigation measures beyond the field survey described in Section 5.6 are identified for the Zumbrota facility.

[199] Appendix C
[200] Application, at Appendix F
[201] Application, at p. 81,

Figure 99: Zumbrota Project Detail

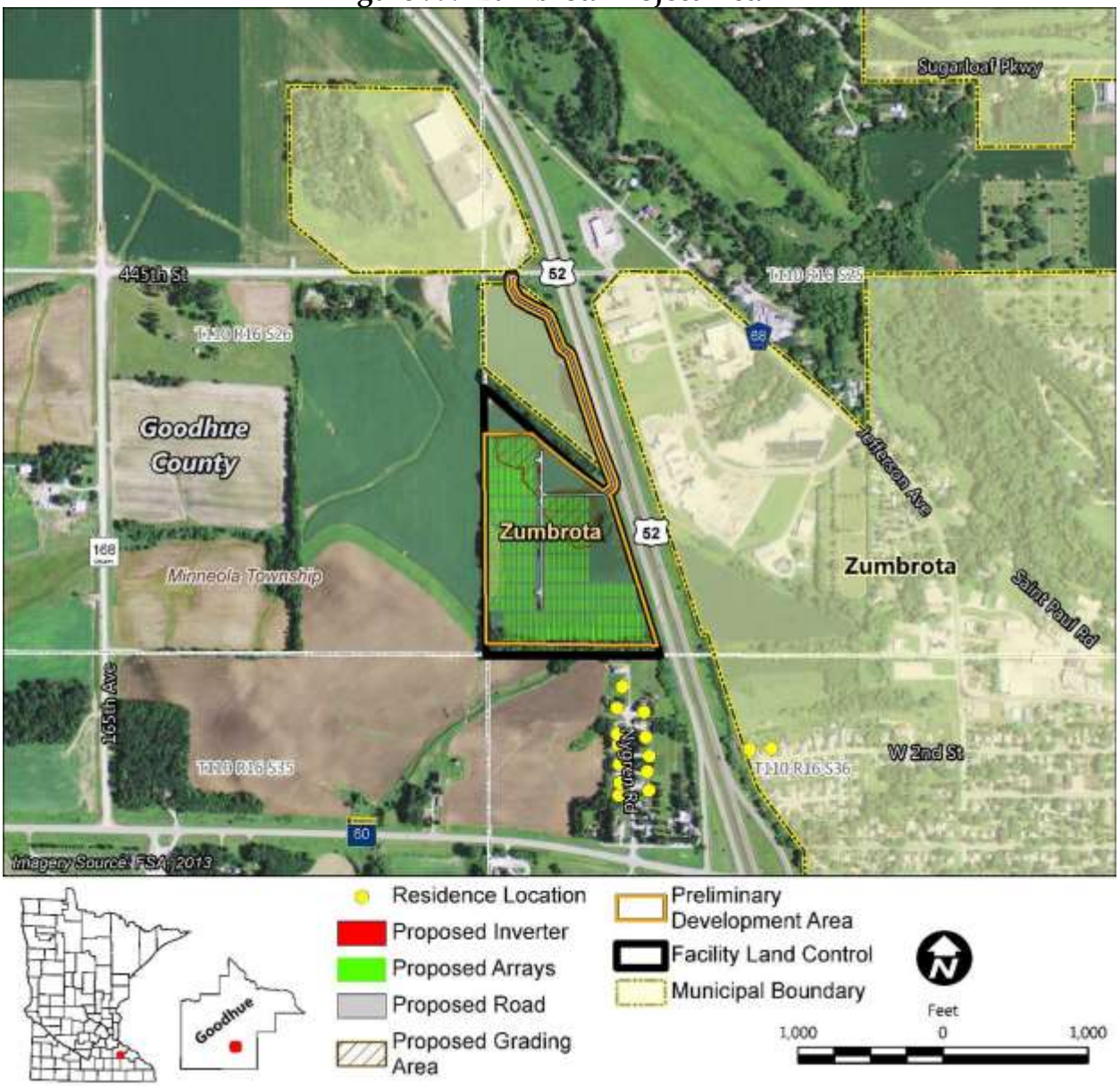


Figure 100: Zumbrota Land Cover Overview

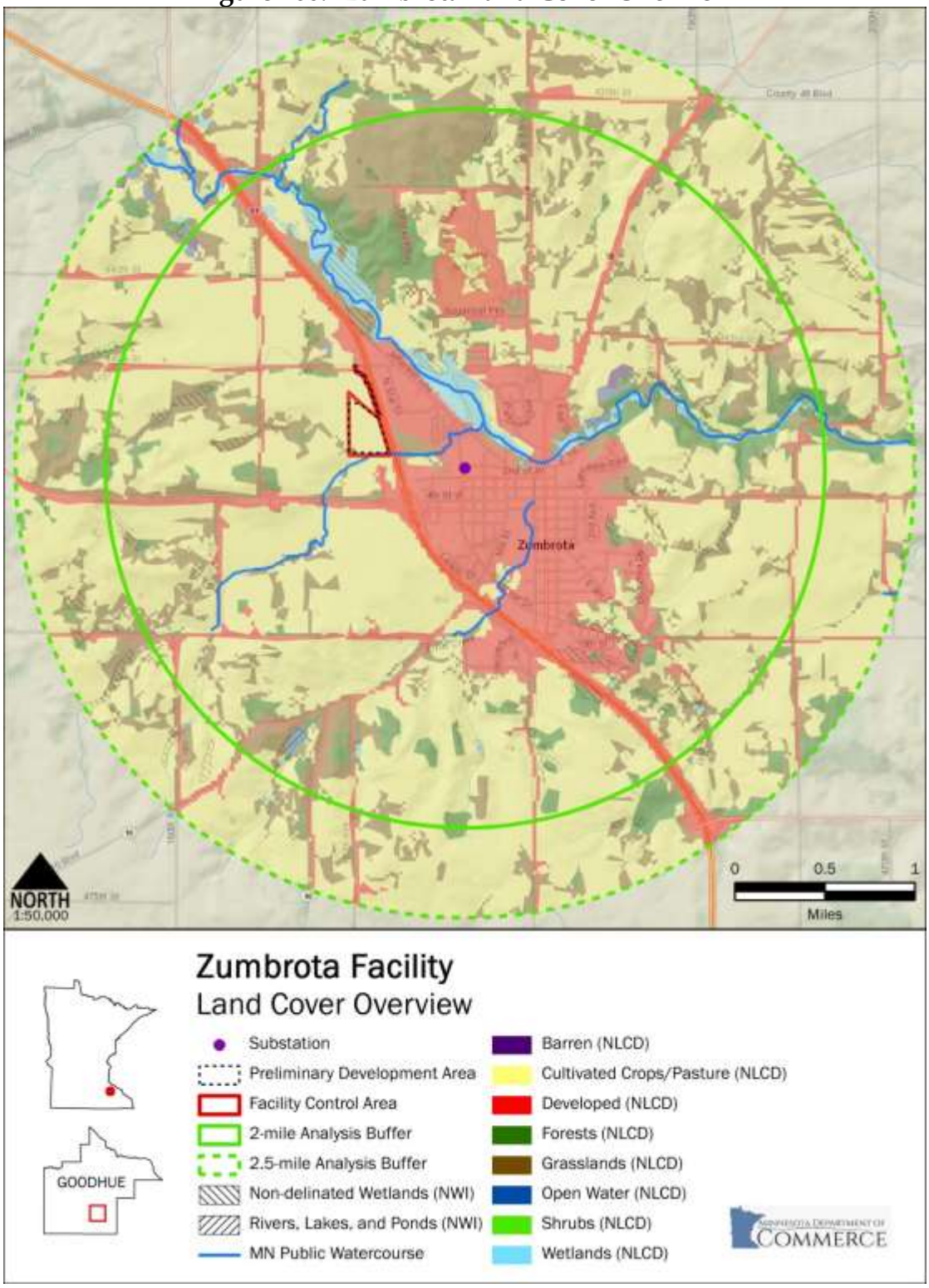


Figure 101: Zumbrota Generally Incompatilbe Areas

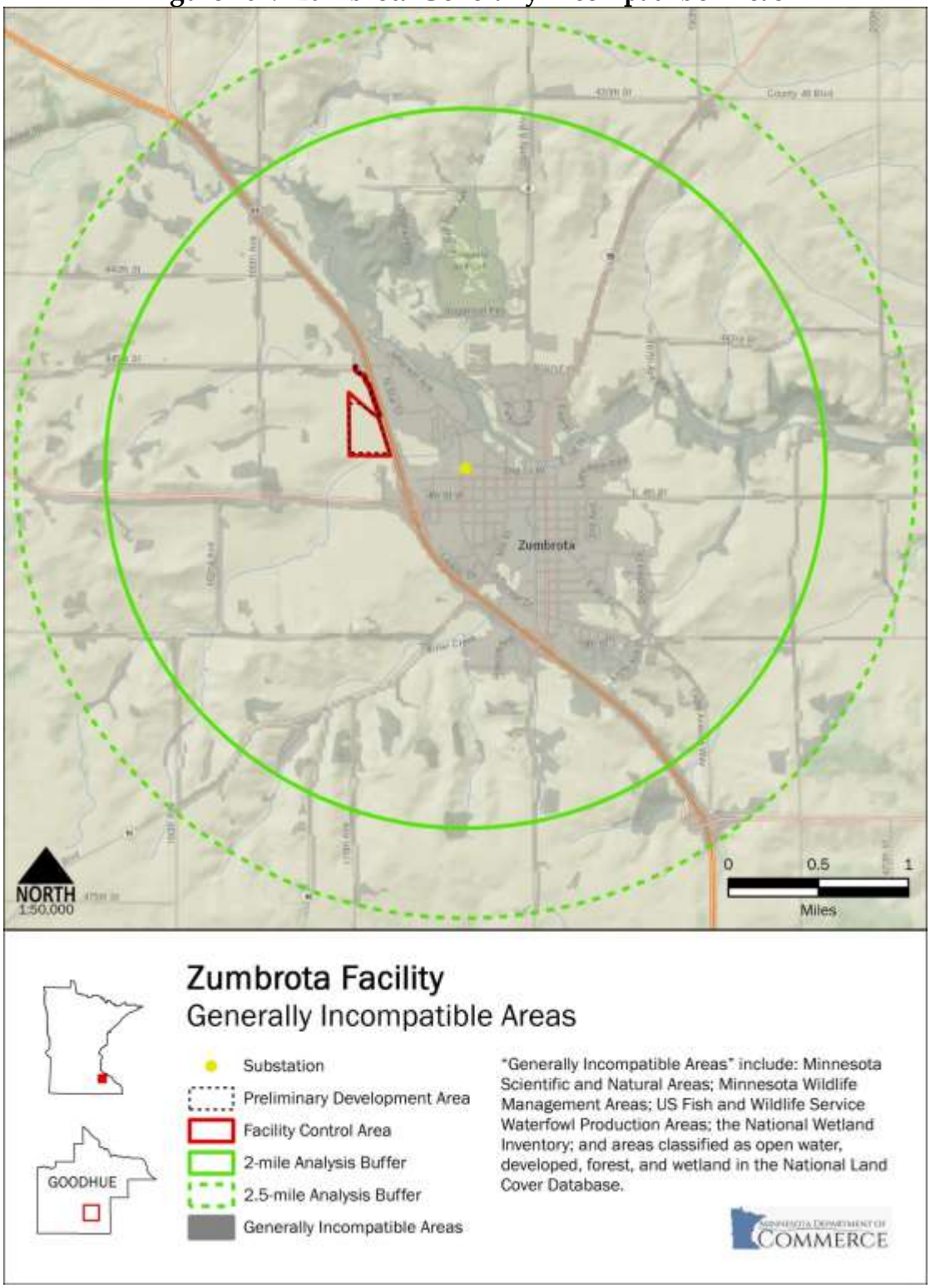
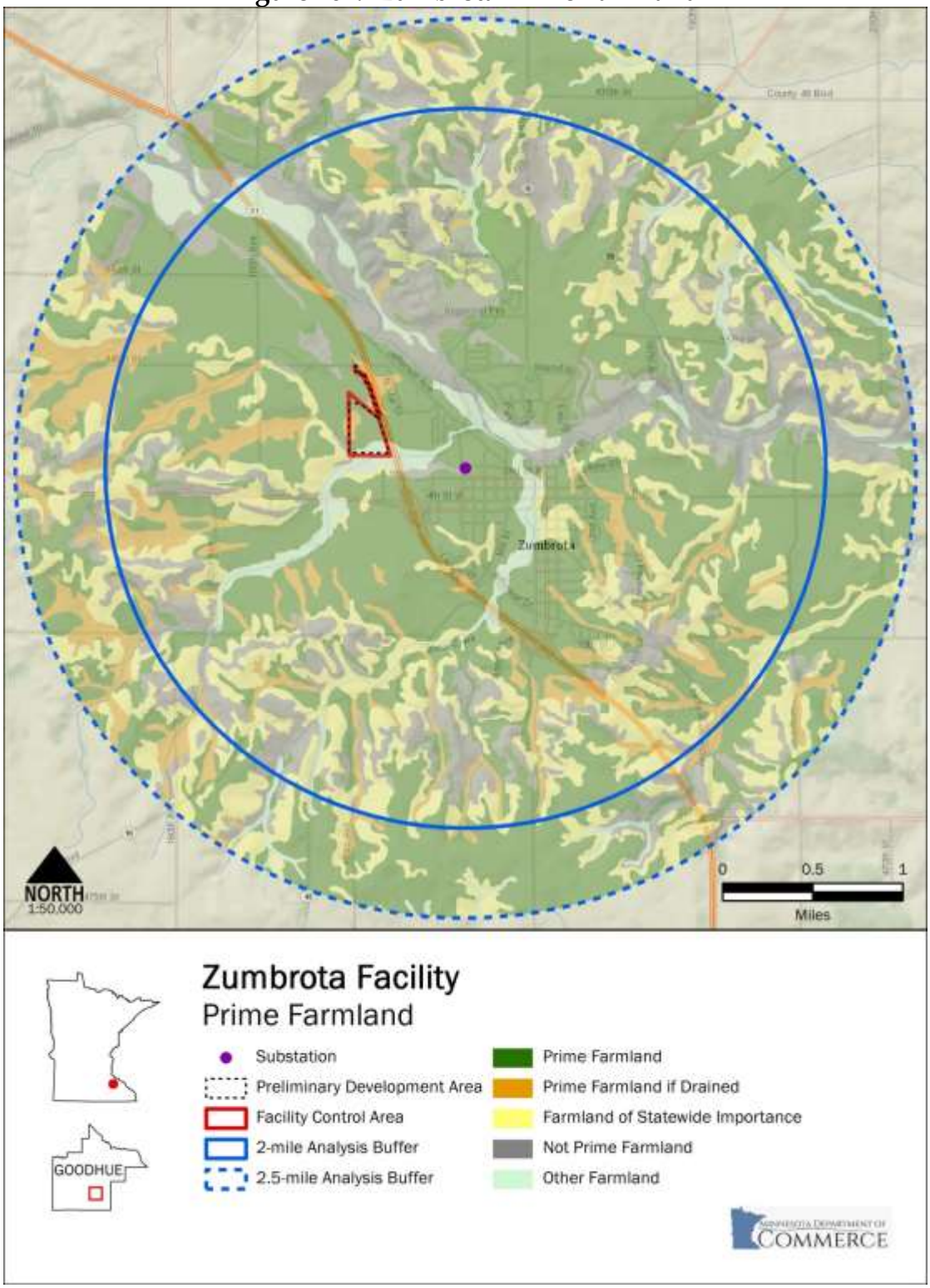


Figure 102: Zumbrota Prime Farmland



7 Application of Siting 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.[202] 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.

7.1 Relative Merits of the Facilities

For the most part, adherence to best practices during construction and operation and the general permit conditions in the Site Permit Template provided by Commission Staff in this record (Appendix B) is anticipated to result in minimal to moderate impacts from each of the facilities. In some instances, however, the addition of permit conditions could help to minimize impacts. In some instances, specific site permit conditions may improve the suitability of a particular facility for inclusion in the Project.

7.1.1 Factor: Effects on Human Settlement

Potential impacts and mitigative measures related to human settlement are discussed in Section 5.2.

Elements: Noise, cultural values, public services, recreation

For all the proposed facilities, 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.

Element: Displacement

Construction of the Mayhew Lake Facility would result in the removal of one home at the site. Aurora does not have the authority to exercise Eminent Domain for the Project, however, the removal of the home is part of a voluntary agreement between Aurora and the landowner. Aurora has committed to providing sufficient notice of the project schedule with the landowner to allow for notice to the renters.

No displacement is anticipated for any of the remaining 23 proposed facilities.

[202] Minnesota Statute 216E.02, https://www.revisor.mn.gov/statutes/?id=216E.02

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 for the following facilities: Albany, Annandale, Brooten, Chisago, Dodge Center, Eastwood, Fiesta City, Hastings, Lake Emily, Lake Pulaski, Lawrence Creek, Lester Prairie, Mayhew Lake, Montrose, Paynesville, Pine Island, Scandia, Waseca, West Faribault, West Waconia and Wyoming.

Aesthetic impacts at the Atwater, Pipestone and Zumbrota facilities are anticipated to be minimal to moderate, but may be mitigated to a degree with special permit conditions. Given the proximity of these facilities to existing homes, 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.

Element: Consistency with Local Land Use and Planning

Some jurisdictions, such as Chisago, Stearns, and Kandiyohi counties, 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 from property boundaries. Many local ordinances preclude construction of solar facilities within designated shoreland protection areas. Many jurisdictions have solar ordinances limited to preserving solar access and providing standards for smaller solar installations that are for accessory use at homes or businesses.

The Albany, Atwater, Dodge Center, Lawrence Creek, Paynesville, Pine Island, Scandia, Waseca, West Waconia and Zumbrota facilities are located in jurisdictions that address solar farms such as the Aurora facilities in their zoning ordinances. Of those facilities located in jurisdictions with ordinances addressing solar farms, only the Paynesville facility is not a permissible use in its zoning district. Although Stearns County's solar ordinance permits solar farms as a conditional use in certain zoning districts, the Transitional District T-20 (where the proposed facility is located) is not included in the districts where such facilities would be permitted.

The location of the Annandale, Eastwood, Mayhew Lake, Pine Island and Zumbrota facilities may be inconsistent with the development plans for those areas. At this time it is unknown what the impact of these facilities may be to future development plans.

7.1.2 Factor: Effects on Public Health and Safety

For all of the proposed facilities impacts to public health and safety are anticipated to be minimal with use of standard construction techniques and the general conditions identified in the Site Permit Template.

7.1.3 Factor: Effects on Land-Based Economies

Elements: Forestry, Tourism and Mining

For all of the proposed facilities, impacts to forestry, tourism and mining are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

Element: Agriculture

For all the proposed facilities, impacts to agriculture for all facilities are anticipated to be minimal with use of standard construction techniques and the general conditions identified in the Site Permit Template.

Minnesota Rule 7550.4400, Subpart 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 Annandale, Brooten, Chisago, Eastwood, Hastings, Lake Emily, Lake Pulaski, Mayhew Lake, Montrose, Pine Island, Pipestone, West Faribault, Wyoming and Zumbrota facilities because they are within statutory cities, within two miles of a first, second or third class city, or are in areas designated for orderly annexation.

The Paynesville and Scandia facilities do not fall under the location exemptions identified in Minnesota Rule 7550.4400, Subpart 4, but are expected to use less than 0.5 acres per MW.

The Albany, Atwater, Dodge Center, Fiesta City, Lester Prairie, Lawrence Creek, Waseca and West Waconia facilities do not fall under the location exemptions identified in Minnesota Rule 7550.4400, Subpart 4, and will use more than 0.5 acres of prime farmland or prime farmland if drained per MW. Given their respective study areas, it is likely that any alternate location in those areas would also need to be sited on prime farmland or prime farmland if drained.

7.1.4 Factor: Effects on Archaeological and Historic Resources

Impacts for the Mayhew Lake facility are anticipated to be minimal to moderate with use of standard construction techniques and the general conditions identified in the Site Permit Template. No archaeological sites were identified in a survey of the Mayhew Lake facility, but a barn located within the preliminary development area has not been surveyed. If the Mayhew Lake facility is constructed, the barn would need to be evaluated for eligibility for the NRHP. If the barn is determined to be eligible for the NRHP, impacts could be mitigated through avoidance of the barn during construction or development of a special mitigation plan in consultation with SHPO.

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

The procedures outlined in Section 7.2 of the Site Permit Template provide an outline of the process for resolution should any previously unknown archaeological resource or human remains be encountered.

7.1.5 Factor: Effects on Natural Environment

Element: Air

For all of the proposed facilities 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 from all facilities are anticipated to be minimal to moderate with the use of standard construction techniques and the general conditions identified in the Site Permit Template.

In addition to the general conditions in the Site Permit Template, the site permit should preclude construction within Shoreland Overlay Districts to further minimize impacts to surface waters.

Element: Wetlands

Impacts to wetlands at the Hastings, Lake Emily, Lester Prairie, Pipestone, Scandia and Waseca facilities are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

Impacts to wetlands at the Albany, Annandale, Atwater, Brooten, Chisago, Dodge Center, Eastwood, Fiesta City, Lake Pulaski, Lawrence Creek, Mayhew Lake, Montrose, Paynesville, Pine Island, West Faribault, West Waconia, Wyoming and Zumbrota facilities are anticipated to be minimal to moderate with the use of standard construction techniques and the general conditions in the Site Permit.

Based on preliminary design, the Paynesville facility may impact up to 36 acres of wetlands. Section 5.2 of the site permit template prohibits placement of panels and associated facilities in public waters wetlands as defined in Minnesota Statues section 103G.005, subdivision 15(a). Field delineations identified a Type 3 wetland of approximately 13.1 acres (as well as two smaller Type 3 wetlands of approximately 3.7 and 6.7 acres) at the Paynesville location; placement of panels and associated facilities would be precluded in at least the largest of the Type 3 wetlands identified in the delineation. Compliance with the permit may require in a smaller facility than proposed.

Element: Soils and Groundwater

For all of the proposed facilities 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 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 and maintain the ground cover to minimize erosion and stormwater runoff.

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 identified natural wildlife, wetland, woodland or other corridors:

Additionally, marking of any overhead collector lines and poles associated with the Hastings facility with bird flight diverters and raptor shields could reduce the potential for avian collisions.

7.1.6 Factor: Effects on Rare and Unique Natural Resources

With the exception of the Dodge Center, Paynesville and Pine Island facilities, impacts to rare and unique natural resources from the facilities are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template provided by the Commission staff in this record.

Special permit conditions requiring avoidance of:

- the Southern Wet-Mesic Hardwood Forest located in the southwestern portion of the Dodge Center facility;
- the floodplain forest in the eastern portion of the Paynesville facility; and
- the Elm-Ash-Basswood Terrace Forest located in the southern portion of the Pine Island facility

would minimize impacts to these unique natural resources.

7.1.7 Factor: Project Design

Element: Design Options to Maximize Energy Efficiencies

The modular nature of Aurora's proposal means that all proposed facilities provide the same level of energy efficiency.

Element: Design Options to Accommodate Potential Expansion

There is insufficient information in the record to fully assess an individual facility's ability to expand its generating capacity. Aurora has designed the proposed facilities in accordance with agreements with landowners, environmental and other siting constraints specific to each facility, and available capacity at specific Xcel Energy substations. Aurora's ability to expand a facility depends upon a number of criteria, including:

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

The information Aurora has provided for each facility incorporates preliminary design for a PV facility of a particular size. In some cases Aurora has site control of land beyond that required for the preliminary design of the facility. In some cases, certain site constraints (wetlands being the primary example) may require modification of the preliminary site design that will accommodate a smaller project. Aurora has applied to Xcel Energy for interconnection of a particularly sized facility to each designated Energy substation; there is not information in the record that demonstrates the additional capacity at the designated substation. It is anticipated that, should Aurora wish to expand any facility, Aurora will seek a modification to the site permit from the Commission.

Element: Design Options to Mitigate Adverse Environmental Effects

A description of mitigative measures that could be used to avoid and minimize impacts is included in the descriptions of impacts in Section 5. To the extent that special conditions may be appropriate for particular facilities, those mitigative measures are identified in the individual facility descriptions in Section 6.

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

None of the proposed facilities use existing Large Electric Power Generating Plant sites. Aurora'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 a willing landowner make using existing power plant sites more challenging.

7.1.9 Factor: Electrical System Reliability

The geographic dispersion of the facilities does not decrease the reliability of the electrical system. Any impacts related to outages of individual facilities would be limited to the local area and would not impact system reliability.

7.1.10 Factor: Design-Dependent Costs

The modular nature of Aurora's proposal means that basic capital and operating costs per MW are the same for all proposed facilities.

7.1.11 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. 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.

7.1.12 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; the unavoidable adverse effects caused by the proposed project that would remain after applying mitigation measures are discussed in Chapter 6.

Unavoidable adverse effects related to 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 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, chain-link security fencing, and, in some cases, overhead distribution lines; and
- Changes in land use and development patterns surrounding individual facilities.

8 References

Appleyard, D. (2009). *Solar Trackers: Facing the Sun.* Retrieved November 3, 2014, from Renewable Energy World: http://www.renewableenergyworld.com/rea/news/article/2009/06/solar-trackers-facing-the-sun.

Argonne National Laboratory. (2013) *An Overview of Potential Environmental, Cultural, and Socioeconomic Impacts and mitigation Measures for Utility-Scale Solar Energy Development.* Retrieved November 14, 2014, from http://www.evs.anl.gov/downloads/Solar_Environmental_Impact_Summary.pdf.

Carlisle, J., Kane, S., Solan, D., and Joe, J. (2014) Support for solar energy: Examining sense of place and utility-scale development in California. *Energy Research and Social Science, 3,* 124-130. Retrieved January 27, 2015, from ScienceDirect: http://www.sciencedirect.com/science/article/pii/S221462961400084X

Carver County. (n.d.) *Carver County Ordinance, Title XV: Land Use, Section 152 Zoning Code.* Retrieved January 27, 2015, from http://www.co.carver.mn.us/departments/LWS/docs/Code_Title_15.PDF.

Carver County. (2010) *The Carver County 2030 Comprehensive Plan – Young America Township Policy Chapter.* Retrieved January 16, 2015, from http://www.co.carver.mn.us/departments/LWS/docs/YoungAmericaTWP_100427.pdf.

Chisago County. (2007) *Chisago County Comprehensive Plan.* Retrieved January 27, 2015, from http://www.co.chisago.mn.us/DocumentCenter/View/4328.

City of Pine Island. (2010) *Pine Island Comprehensive Plan.* Retrieved January 27, 2015, from http://cc.pineislandmn.com/downloads/final_document_101410_2.pdf.

City of Pine Island. (2015) *Planning and Zoning Commission Agenda.* Retrieved January 27, 2015, from http://cc.pineislandmn.com/downloads/whole_agenda_1132015.pdf.

Department of Commerce, Energy Environmental Review and Analysis. (2013) *Environmental Report: Hollydale 115 kV Project*. Retrieved January 22, 2015 from http://mn.gov/commerce/energyfacilities//resource.html?Id=33094

Goodhue County. (2014) *Zoning Ordinance: Article 19, Solar Energy System (SES) Regulations.* Retrieved January 27, 2015, from http://www.co.goodhue.mn.us/DocumentCenter/View/2428.

Lovelady, A. (2014) *Planning and Zoning for Solar in North Carolina.* Retrieved January 27, 2015, from http://sogpubs.unc.edu/electronicversions/pdfs/pandzsolar2014.pdf.

Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center. (2012) *Questions and Answer, Ground-Mounted Solar Photovoltaic Systems.* Retrieved January 27, 2015, from http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf.

McLeod County. (2009) *McLeod County Zoning Map.* Retrieved January 26, 2015, from http://co.mcleod.mn.us/department_files/Zoning/LandUseMap2009v12.pdf.

Metropolitan Council. (2013) 2012 *Metropolitan Agricultural Preserves Program Status Report.* Retrieved January 27, 2015, from http://www.metrocouncil.org/METC/files/53/53f6bd9e-da92-40cb-b485-98326c7b18cf.pdf.

Minnesota Department of Natural Resources. (n.d.) *Ecological Classification System: Ecological Land Classification Hierarchy*. Retrieved January 27, 2015, from MN DNR: http://www.dnr.state.mn.us/ecs/index.html.

Minnesota Department of Natural Resources. (2013) *Wildlife-friendly Erosion Control.* Retrieved January 27, 2015, from http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.

DNR. (2011) *What is a Calcareous Seepage Fen?* Retrieved January 27, 2015 from http://files.dnr.state.mn.us/natural_resources/water/wetlands/calcareous_fen_fact_sheet_dec_2011.pdf

Minnesota Pollution Control Agency. (2009) *Air Quality in Minnesota: Emerging Trends, 2009 Report to the Legislature.* Retrieved January 20, 2015, from http://www.pca.state.mn.us/index.php/view-document.html?gid=5658.

Municipal Development Group, Inc. (2011) *Pine Island Zoning Map.* Retrieved January 27, 2015, from http://cc.pineislandmn.com/downloads/officialzoningmapordinance1132ndseries10182011.pdf.

National Aeronautics and Space Administration. (2011). *How Do Photovoltaics Work?.* Retrieved October 16, 2014, from NASA Science: http://science.nasa.gov/science-news/science-at-nasa/2002/solarcells/.

National Park Service. (2015) *Pipestone National Monument Minnesota: Plan Your Visit.* Retrieved January 27, 2015, from: http://www.nps.gov/pipe/planyourvisit/index.htm.

Oregon Department of Transportation, *Health and Safety Concerns of Photovoltaic Panels.* Retrieved January 28, 2015 from: http://www.oregon.gov/ODOT/HWY/OIPP/docs/life-cyclehealthandsafetyconcerns.pdf

SolarEnergy.net. (2014). *How Photovoltaic Cells Work.* Retrieved October 14, 2014, from Solarenergy.net: http://solarenergy.net/solar-power-resources/how-photovoltaic-cells-work/.

Stearns County. (n.d.) *Stearns County 2030 Comprehensive Plan.* Retrieved January 27, 2015, from Stearns County, Minnesota: http://www.co.stearns.mn.us/Government/CountyDevelopment/StearnsCountyComprehensivePlan.

United States Bureau of Land Management. (2010) *Lucerne Valley Solar Project, Final Environmental Impact Statement.* Retrieved January 27, 2015, from http://www.blm.gov/style/medialib/blm/ca/pdf/cdd/energy.Par.8730.File.dat/Lucerne_Valley-FEIS%20Volume%20I-Chapter4.pdf.

United States Department of Agriculture. (n.d.) *National Soil Survey Handbook, Exhibit 622-1 – Prime and Unique Farmlands.* Retrieved January 12, 2015, from Natural Resources Conservation Service: Soils: http://www.soils.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054226#ex1.

United States Department of Energy, Office of Energy Efficiency and Renewable Energy. (2013). *Photovoltaic Technology Basics.* Retrieved November 18, 2014, from Energy.gov: http://energy.gov/eere/energybasics/articles/photovoltaic-technology-basics.

United States Department of Energy and United States Bureau of Land Management. (n.d.) *Solar Energy Development Environmental Considerations.* Retrieved January 25, 2015, from Solar Energy Development Programmatic EIS Information Center: http://solareis.anl.gov/guide/environment/index.cfm.

United States Geological Service. (2013) *Land Cover.* Retrieved January 27, 2015, from The National Map: http://nationalmap.gov/landcover.html.

United States Geological Service. (2014) *National Land Cover Database 2011: Product Legend.* Retrieved January 27, 2015, from Multi-Resolution Land Characteristics Consortium: http://www.mrlc.gov/nlcd11_leg.php.

URS Corporation. (2008) *Cluster Area 4: South Central: Future Land Use Plan.* Retrieved January 27, 2015, from http://www.co.stearns.mn.us/Portals/0/docs/CompPlan/CompPlanFigureA4.pdf.

Waseca County. (2005) *Waseca County Comprehensive Plan*. Retrieved January 27, 2015 from http://www.co.waseca.mn.us/DocumentCenter/View/127,

Washington County. (2010) *Washington County 2030 Comprehensive Plan: A Policy Guide to 2030.* Retrieved January 27, 2015, from http://www.co.washington.mn.us/DocumentCenter/View/124.

Westwood Professional Services. (2014) *Phase I and Phase II Investigations: Aurora Distributed Solar Project*.

GIS Data Sources

Minnesota Department of Natural Resources. *Minnesota County Boundaries*. Retrieved April 23, 2014, from http://deli.dnr.state.mn.us/.

Minnesota Department of Natural Resources. *Minnesota Scientific and Natural Area Boundaries*. Retrieved April 28, 2014, from http://deli.dnr.state.mn.us/.

Minnesota Department of Natural Resources. *Public Waters Inventory (PWI) Watercourse Delineations*. Retrieved April 30, 2014, from http://deli.dnr.state.mn.us/.

Minnesota Department of Natural Resources. *State Wildlife Management Area Boundaries - Publicly Accessible.* Retrieved January 8, 2015, from http://deli.dnr.state.mn.us/.

Minnesota Geospatial Information Office. *City, Township, and Unorganized Territory (CTU) Boundaries, Minnesota, May 29, 2014*. Retrieved September 25, 2014, from http://deli.dnr.state.mn.us/.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey*. Retrieved December 19, 2014, from http://websoilsurvey.nrcs.usda.gov/.

United States Fish and Wildlife Service. *USFWS Waterfowl Production Areas (Fee Interest).* Retrieved April 17, 2014, from http://deli.dnr.state.mn.us/.

United States Fish and Wildlife Service. *Wetlands and Deepwater Habitats of the United States*. Retrieved October 9, 2014, from http://www.fws.gov/wetlands/Data/State-Downloads.html.

United States Geological Survey, 20140331, *NLCD 2011 Land Cover (2011 Edition)*: U.S. Geological Survey, Sioux Falls, SD. Retrieved December 12, 2014, from http://www.mrlc.gov/nlcd11_data.php.