Appendix A—Detailed Map Supplement (published as a standalone document)

Appendix B—GIS Data Sources

Appendix C—Minnesota Office of Energy Security Right-of-way and Easement Fact Sheet

Appendix D—Detailed River Crossing Information

Appendix E—Agricultural Impact Mitigation Plan

Appendix F—Rare and Unique Natural Resources

Appendix G—Cultural Resources

Appendix H—Segment 1 Summary Tables

Appendix I—Segment 2 Summary Tables

Appendix J—Segment 3 Summary Tables

Appendix K—Scoping Decision Document

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Appendix A is published as a standalone document and is also available for download at the Public Utilities Commission website at: http://energyfacilities.puc.state.mn.us/Docket.html?Id=25731. A DVD version is also available upon request.

Data	Source
Aggregate Mines	Architecture, Engineering, Consulting, Operations and Management Technology Corporation
Airport	U.S. Department of Transportation - Research and Innovative Technology Administration - Bureau of Transportation Statistics Architecture, Engineering, Consulting, Operations and Management Technology Corporation (updated with field review by Barr Engineering)
Archaeological Sites	Minnesota Historical Society - State Historic Preservation Office
Boat Access	Minnesota Department of Natural Resources - Division of Trails and Waterways
Center Pivot Irrigation	Architecture, Engineering, Consulting, Operations and Management Technology Corporation
Churches/Cemeteries	Geographic Names Information Database Publisher: Minnesota Department of Natural Resources - Management Information Services (updated with field review by Barr Engineering)
Conservation Easements	Minnesota Board of Water and Soil Resources
County Well Index	Minnesota Geological Well Survey Minnesota Department of Health
Floodplain	Federal Emergency Management Agency Minnesota Department of Natural Resources - Management Information Services
Historical Sites	Minnesota Historical Society - State Historic Preservation Office
Homes	Barr Engineering
Hospitals	Minnesota Department of Health Publisher: Land Management Information Center
Impaired Lakes	Minnesota Pollution Control Agency
Impaired Streams	Minnesota Pollution Control Agency
Karst Features	Minnesota Department of Natural Resources - Management Information Services
Land Cover (Gap Analysis Program)	U.S. Geological Survey - National Biological Information Infrastructure
Leaking Underground Storage Tank (LUST) Locations	Minnesota Pollution Control Agency
Local Parks	U.S. Geological Survey - U.S. HomeTownLocator
Master Entity System (MES) Locations	Minnesota Pollution Control Agency
MCBS (Biodiversity Significant)	Minnesota County Biological Survey Minnesota Department of Natural Resources - Division of Ecological Resources
MCBS (Native Plant Communities)	Minnesota County Biological Survey Minnesota Department of Natural Resources - Division of Ecological Resources
MCBS (Railroad Right-of-Way Prairie)	Minnesota County Biological Survey Minnesota Department of Natural Resources - Division of Ecological Resources

Data	Source
Minnesota County Parks	Architecture, Engineering, Consulting, Operations and Management Technology Corporation
Minnesota State Forest Campground	Minnesota Department of Natural Resources - Division of Parks and Recreation
Minnesota State Park Trails	Minnesota Department of Natural Resources - Division of Trails and Waterways
Minnesota State Trails	Minnesota Department of Natural Resources - Division of Trails and Waterways
Narrow Areas	Barr Engineering
Natural Heritage (Points)	Minnesota Department of Natural Resources - Division of Ecological Resources
Natural Heritage (Polygons)	Minnesota Department of Natural Resources - Division of Ecological Resources
NHD Streams	U.S. Geological Survey
Nursing Homes	Minnesota Department of Health Publisher: Land Management Information Center
Prime Farmland	Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database
Public Waters Inventory Basins	U.S. Geological Survey
Public Waters Inventory Streams	U.S. Geological Survey
Scenic Byways	U.S. Department of Transportation Explore Minnesota Tourism
Schools	Minnesota Department of Education (updated with field review by Barr Engineering)
Scientific and Natural Areas	Minnesota Department of Natural Resources - Division of Ecological Services - Scientific and Natural Areas Program
Shallow Lakes	Minnesota Department of Natural Resources - Management Information Services
Snowmobile Trails	Minnesota Department of Natural Resources - Division of Trails and Waterways
State Forest	Minnesota Department of Natural Resources - Division of Forestry
State Parks	Minnesota Department of Natural Resources - Division of Parks and Recreation
Towers	Federal Communications Commission (updated with field review by Barr Engineering)
Trout Streams	Minnesota Department of Natural Resources - Division of Fisheries
Wetlands	U.S Fish and Wildlife Service - Division of Habitat and Resource
Wildlife Lakes	Minnesota Department of Natural Resources - Division of Fish and Wildlife - Wildlife Unit
Wildlife Refuge	U.S. Fish and Wildlife Service
WMA	Minnesota Department of Natural Resources - Division of Fish and Wildlife
WPA	U.S. Fish and Wildlife Service

Minnesota Office of Energy Security

FACT SHEET

Rights-of-Way and Easements for Energy Facility Construction and Operation

This fact sheet has been developed by Minnesota Department of Commerce, Office of Energy Security Energy Facility Permitting staff. It is intended for informational purposes only, as a result of and in response to questions and comments made at siting and routing public meetings throughout Minnesota. This document does not constitute legal advice, nor should it be relied on as such. Landowners are encouraged to independently verify any statements made herein.

The Minnesota Department of Commerce, Office of Energy Security (OES) provides this fact sheet for landowners who may be affected by construction of energy facilities in the State of Minnesota. Its purpose is to explain the process by which utilities obtain rights-of-way for new energy facilities (i.e., transmission lines and pipelines) and to inform landowners of their rights in negotiating right-of-way agreements.

Public Utilities Commission and Permits for Energy Facilities

The State of Minnesota has established a state policy of locating energy facilities in an orderly manner compatible with environmental preservation, sustainable development, and efficient use of resources. The Minnesota Public Utilities Commission (PUC) has authority to issue permits for certain energy facilities in the state, including power plants, transmission lines, wind farms, and pipelines. When it issues such permits, the PUC must choose sites and routes that minimize adverse human and environmental impacts while ensuring energy system reliability and sufficient energy supplies.

The land required for a specific energy facility may impact multiple landowners. In order to ensure that the particular land and rights-of-way required for an energy facility can be obtained for a project, Minnesota law gives utilities the power of eminent domain. Because the general public interest is enhanced by the addition of necessary energy facilities, the power of eminent domain allows utilities to obtain property rights even if landowners are unwilling to negotiate right-of-way agreements. Thus, Minnesota law gives utilities the power to acquire or "take" property interests (generally easements) by condemnation for constructing energy facilities.

Route Permits: Route permits issued by the PUC for transmission lines and pipelines specify a route width and a right-of-way (ROW) width. The route width is typically larger than the ROW width – providing flexibility in ROW placement within the route to address human and environmental concerns that arise after the permit has been issued. For example, the permitted ROW might be 150 ft. wide for a transmission line, but the permitted route might be 1000 ft. wide. The route is larger than the ROW to provide flexibility in locating and constructing the energy facility. But the route is also specific – it identifies where the energy facility must be placed, i.e. within the route. Thus, the route provides flexibility and predictability; it specifies where the energy facility must go and facilitates best placement of the facility within the route.

Site permits: The PUC typically issues site permits for electric power plants and wind farms. A PUC site permit will specify the site of the energy facility, with limited flexibility for locating and constructing the project. Eminent domain authority is not common for power plant sites, and is not available for wind farms.

Rights-of-way

The right-of-way (ROW) is the physical land area within a route that is needed to construct and operate the energy facility. A utility is interested in having rights to this land area sufficient to meet these uses. These rights may be obtained through one of two means: (1) purchase of an easement for the ROW, or (2) purchase of the land outright (fee simple ownership). An outright land purchase is less common because utilities seek only enough land interests to build and safely operate the facility, and fee simple ownership may not be necessary to accomplish this goal.

A ROW agreement is a private agreement between a landowner and a utility. The PUC does not involve itself with negotiations between landowners and utilities and has no authority over this process. However, the PUC does enforce the permits which it issues, including permit conditions related to design, construction, maintenance, and restoration within the ROW.

Easements

The most common form of right-of-way (ROW) agreement is an easement, which is a legal interest in real property that transfers a partial property right to the holder of the easement (e.g., from a landowner to a utility). The easement agreement specifies restrictions on both the utility's and the landowner's use of the land and specifies the rights of the utility to enter and use the land. It is binding upon the utility, the landowner, and any future owners of the land unless and until the easement is discharged. The easement will be recorded in the county in which it is located in the same manner as other real estate transactions.

Easement agreements allow only what is described by the terms of the easement – e.g., to "build and maintain a 20 inch oil pipeline" or "build and maintain a 115 kilovolt (kV) transmission line." Easements last for as long as the utility uses and maintains the energy facility in the ROW. If the utility abandons or removes the facility, the property interest transferred by the easement may return to the landowner (Minn. Stat. §117.225).

Easements typically describe allowable uses and restricted uses by the landowner. In general, the primary land use restrictions for transmission line ROWs include tall trees and buildings; for pipeline ROWs they include buildings, trees, shrubs, and brush.

ROW maintenance typically includes removing trees and other vegetation as needed within the ROW, and may include application of herbicides. Landowners with requirements for management of their land, e.g., organic certification prohibiting the use of certain pesticides, can discuss these requirements during their easement negotiations with the utility or its agent. Utilities typically notify landowners before beginning maintenance activities in the ROW; notification requirements may be part of the easement agreement. Some general conditions addressing the needs of landowners may be included in the permit issued by the PUC. In addition, the permitting process includes preparation of an Agricultural Impact Mitigation Plan (AIMP) by the Minnesota Department of Agriculture. The AIMP may include provisions dealing with organic farming as well as traditional agricultural uses.

In some instances, utilities require additional space during construction of an energy facility. This additional space is called "temporary work space" and is included in the ROW agreement, but is not part of the permanent easement. As the name implies, this work space is temporary and is typically used to place construction materials or provide operating room for machinery, e.g., room to maneuver and operate a pipeline drill. Unlike an easement, the property interest in the temporary work space reverts back to the landowner upon completion of the described work. A description of temporary work space, its uses, and duration should be part of ROW negotiations.

Negotiating

Almost all parts of the ROW agreement are negotiable, whether it is the purchase of an easement or fee simple ownership. Landowners can negotiate terms in the ROW agreement that will avoid or reduce negative impacts to their property. They can negotiate compensation for the ROW. Utilities, in turn, have an obligation to negotiate terms that meet the needs of their proposed facility. A satisfactory ROW agreement is likely best achieved if the landowner and the utility have reasonable expectations and negotiate in good faith.

Utilities have a statutory incentive to negotiate in good faith – if their last written offer to a landowner is significantly different from the final judgment of an eminent domain proceeding, the landowner can get attorney fees and other reasonable costs reimbursed (Minn. Stat. §117.031).

Typically a utility real estate agent contacts a landowner to purchase an easement for a specific parcel or strip of land that is to be used for a ROW. The utility may offer a standard easement agreement and an amount of money it is willing to pay for the easement. The offer will reflect the utility's assessment of the ROW's impact on the fair market value of the property. Typically a landowner does not sign an easement agreement without first reading it, asking questions, and negotiating terms. A landowner may wish to obtain an independent appraisal of his or her land value, speak to other landowners about possible ROW agreements and conditions, or hire an attorney or other person to negotiate on the landowner's behalf.

Easement and purchase agreements are legal documents and should, to the extent possible, include detailed and precise language. In general, it is a good idea to include in the easement agreement details about the ROW, its uses, and parties' rights and responsibilities. Blanket easements, i.e., easements that do not identify the exact location of the ROW, were common at one time in Minnesota. More contemporary easements identify and define the land area of the ROW.

If a landowner feels confused or overwhelmed during negotiations, he or she may wish to consult an attorney or "take a timeout" from negotiating until they get a better understanding of the process. Generally, time spent negotiating is time well spent – eminent domain proceedings can be time consuming and expensive.

Ultimately, each ROW agreement is unique – reflecting the values and interests of the landowner and the utility. These interests typically are not mutually exclusive and a satisfactory ROW agreement can most often be reached through negotiation.

Determining Value

A common point of negotiation in ROW agreements is the amount of money that a landowner should receive for the ROW, be it an easement or fee simple purchase. By law, landowners are due just compensation for their property. Landowners often have questions regarding what values should be included in this compensation and how these values are calculated.

To begin with, the value of the land itself – the physical length and width of the ROW – should be included. It is possible to estimate the fair market value of this land with established appraisal methods. Fair market value is the amount a willing buyer would pay a willing seller, taking into consideration the highest and best use to which the property can be put. Fair market value is typically estimated in one of four ways: (1) comparing the property to similar properties that have been sold recently, (2) estimating the future income producing capability of the property, (3) estimating the cost to replace an existing structure on the property, and (4) estimating the value of planned development on the property. These methods are not conclusive but can be used to support or defend a particular value.

If the utility is purchasing an easement, it is not purchasing all of the land rights associated with the ROW. Thus, the utility may propose paying a percentage of the fair market value of the property. This percentage is a point of negotiation between the landowner and utility.

Landowners can include damages as part of their compensation – e.g., crop damage or drain tile damage due to construction or maintenance of the energy facility. Landowners can negotiate how this value is calculated. Landowners can also be compensated for loss of a going concern (Minn. Stat. §117.186).

Another value that landowners may desire to include is any change in the value of their property that is not in the ROW, but is adjacent to it. It may be difficult to determine if a ROW and associated energy facility will affect the value of adjoining property, and if so, to what extent. Numerous studies have been conducted on this issue with varying results. Some general trends have been revealed by these studies. First, when negative impacts on property values occur due to establishment of a ROW, they tend to be in the range of a 1 to 10 percent reduction in value. Conversely, in some cases, the impacts can be positive. Second, negative impacts are most often attributed to the unattractiveness of the energy facility, fear of potential health effects, noise (during operation and maintenance, depending on the type of facility), and safety concerns. Third, the presence of the ROW and energy facility is not the primary determinant of property value. Neighborhood characteristics, lot size, schools, land characteristics, and improvements are all better predictors of property value. Fourth, the impact on property value from a ROW decreases the further away the property is from the ROW. Thus, impacts are usually greater for smaller properties than for larger properties.

Studies notwithstanding, every landowner has a unique relationship with his or her property and thus valuing impacts to property adjacent to a ROW can be challenging. If a landowner determines that he or she cannot continue living on property with an energy facility ROW easement, the landowner can, with some limitations, require that the utility purchase the landowner's entire property in fee simple (Minn. Stat. §216E.12).

A value that generally is not included in ROW agreements is the value of the energy moving through the energy facility (e.g., transmission line, pipeline). In contrast, landowners with agreements to allow wind turbines to be placed on their property can receive payments that reflect the wind energy generated on their property. In these cases, the wind farm developer is purchasing a property right that includes a known energy source, the wind. ROW agreements for transmission lines and pipelines do not anticipate drawing or creating energy from the ROW; thus, there is no energy value to speak of and no energy value appears in the ROW agreement.

Eminent Domain

"Eminent domain" is the power to take privately owned property, particularly land, and convert it to public use, subject to reasonable compensation for the taking. Despite good faith negotiations, it's possible that a landowner and utility will not reach agreement on the terms of a ROW agreement. Under these circumstances, once it obtains the necessary PUC permits, the utility has the right to use eminent domain power to initiate condemnation proceedings. However, until the utility receives the necessary permits, it may not initiate such a proceeding.

Minnesota Statutes Chapter 117 (Minn. Stat. §117, titled "Eminent Domain") describes the procedures to be followed for condemnation proceedings in Minnesota. The intent of Chapter 117 is to determine, through a fair process, what payment is due the landowner for the use of his or her land. Chapter 117 provides protections for landowners. The utility must negotiate in good faith with the landowner, and provide the landowner with a copy of an appraisal of the property before beginning a condemnation proceeding (Minn. Stat. §117.036). The landowner can obtain an appraisal and may be reimbursed, within statutory limits, for the reasonable costs of this appraisal (Minn. Stat. §117.036).

The utility begins a condemnation proceeding by filing a petition with the appropriate District Court. Landowners must receive notice of the petition (Minn. Stat. §117.055). A landowner may object to the granting of the petition and may appeal the issuance of a petition. If the petition is granted, the property interest (i.e., easement or fee simple ownership) is transferred to the utility, and the issue of compensation is taken up. The Court must appoint three impartial commissioners for the condemnation proceeding to ascertain the amount of compensation due to the landowner for the taking of the property (Minn. Stat. §117.075). The commissioners have broad powers to hear and consider "allegations and proofs of all persons interested" (Minn. Stat. §117.085). The commissioners' decision is considered final; however, landowners may appeal the decision and may request a jury trial.

A landowner who chooses not to negotiate a ROW on his or her property and instead requires the utility to use eminent domain power by initiating a condemnation process, would likely benefit from legal counsel. Condemnation proceedings can be time consuming and expensive; however, some landowners may feel this time and expense is necessary and worthwhile.

References and Resources

- Minnesota Statutes, Law, and Rules, http://www.revisor.mn.gov/pubs/
- Minnesota Session Laws, 2010, Chapter 288, https://www.revisor.mn.gov/laws/?id=288&doctype=Chapter&year=2010&type=0
- "Eminent Domain: Just Compensation," Minnesota House of Representatives, House Research, http://www.house.leg.state.mn.us/hrd/pubs/ss/clssedjust.htm
- Resources on Minnesota Issues, Eminent Domain, Minnesota Legislative Reference Library, http://www.leg.state.mn.us/lrl/issues/eminentdomain.asp
- "Summary Guide to Eminent Domain," Bruce D. Malkerson, Howard A. Roston, and Patrick B. Steinhoff (2006), available for purchase from Minnesota CLE, http://www.minncle.org
- "Right-of-Way and Easements for Electric Facility Construction," Public Service Commission of Wisconsin, http://psc.wi.gov/thelibrary/publications/electric/electric02.pdf
- "The Effects of Overhead Transmission Lines on Property Values: A Review and Analysis of the Literature," Cynthia A. Kroll and Thomas Priestley, Edison Electric Institute (1992), http://staff.haas.berkeley.edu/kroll/pubs/tranline.pdf
- "Do High Voltage Electric Transmission Lines Affect Property Value?," Stanley W. Hamilton and Gregory M. Schwann, *Land Economics*, Vol. 71, No. 4 (Nov., 1995), p. 436-444
- "The Impact of Transmission Lines on Property Values: Coming to Terms with Stigma," Peter Elliott, David Wadley, *Property Management*, 20(2), (2002), p. 137-152. http://espace.library.uq.edu.au/eserv/UQ:8095/dw_pm_02.pdf
- "Power Lines and Property Values Revisited," Jennifer M. Pitts, Thomas O. Jackson, Appraisal Journal, Fall 2007, http://www.entrepreneur.com/tradejournals/article/171851335.html

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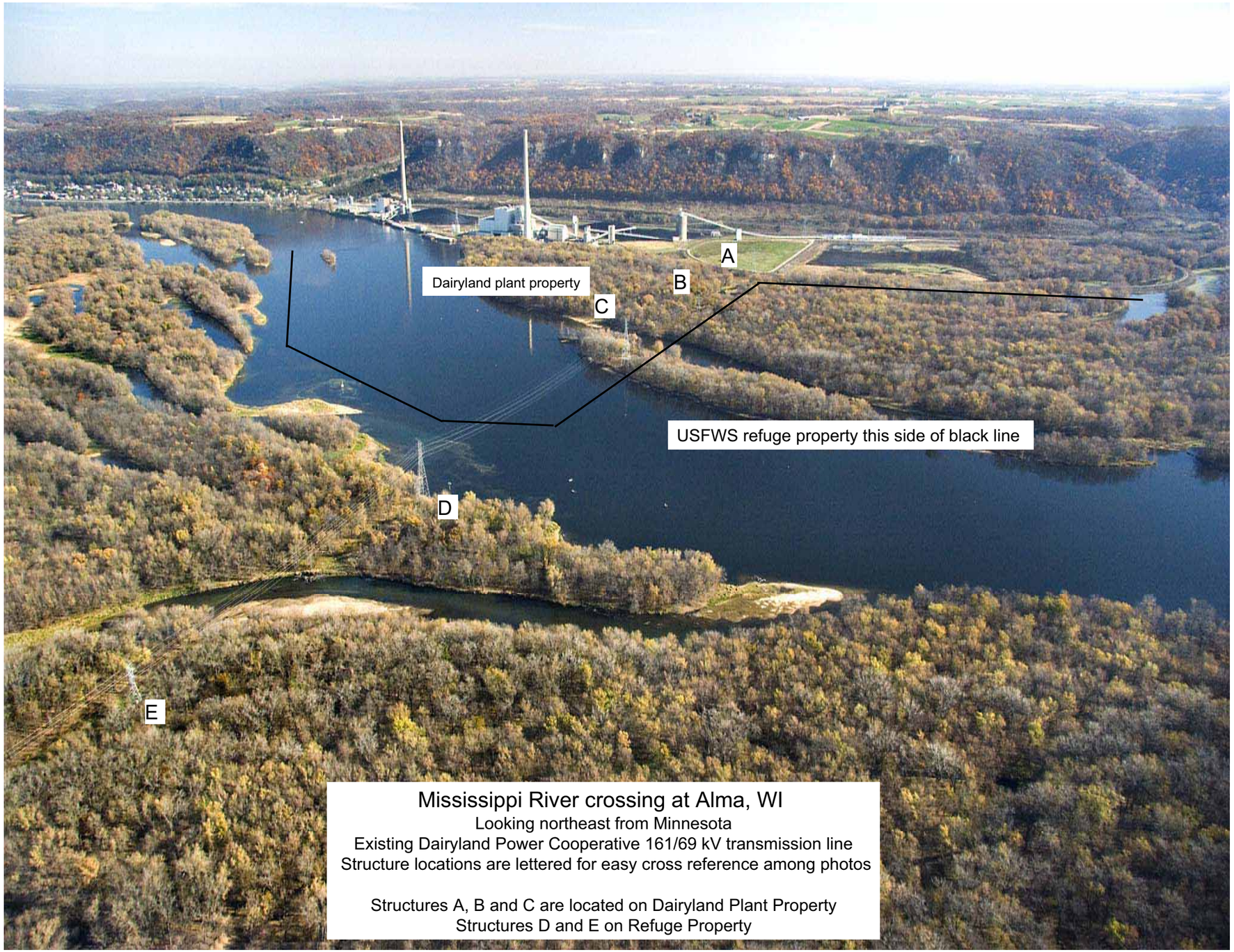
Appendix D is a reprint of Appendices E1, E2, and E3 from the applicant's January 2010 Route Permit Application (RPA). RPA Appendix E1 contains photos of existing transmission line crossings at Alma, Winona and La Crescent. RPA Appendix E2 describes the Mississippi River crossing design options at Alma (referred to in the Draft EIS as the Kellogg crossing). RPA Appendix E3 provides a detailed underground feasibility analysis for the Kellogg crossing.

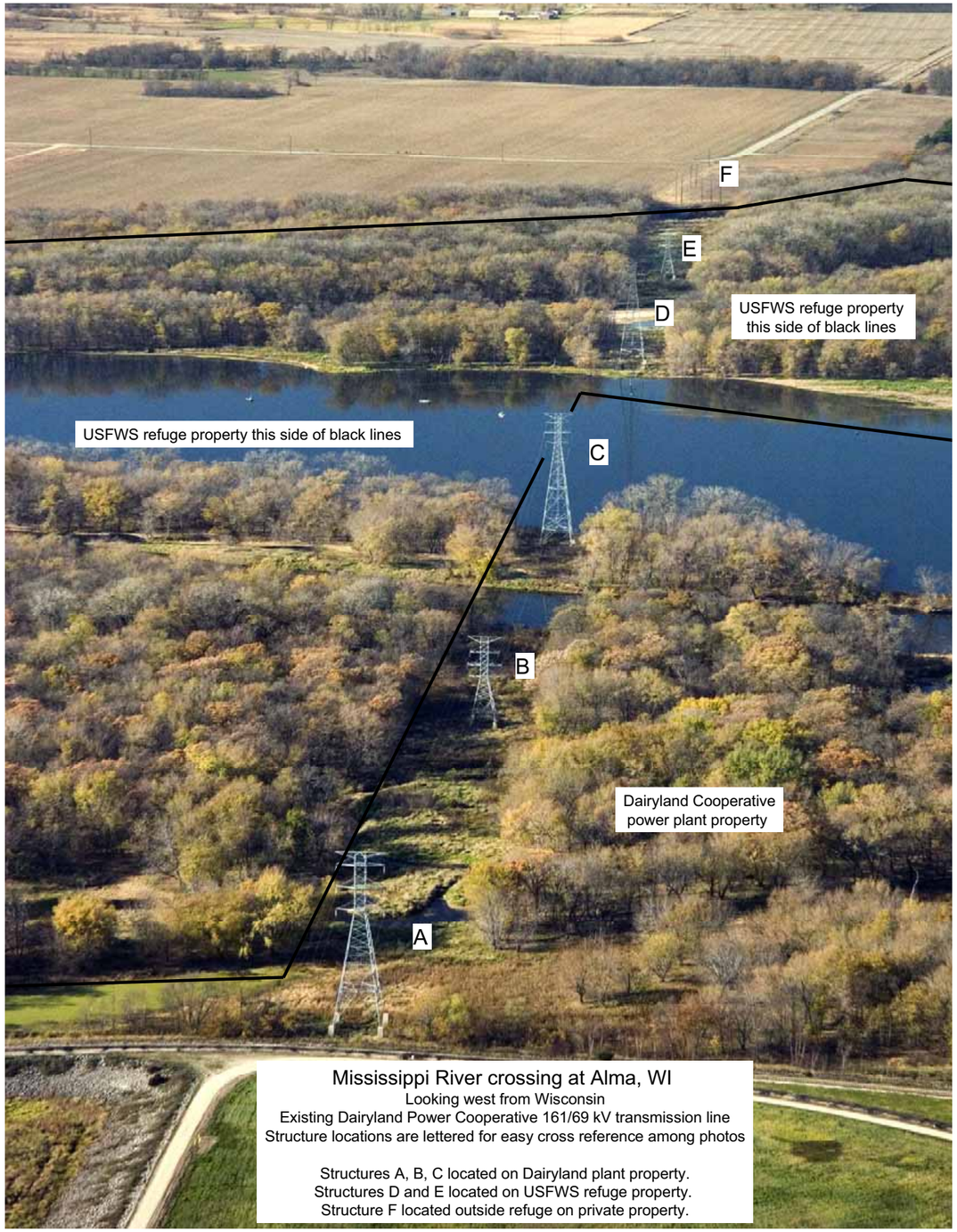
Mississippi River Crossing at Alma, WI
Existing Dairyland 161/69 kV transmission line pole locations are lettered for easy cross reference among photos

Green shading is an approximation of lands owned/managed by the US Fish and Wildlife Service National Wildlife Refuge



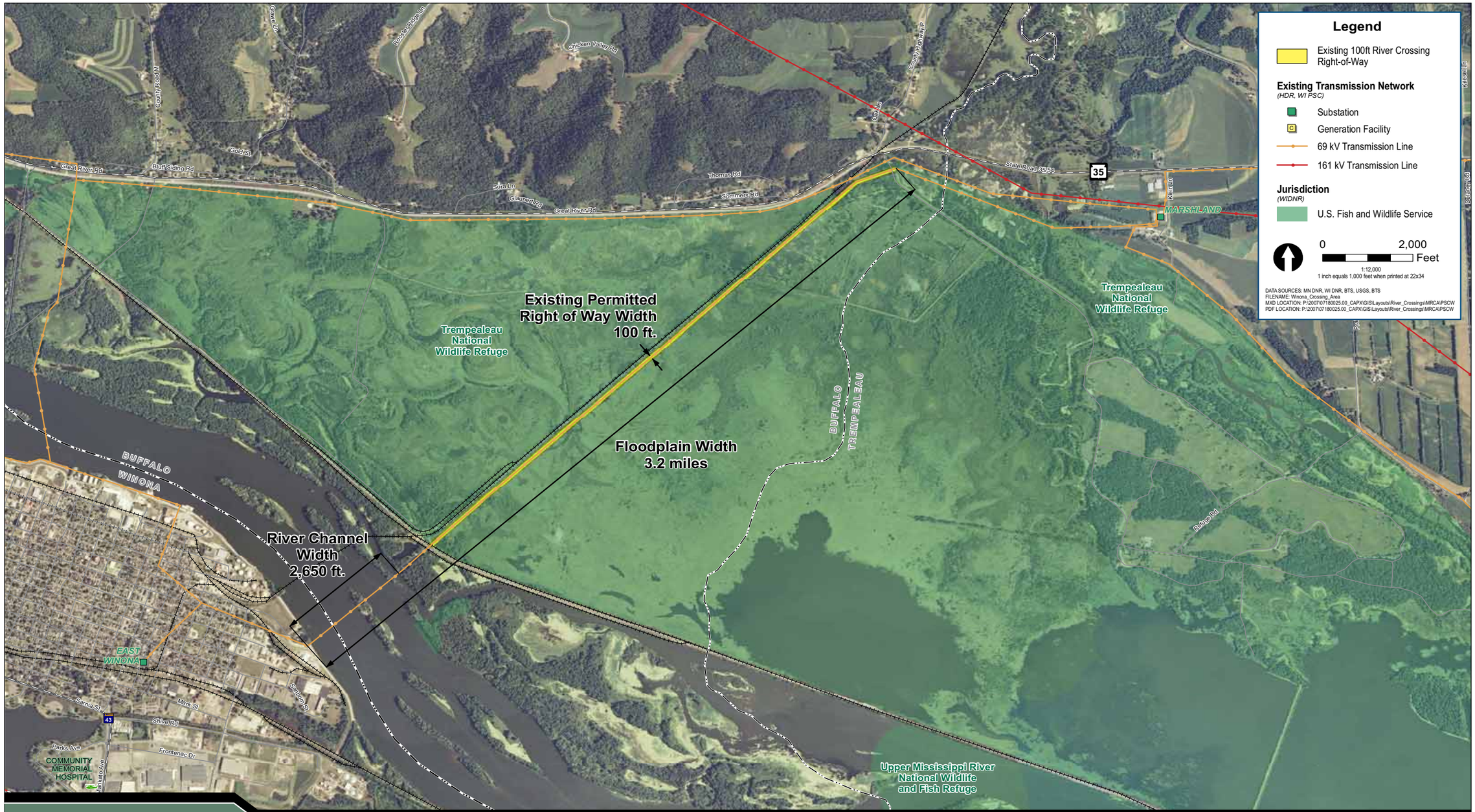
Mississippi River crossing at Alma, WI
Looking northeast from Minnesota
Existing Dairyland Power Cooperative 161/69 kV transmission line
Structure locations are lettered for easy cross reference among photos

Structures A, B and C are located on Dairyland Plant Property
Structures D and E on Refuge Property



Mississippi River crossing at Alma, WI
Looking west from Wisconsin
Existing Dairyland Power Cooperative 161/69 kV transmission line
Structure locations are lettered for easy cross reference among photos

Structures A, B, C located on Dairyland plant property.
Structures D and E located on USFWS refuge property.
Structure F located outside refuge on private property.



CapX2020

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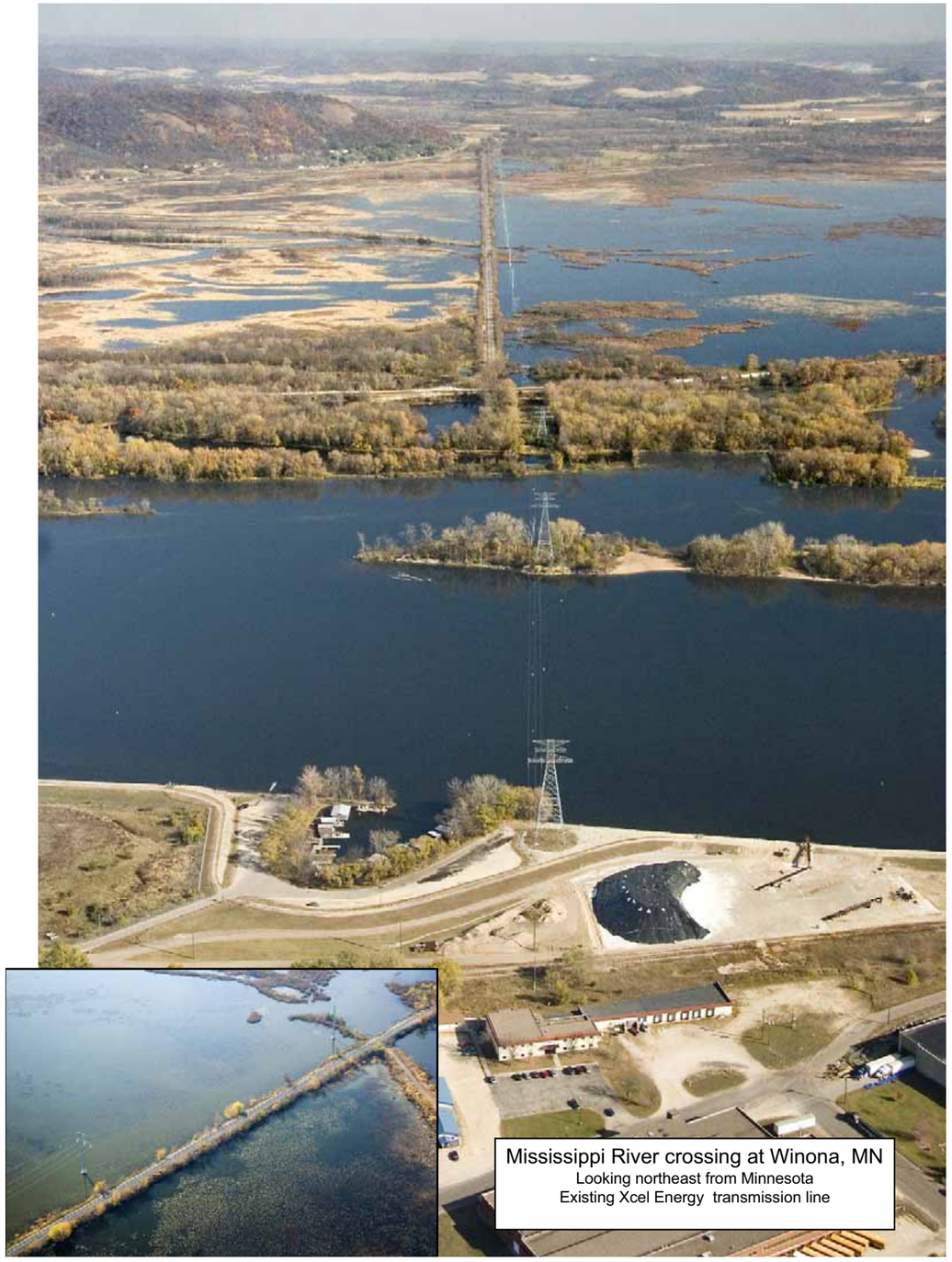
Xcel Energy • Dairyland Power Cooperative • Rochester Public Utilities • WPPI • Southern Minnesota Municipal Power Agency

Winona
Potential Crossing Area



Mississippi River crossing at Winona, MN
Looking northeast from Minnesota
Existing Xcel Energy transmission line

Legend
Existing 100ft River Crossing Right-of-Way
Existing Transmission Network
(HDR, WI PSC)
Substation
Generation Facility
69 kV Transmission Line
161 kV Transmission Line
Jurisdiction
(WIDNR)
U.S. Fish and Wildlife Service
0
2,000
Feet
DATA SOURCES: MN DNR, WI DNR, BTS, USGS, BTS
FILENAME: La_Crosse_Crossing_Area
MXD LOCATION: P:\2007\07180025.00_CAPX\GIS\Layouts\River_Crossings\MRCA\PSCW
PDF LOCATION: P:\2007\07180025.00_CAPX\GIS\Layouts\River_Crossings\MRCA\PSCW
Existing Permitted Right of Way Width 100 ft.
River Channel Width 730 ft.
River Channel Width - 1,150 ft.
Floodplain Width 2.5 miles (following existing ROW)
Upper Mississippi River National Wildlife and Fish Refuge
Upper Mississippi River National Wildlife and Fish Refuge
WINONA
HOUSTON
LACRESCENT
La Crescent
FRENCH ISLAND
French Island
LACROSSE
STATEWIDE HABITAT AREAS
ST FRANCIS MEDICAL CENTER
La Crosse
LA CROSSE
HOUSTON
CapX2020
Hampton • Rochester • La Crosse 345 kV Transmission Project
Xcel Energy • Dairyland Power Cooperative • Rochester Public Utilities • WPPI • Southern Minnesota Municipal Power Agency
La Crosse
Potential Crossing Area

Mississippi River crossing at La Crescent, MN
Looking east from Minnesota
Existing Xcel Energy transmission line

Mississippi River crossing at La Crescent, MN
Main channel looking northeast from Minnesota
Existing Xcel Energy transmission line

Appendix E2:

Mississippi River Crossing Design Dra ings

The Mississippi River presents unique considerations that will require the use of multiple-circuit, specialty structures. A portion of this crossing is on Upper Mississippi River Wildlife Refuge (Refuge) lands managed by the U.S. Fish and Wildlife Service (USFWS). A Special Use Permit will be required to cross the Refuge and the Applicant will work closely with the USFWS to identify the most appropriate structure design.

An existing double-circuit transmission line crosses the Mississippi River and Refuge at the Project's proposed crossing location. The existing line crosses approximately 0.5 mile of Refuge lands and includes two structures on refuge property. The line is constructed on a 180-foot-wide permitted ROW. An area approximately 125 feet wide and 1,900 feet long is maintained cleared of trees. The two main river crossing structures are 180 feet tall.

Several possible designs for the proposed river crossing are described in this appendix. The design options demonstrate tradeoffs between structure height and easement width while maintaining only three structures on refuge lands. Minimum conductor clearance over the Mississippi River main channel in all instances is approximately 90 feet, per by US Army Corps of Engineers requirements.

- Option A: A design that stays within the existing 125-foot wide tree clearing. However, this results in main channel crossing structures of 275 feet in height. The Federal Aviation Administration (FAA) requires lighting of poles exceeding 200 feet above ground level, and may also require poles to be painted alternating red and white.
- Option B: The shortest possible pole design with horizontal circuit configuration. This keeps the main channel crossing structures less than 200 feet tall, avoiding FAA lighting requirements and keeps all the conductors in one plane, which is often preferred by those who are concerned about bird impacts. This design requires a 280-foot cleared ROW.
- Options C and D: A combination of options A and B keeps main channel crossing structures of less than 200 feet while using narrower structures elsewhere to minimize the need for additional ROW and tree clearing on refuge lands.

These overhead options are represented in the attached pages through the use of plan view, or aerial photo, drawings. These drawings incorporate black and white aerial photographs, obtained by the Applicant in November 2008, as a background. Numbered black dots represent transmission structure locations. Also noted on each drawing is the right-of-way width required by each option, and a black line with grey cross hatching that represents US Fish and Wildlife Service Upper Mississippi National Wildlife Refuge lands. The oval train tracks at Dairyland Power Cooperative's Alma generating station is at the bottom right. The distance between the western most structure, 1, and the eastern most structure, 9, is approximately 1.5 miles, or slightly wider than the river flood plane in this area. Sketches of the various structure types proposed for each design are inset in the drawings and are numbered and dimensioned. The following tables summarize structure height and right-of-way width for each option.

Table E1:
Option A Mississippi River Crossing

tructure	eight feet	Width of Right of Way at tructure feet	Location Comment
1	105	125	Private property
2	130	125	Wildlife refuge
3	130	125	Wildlife refuge
4	275	125	Wildlife refuge; river crossing structure; height triggers FAA lighting requirements
5	275	125	Dairyland Power property; river crossing structure; height triggers FAA lighting requirements
6	135	125	Dairyland Power property
7	195	125	Dairyland Power property
8	195	125	Dairyland Power property
9	100	125	Private property

Table E2:
Option Mississippi River Crossing

tructure	eight feet	Width of Right of Way at tructure feet	Location Comment
1	60	270	Private property
2	85	270	Wildlife refuge
3	80	270	Wildlife refuge
4	199	280	Wildlife refuge; river crossing structure
5	199	280	Dairyland Power property; river crossing structure
6	80	280	Dairyland Power property
7	140	280	Dairyland Power property
8	140	280	Dairyland Power property
9	60	270	Private property

Table E3:
Option C Mississippi River Crossing

tructure	eight feet	Width of Right of Way at tructure feet	Location Comment
1	105	125	Private property
2	130	125	Wildlife refuge
3	130	125	Wildlife refuge
4	199	280	Wildlife refuge; river crossing structure
5	199	280	Dairyland Power property; river crossing structure
6	80	280	Dairyland Power property
7	140	280	Dairyland Power property
8	140	280	Dairyland Power property
9	60	270	Private property

Table E4:
Option D Mississippi River Crossing

tructure	eight feet	Width of Right of Way at tructure feet	Location Comment
1	105	125	Private property
2	130	125	Wildlife refuge
3	130	125	Wildlife refuge
4	196	180	Wildlife refuge; river crossing structure
5	196	180	Dairyland Power property; river crossing structure
6	130	125	Dairyland Power property
7	195	125	Dairyland Power property
8	195	125	Dairyland Power property
9	100	125	Private property

Minnesota Route Permit – Appendix E2

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January 2010

Appendix E3:

Mississippi River Underground Crossing Feasibility Analysis

Applicant's Conclusions and Comments

The Applicant engaged an engineering firm to determine the feasibility of underground installation for the double circuit 345 kV line at the Alma River Crossing. That analysis is attached.

The length of the underground alternative studied is 1.3 miles and has an estimated cost of $90 million. This is approximately $70 million per mile for underground double circuit 345 kV compared to approximately $2 million per mile for overhead.

Underground transmission cable, especially at high voltages such as 345 kV, is much different than underground distribution cable. Transmission cables are several inches in diameter and must be contained in 10 to 30 inch pipes. Multiple conductors per phase are required. When open trench methods place the conductors close to the surface, they must be encased in concrete to protect them from potential damage.

Based on the engineer's analysis and the Applicant's own experience, the Applicant concluded that undergrounding is not a prudent alternative because there are not benefits that justify a $90 million additional expenditure. The key considerations were aesthetic impacts, avian impacts, cost and reliability.

Overhead and underground alternatives have different aesthetic and avian impacts. However, these impacts can be successfully mitigated with wire marking techniques and appropriate design alternatives. The Project's overhead options consolidate the existing and proposed transmission lines into single structures.

Aesthetic impacts and the risk of bird impacts can be reduced with underground construction. However, with the underground alternative studied, the existing double circuit overhead line at the Alma Crossing would remain in place. In addition, underground construction would involve more ground disturbance during construction than overhead alternatives due to the need to construct with horizontal directional drill and open trench methods. In this instance, the underground alternative results in a 235 foot wide cleared right-of-way containing eight 10-inch borings under the river spaced 25 feet apart. Temporary construction areas would require additional tree clearing. High pressure fluid-filled pipe technology contains a mineral oil dielectric coolant that, while manageable, is a potential environmental issue that is not present with overhead construction. In addition, the underground design would require is transition stations. Similar to small fenced substations, a transition station is required at each end to transition from underground to overhead cable. Each transition station would be approximately one acre in size.

The underground alternative also has unique reliability concerns. Failures of underground cables take longer to locate and repair than overhead alternatives. Complete replacement of a span of cable, if necessary, would leave the transmission line out of service for several months.

The attached underground feasibility report was prepared using aerial photographs and USGS topographic maps. No further site-specific investigation was conducted during this feasibility stage. Potential environmental issues discussed in the report are general to underground installations and are not necessarily project specific.

December 30, 2009

XCEL ENERGY

CapX Hampton – Rochester – La Crosse 345kV Project

Alma Mississippi River Crossing
Underground Report

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I. EXECUTIVE SUMMARY

Scope of Work

Xcel Energy (Xcel) requested that a comparison be made of alternative 345kV underground cable systems for the CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing.

Underground Cable Systems

Two basic types of underground cable systems were considered for the CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing, namely an extruded dielectric, cross-linked polyethylene (XLPE), (extruded) cable system and a high-pressure fluid-filled pipe-type (HPFF) cable system. Details of the construction of the cables and major accessories for each of these cable systems are included in Section II. The major pros and cons of each of these cable systems are as follows:

Extruded Dielectric Cable Systems

Pros:

- Essentially no operation and maintenance requirements.
- High reliability reported for systems of modern design at voltages 230kV and below in the USA, Japan and European countries.
- Higher normal operating and short circuit temperature ratings as compared to HPFF systems.
- Installation environmental condition requirements for splicing and terminating less stringent.
- Lower dielectric loses.
- Shorter time required for repair.
- Concrete encased duct bank systems provide mechanical protection from dig-ins and allow for short lengths of trench to be opened for construction activities.

Cons:

- Susceptible to damage from dig-ins if direct buried, more so than HPFF pipe-type cable systems.
- Potential for induced sheath voltages and losses.
- Trench for installation of each cable length (direct buried) must be left open for the entire length during cable installation.
- Duct bank/conduit installation may reduce thermal performance and increases cost.
- XLPE insulation not as forgiving (fluid-impregnated paper insulation is more tolerant of manufacturing defects, and variances).
- Limited use at 345kV in US.

HPFF Pipe Type Cable Systems

Pros:

- Long experience record dating from 1930's with extensive use in the U.S.
- Very high reliability based on utility records.
- Steel pipe affords mechanical strength and protection from "dig-ins."
- Short length of trench can be opened for construction activities.
- The cable and other materials can be manufactured and installed by firms located in the United States.
- For direction drilling installations the casing installed can also be utilized as the cable conduit.
- Allows for dielectric fluid circulation to help increase ampacity.

Cons:

- Pipe susceptible to corrosion.
- Requires very large specially designed equipment for installation activities.
- Requires specialists for specific installation activities.
- May require long repair time in case of faults in the cable system.
- Requires installation and maintenance of a cathodic protection system.
- Requires maintenance of monitoring and pressurization system.

Cable Case Summary

The options for installation of the 345kV circuits circuit are summarized below. For each case, the cable system type, number of cables per phase, installation depth and ampacity are provided.

Table 1: Ampacity Results

Case #	345kV Circuit	Cables per Phase	Cable Type	Burial Depth	Number of Bores - Spacing	Total Ampacity
1	5000 kcmil	6*	XLPE	30-ft	6 - 40-ft	3700A
2	2500 kcmil	4	HPFF	20-ft	4 - 25-ft	3700A

* Due to software limitation, the 345kV XLPE case attached in the appendix shows only 4 cables per phase. The total of 6 required cables per phase was extrapolated from the cable rating in the aforementioned case.

Cost Estimates

The estimated installed costs for the XLPE and HPFF pipe-type insulated cable systems for the CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing are:

Table 2: Cost Summary Table *

Description	Material (One Circuit)	Labor (One Circuit)	Total (One Circuit)	Total (Two Circuits)
345kV XLPE 5000 kcmil Copper Conductor	$64,631,645	$33,099,965	$97,731,610	$195,463,220
345kV HPFF 2500 kcmil Copper Conductor	$25,426,148	$19,675,275	$45,101,423	$90,202,846

* A 15 % contingency is included in the estimates.

The addition of a multiple circuits will require additional materials, horizontal directional drills, open trenching, manholes, and transition stations. There will be little to no overlap between additional circuits. The costs included in the table above for multiple circuits can be accounted for by simply summing the relevant individual circuit costs.

II. PROJECT DESCRIPTION

POWER prepared this report for Xcel's CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing.

Cross-linked polyethylene (XLPE) and high-pressure fluid-filled (HPFF) systems were analyzed for the underground portion of the line. The following describes the design criteria and assumptions used in the analysis.

For both types of cable systems a number of variables remain constant. These include but are not limited to: bore length, earth ambient temperature, thermal resistivites, load factors, and burial depths as described in the Cable System Evaluation Report as well as the Ampacity Design Criteria.

The Horizontal Directional Drill (HDD) depth is controlled largely by the casing bending limitations. For example, the HDD reaches a depth of 20-ft for the HPFF system using a 10-inch casing. The heat dissipation characteristics decrease as depth increases, which ultimately increases the spacing and size of cables needed to achieve the target ampacity. For this reason a 345kV XLPE requires six (6) bores using smaller casings to decrease the overall required depth to 30-ft. However, even at this depth a 40-ft spacing is required between each bore. The drawings included in the appendices show the profile view of the HDD and typical cross sections for each configuration.

Cable System Evaluation Report

Cable System HPFF ☑ LPFF ☐ Solid Dielectric ☑
Codes AEIC ☑ IEC ☐ ICEA ☐ IEEE ☑
Conductor Size (kcmil/AWG) 1750-5000
Conductor Type Copper
Insulation Thickness (mils) XLPE: 1023, PPP: 600
Insulation Material PPP/XLPE
Installation Method HDD
Shield Type
Jacket Yes ☑ No ☐ TYPE: polyethylene
Fiber Optic Strand (PMT) Yes ☐ No ☑
Describe

a) Voltage Class: 345kV
b) Conductor: Copper X Aluminum ____
Construction Segmented
c) Insulation: *XLPE ☑ EPR ☐ Kraft Paper ☐ Poly Paper ☑

*XLPE maximum stress design AEIC CS9-06 Yes ☐ No ☑

As an option
High-Pressure-Fluid-Filed (HPFF) X
High-Pressure-Gas-Filled (HPGF)
Self-Contained-Fluid-Filled (SCFF)

d) Shield:
e) Jacket: XLPE: Polyethylene
f) Skid Wire Type Stainless Steel

A. Cable Operating Parameters

1. Ampacity Requirements

a.) Maximum Steady State 3700 A @ 345kV
b.) Emergency/Load
c.) Load Factor 75%
d.) Ultimate Short Circuit Amps ____ Cycles ____
e.) Shield Operation Cross-bonded ☐ Multi-Point ☐ Single-point ☑
f.) Shield Open Circuit Voltage Limit 150V

B. Operating Design Criteria

1. Earth Rho (Cº-cm/Watt) - Per Geotherm 90 Cº-cm/Watt
2. Earth Ambient (Cº) (as provided) 15° C
3. Air Ambient (Cº) N/A
4. Maximum Conductor Operating Temperature (Cº) EPR ___ XLPE 90 Paper 85
5. Emergency Conductor Operating Temperature (Cº) EPR ___ XLPE 105 Paper 105
6. Soil Thermal Resistivity (Rho) (Cº-cm/Watt) 90°C-cm/W
   Grout Resistivity (Cº-cm/Watt) 70°C·cm/W

C. Installation Parameters

1. Substation Terminator Constraints
2. Cable System Burial Depth 60-ft Maximum 20-ft Minimum
3. Manholes
   a.) Burial Depth TBD
   b.) Single Circuit ☑ Double Circuit ☐
   c.) Comments
4. Route Criteria
5. Cathodic Protection Thermocouples included at CP test stations. ISP/ Rectifier/ Anode Bed
6. Permits Obtained by Xcel Energy
7. Duct Bank/Pipe Encasement (Configuration)
8. Communication Ducts: N/A
9. Accessories
   a.) Splices Per cable manufacturer's recommendation
   b.) Arresters MCOV Per cable manufacturer's recommendation
   Leakage Distance
   Duty Cycle Rating
   c.) Terminations Per cable manufacturer's recommendation
   d.) Cable Clamps Per cable manufacturer's recommendation
   e.) Link Boxes (Sheath Grounding) Per cable manufacturer's recommendation

Ampacity Studies

POWER Engineers, Inc. (POWER) performed an XLPE and HPFF cable sizing/ampacity study for the CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing. The primary purpose of the study was to determine a minimum conductor size based on the design requirements provided by XCEL.

POWER used CYME International's Cable Ampacity Program (CAP) to model the cable system. The cable systems analyzed were Cross-Linked Polyethylene (XLPE) and High-Pressure Fluid-Filled (HPFF). These cable systems were analyzed using the following design criteria.

- Ampacity
  - Normal ..... 3,700 Amps at 345kV
- Load Factor 75%
- Conductor Material..... Copper
- Thermal Resistivity (ρ, rho)
  - Native Soil ..... 90°C-cm/W
  - Grout ..... 70°C-cm/W
- Ambient Temperature
  - Earth..... 15°C
- Maximum Conductor Operating Temperature
  - Steady State
    - XLPE ..... 90°C
    - HPFF..... 85°C
  - Emergency
    - XLPE ..... 105°C
    - HPFF..... 105°C
- Burial Depth (Top of System)
  - Minimum ..... 20 feet
  - Maximum..... 60 feet
- Bore Length..... 3000 feet

Four cases were successfully run using depths determined by the drill path for the appropriate casing size. Multiple cables per phase were used since it is impractical to achieve the required ampacities at the given depths with a single cable. Note that the native thermal resistivity is assumed to be 90°C·cm/W. This value is a typical value and may actually be higher or lower depending on the particular soil conditions found at the project site. Table 3 includes a summary of the cases including number of bores, spacing, casing size, depth, and ampacity with operating temperature.

Table 3: Ampacity Results

Cable System Type and Conductor Size	Cables Per Phase	Number of Bores (Spacing)	Bore Casing Size	Depth	Ampacity per Cable (Temperature)
345kV XLPE 5,000 kcmil CU	6*	6 (40-ft)	30-inch	30-ft	625A (88°C)
345kV HPFF 2,500 kcmil CU	4	4 (25-ft)	10-inch	20-ft	925A (82°C)

* Due to software limitation, the 345kV XLPE case attached in the appendix shows only 4 cables per phase. The total of 6 required cables per phase was extrapolated from the cable rating in the aforementioned case.

Detailed ampacity calculations are located at the end of this report.

345kV XLPE Installation Concerns

Due to the high ampacity requirements, a 345kV XLPE system is not feasible when compared to a 345kV HPFF system. This system would require a large conductor size and the use of multiple cables per phase. The cable itself would be available only from a limited number of manufacturers and would have a high cost. In addition, the cable would weigh approximately 40 pounds per foot and would have a required reel length of 3,000-ft. A reel of this length would weigh 12,000 pounds and would pose a problem for transportation to the work site. The total amount of cable required for the line would likely require the use of a barge for transportation. Once at the site, the cable could either be offloaded and installed or installed directly from the barge. Both options have their own difficulties and high cost. In addition to these problems, the 345kV XLPE installation requires additional bores with much larger spacing. This greatly increases the impact of the line since the actual work site as well as the final installation itself will take up a much larger area. A higher number of cables means a larger transition station will be required on each end as well. The end result is that the footprint of the 345kV XLPE installation will likely be about twice as large as that of the 345kV HPFF installation, and it would cost about twice as much per circuit. Due to the concerns about materials, procurement, transportation, installation, cost, and overall impact, a 345kV XLPE system is not as feasible for this project as a 345kV HPFF system.

III. UNDERGROUND CABLE SYSTEMS

Introduction

Two basic types of underground cable systems are being considered. These systems are an extruded cross-linked polyethylene cross-linked polyethylene (XLPE) insulated cable system and a high-pressure-fluid-filled pipe-type (HPFF) cable system. A brief summary of the construction of the cables and accessories for each of these cable systems follows. The pros and cons of these two cable systems are included.

Reliability

While underground transmission lines are highly reliable, their down times are significantly longer than their overhead counterparts when trouble is encountered. As a result, particular design practices are used to alleviate the problem with alternative T-lines or 100% redundancy. By implementing a design to ensure continuous operation, the reliability of underground transmission lines significantly increases.

Extruded Dielectric Cable Systems

Cable

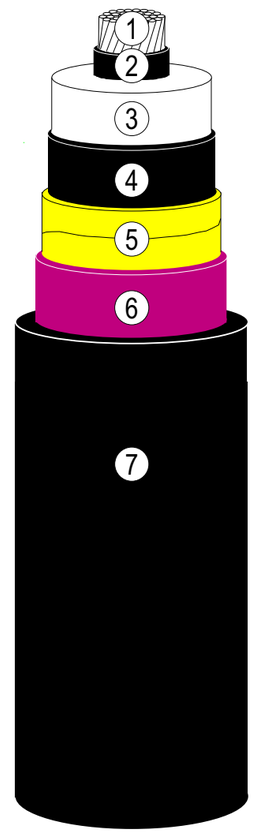
The components of a typical dielectric cable are shown in Figure 1. The typical cable consists of a stranded copper or aluminum conductor, semi-conducting extruded conductor shield, extruded dielectric insulation, extruded semiconducting insulation shield, a lead, aluminum, copper or stainless steel sheath moisture barrier, and a protective jacket. The inclusion of a moisture barrier is typical of French and other non-U.S. cables, but has not been a standard feature of U.S. extruded dielectric cables until recently (last ten years).

A metallic shield, tape or drainwire, is required to carry fault current when a sheath is not used.

Insulation materials used for extruded dielectric cables include:

- Thermoplastic Polyethylene Compounds

  Typical thermoplastic polyethylene insulation materials are low-density polyethylene (LDPE), high molecular weight polyethylene (HMWPE) and high-density polyethylene (HDPE).



1 - CONDUCTOR
Cross-section: 1750 kcmil, segmental
Material: copper

2 - INNER SEMI-CONDUCTIVE LAYER
Indicative thickness: 60 mils
Minimum point thickness: 24 mils

3 - INSULATION
Material: cross-linked polyethylene
Minimum average thickness: 900 mils *

4 - OUTER SEMI-CONDUCTIVE LAYER
Indicative thickness: 63 mils
Minimum point thickness: 40 mils
Maximum point thickness: 100 mils

5 - SWELLING TAPE

6 - LEAD SHEATH
Minimum average thickness: 45 mils *

7 - OUTER SHEATH AND EXTRUDED SEMICONDUCTING LAYER
Material: medium density polyethylene
Minimum average thickness: 120 mils *

Figure 1: Typical XLPE Cable

- Thermosetting Compounds

  Ethylene propylene rubber (EPR) and cross-linked polyethylene (XLPE) are typical thermosetting insulation compounds.

It is interesting to note that each of these insulation materials enjoys preferential use in different parts of the world. For instance, the preferred extruded dielectric insulation in France is LDPE, in Italy EPR, and in most of Europe, Japan and the U.S. XLPE. The reason for this difference is likely that no one extruded dielectric insulation material has emerged as conclusively superior to the others in all aspects for every application, including manufacturing, cost and reliability.

Materials used for semi-conducting extruded conductor and insulation shields are semi-conducting PE, XLPE and EPR compounds. PE compounds are used with PE and XLPE insulation, XLPE compounds with XLPE insulation, and EPR compounds with EPR insulation.

Cable Jackets are typically extruded PE and on rare occasions polyvinyl chloride (PVC).

Extruded dielectric cables are manufactured using one of the following extrusion techniques:

- The conductor shield and insulation are extruded in tandem over the conductor. Extrusion of the insulation shield is a separate operation.

- The insulation shield, insulation and conductor shield is extruded in tandem over the conductor. This method is known as triple tandem extrusion. Triple extrusion is the preferred and recommended technique.

The metallic shield, tape, concentric neutrals, etc., and jacket, as applicable, are applied later in separate operations.

Vulcanization of thermosetting insulation compounds, EPR and XLPE, occurs via a dry cure or steam cure process in a tube called a curing tube. After vulcanization, the insulation is cooled with water or gas in a cooling tube.

Three major types of extruder lines are used to produce extruded dielectric cable; they are catenary, MDCV (long land die) and vertical extruder lines. Vertical extruder lines are often used when heavy insulation walls are required, for cables rated in excess of 35kV and for guaranteeing concentricity.

The manufacturing process for extruded cables is of critical importance in ensuring a reliable end product, since extruded dielectric insulations are not self-healing. Fluid-impregnated paper insulation is much more tolerant of manufacturing defects. As such, quality control during manufacture of extruded dielectric cables is critical to minimize moisture contamination, voids, contaminants and protrusions. Insulation contamination can be minimized by manufacture of and use of super clean insulation compounds; transportation and storage of the compounds in sealed facilities; and screening out of contaminants at the extruder head.

Voids and moisture contamination are inevitable results of steam vulcanizing, water-cooling and cross-linking agent decomposition. Dry (gas) curing produces smaller and fewer voids and less moisture contamination.

Lead sheaths are typically extruded (see end of this section for typical cable cross-section drawings and data); however, other types of water impervious material are available. The following table compares the various types of sheath materials.

Table 4: Cable Sheath Comparison

	Extruded Lead	Extruded Aluminum	Metallic Foil Laminate	Copper	Stainless Steel
Dimensional Stability	Poor	Good	Poor	Very Good	Very Good
Fluid-Imperviousness	Very Good	Very Good	Good	Very Good	Very Good
Flexibility	Good	Poor	Very Good	Very Good	Very Good
Mechanical Strength	Good	Very Good	Poor	Very Good	Very Good
Cable Diameter (per unit)	1.0	1.0	1.0	1.05	1.14
Cable Weight (per unit)	1.59	1.0	1.09	1.27	1.34
Minimum Bending Radius	15Ds	15Ds	15Ds	12Ds	12Ds
Corrosion Resistance	Very Good	Poor	Poor	Very Good	Very Good

Ds = Diameter of metallic sheath

Cable Accessories

The three basic cable accessories for extruded dielectric cables are splices, terminations and sheath bonding materials.

Premolded splices are recommended to joint 345kV extruded dielectric cables. Cable preparation for splicing is as follows:

Insulation and shields are removed from the conductor; and the insulation is penciled. The conductor ends are then joined by a compression splice or MIG welding (aluminum conductor only).

The perceived disadvantages of traditional jointing methods compared to premolded are, as assembly is complex, specially trained craftsmen required and no factory testing is possible. The premolded joint offers simpler construction. Also all parts produced can be factory tested prior to field installation (see end of this section for premolded splice cross-section for extruded dielectric cable)

Terminations are available for extruded dielectric cable to allow transitions to overhead lines or above ground equipment. A manufacturer's catalog page showing a cross-section of a typical termination follows. A synthetic rubber stress cone is placed over the insulation to control stress and the interior of the termination body is filled with a synthetic or silicone fluid. Termination bodies are typically made of porcelain and include skirts to minimize the probability of external flashovers due to contamination.

Sheath cross bonding may be required for long extruded dielectric cable systems to minimize or eliminate sheath currents, sheath losses and sheath voltage.

Cable Maintenance and Repair

XLPE cable requires little maintenance since it is usually installed in a duct bank. Duct inspections are performed in conjunction with routine manhole inspections. Furthermore, ducts are seldom cleaned unless a new circuit, cathodic protection, or grounding is being installed. Unless environmental conditions dictate more frequent inspections, a yearly manhole inspection is generally sufficient to examine cable sheaths, protective jackets, joint casings, cable neutrals, and general physical condition of the manhole. Terminations should also be visually checked on a yearly basis to ensure a properly operating system. In the unlikely event of an electrical fault, the cable failure must be located which requires specialized equipment as well as a knowledgeable crew to pinpoint the failure. The time it takes to locate the fault location depends largely on the environmental surroundings and access to the cable for testing. Once pinpointed, an entire section of cable can be removed and replaced between manhole sections, or the duct bank can be opened up and an experienced splicing crew can rejoin the cable ends. The amount of time the system is depends entirely on the fault location and the repair method that provides the most advantageous solution. Typical repair time can range from two to four weeks.

Pros and Cons

The pros and cons of extruded dielectric cable systems for use in high voltage applications are as follows:

Pros:

- Essentially no operation and maintenance requirements.
- High reliability reported for systems of modern design at voltages of 230kV and below in Japan, the US and European countries. Extensive use and success at 400kV in France and Japan.
- Higher normal operating and short circuit temperature ratings as compared to HPFF systems.
- Installation environmental condition requirements for splicing and terminating less stringent.
- Shorter time required for repair.
- Dielectric losses for extruded cable systems considerably less than paper insulated cable systems.
- Less specialized installation equipment required.

Cons:

- Susceptible to damage from dig-ins if direct buried more so than HPFF cable systems.
- Potential for induced sheath voltages and losses.
- Trench for installation of each cable length (direct buried) must be left open during cable installation.
- Duct bank/conduit installation reduces thermal performance and increases cost.
- XLPE insulation not forgiving (fluid-impregnated paper insulation is more tolerant of manufacturing defects, and variances).
- Limited splicing/terminating workforce in USA.

High-Pressure Pipe-Type Cable Systems

Cable

The construction of a typical high-pressure pipe-type (HPPT) cable (high-pressure-gas-filled pipe-type and high-pressure-fluid-filled pipe-type cables) is shown on the following manufacturer's drawing. The cables are typically composed of a conductor, conductor shield (carbon black or metalized paper tapes), insulation (Kraft paper or paper/polypropylene laminate impregnated with polybutene or alkylbenzene fluids), insulation shield (carbon black or metalized paper tapes), a moisture barrier (non-magnetic tapes and metalized mylar tapes), and skid wires (zinc, stainless, brass). The moisture barrier prevents moisture and other contamination and loss of impregnating fluid prior to installation. The skid wires prevent damage to the cable during pulling.

Three HPPT cables are pulled into a low-carbon steel pipe to constitute a cable system. The pipe is coated on the inside with an epoxy coating to prevent oxidation prior to fluid-filling and to reduce pulling friction and tension. The pipe exterior is coated with HDPE or Polypropylene to protect the pipe from environmental corrosion and to isolate the pipe from "ground" to allow use of a cathodic protection system.

A triangular cable configuration is preferred in contrast to a cradle configuration, as it reduces pipe losses and, as a direct result, increases load capacity. Increases in pipe losses for cradled versus triangular cable configuration ranges from 20% to 45%.

HPFF cable systems are filled with pressurized low viscosity polybutene or alkylbenzene fluids.

Cathodic protection is applied to pipes used in HPFF cable systems. This protection inhibits pipe corrosion, thereby minimizing pipe leaks due to corrosion. Most forms of cathodic protection utilize one of two methods: the galvanic-anode system or the impressed-current system. With both systems, anodes are placed in the ground to draw a DC current along the cable pipe into the anodes where metallic deterioration and corrosion are allowed to occur. In most systems an isolator/surge protector is used to block the DC current from entering the station grounding grid but allowing for large AC surges to be safely discharged in the station grid. Through the use of cathodic protection, the reliability of the pipe type system can maintain a high level of performance.

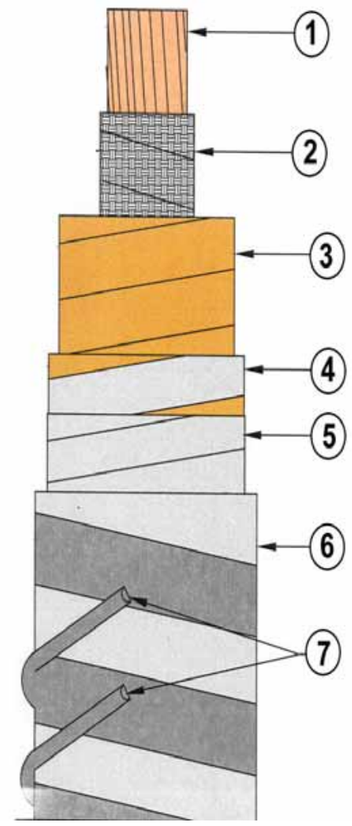
The manufacturing process for HPFF cables is similar to the process used for paper insulated lead-covered cables. A conductor core is covered by helically wound layers of metalized or carbon black paper tape for conductor and insulation shield and high quality Kraft paper or paper/polypropylene laminated for insulation. The insulated cable is dried and then impregnated with fluid in large pressurized tanks.

Cable Accessories

Splicing of HPFF cables begins with removal of the insulation and shields from the conductor, the insulation is step-penciled. The conductor ends are then joined by a ram press, compression connector or MIG welding (aluminum conductor only). Insulation paper tape is wound around the spliced conductor, filling the step-penciled area of the insulation. Metalized tapes or carbon black tapes are used to re-establish the conductor and insulation shields. Small rolls of paper tape are used, as the three cables are very close together.

Maintenance and Repair

To ensure reliable, uninterrupted service, routine maintenance must be completed on cable systems as well as the associated components. Because of the more intricate systems involved with the high pressure fluid filled system, maintenance and occasional repair can be expected to be higher than that of the solid dielectric system. The hardest and often times most over looked component of the pipe type system is the pipe coating, which left un-inspected can cause catastrophic failure to the entire system. Because the cable itself is contained inside of a steel pipe, the pipe coating must be maintained in order to ensure proper operating pressures, and should be tested at least every other year. Repair of the cable pipe is an extensive process but will generally only leave the system off line for a number of days. Routine inspections and testing of the pumping plant must be preformed in order to sustain the proper operating pressures. Although the plant has a number of different sensors and alarms, a thorough yearly inspection is recommended. Other components of the cathodic protection system should be routinely tested such as the rectifier and the isolator/surge protector (ISP). Current levels, as well as voltage levels, should be tested monthly and any significant changes noted as a possible system breakdown. Anodes output levels should also be tested and replaced when necessary. As with extruded cables, electrical failures require locating the fault followed by the on site determination of repair needs. However, because the high pressure fluid filled system utilizes a pressure filled pipe, the dielectric fluid must be capped off while repairs are made. To do this a pipe freeze is initiated using liquid nitrogen to inhibit the fluid flow. Once cable splicing is finished and a repair sleeve installed, the freeze can be removed and any contaminates can be evacuated from the system. In the event of termination failure, the cable generally must be replaced all the way back to the splicing trifurcator. Typical repair time can range from two to six weeks.



1 - CONDUCTOR
Cross-section: 2500 kcmil segmental
Material: copper

2 – CONDUCTOR SHIELD
Carbon Black Paper Tapes

3 - INSULATION
Material: Impregnated Paper (LPP)

4 – INSULATION SHIELD
Metalized Paper Tape

5 - INSULATION SHIELD
Metalized Polyester Tape

6 – ZINC ALLOY TAPE

7 – D-SHAPED SKID WIRES
Material: Zinc or Stainless Steel

Figure 2: Typical HPFF Cable

Terminations are made by first separating the three cables using a trifurcator. Single-phase terminations are then made in fluid-filled terminators.

Pros and Cons

The advantage and disadvantages of HPFF cable systems for use in high voltage applications are as follows:

Pros:

- Long experience record dating from 1930's with extensive use in the U.S.
- Very high reliability based on utility records.
- Steel pipe affords mechanical strength and protection from "dig-ins."
- Short lengths of trench can be opened for construction activities.
- The cable and other materials are manufactured and installed by firms located in the U.S.
- For directional drilling installations, the casing installed can also be utilized as the cable conduit.

Cons:

- Pipe susceptible to corrosion, cathodic protection required.
- Requires very large specially designed equipment for installation activities.
- Requires specialists for specific installation activities.
- Requires very long repair time in case of faults in the cable system.
- Requires installation and maintenance of a cathodic protection system.
- Requires maintenance of pressurization system.

IV. TERMINATION STRUCTURE / STATION

The difference in the two cable systems comes from the manufacturing process and operation characteristics of each type of cable. For the XLPE system, typically larger insulation thicknesses are seen, but a pumping plant and cathodic protection is not required like that of an HPFF system. Further considerations arise at the termination locations. For the HPFF system a transition station must be erected to facilitate the pumping plant, oil filled terminations, and the cathodic protection system. Typical termination stations have a footprint in the range of 250-ft by 250-ft. However, this may be a benefit as a number of switching arrangements can be attained, as well as the addition of circuit protection, monitoring, and voltage regulation. The XLPE system can be converted to an overhead line in a much simpler fashion with the use of a transition structure, because the underground cables, as well as all of the required terminations, can be attached directly to the structure.

The Pros and Cons of each configuration are provided below:

Termination Structure

Pros:

- Essentially no operation and maintenance requirements.
- High reliability
- Small structural footprint
- Terminations can be located on structure
- Lower installation cost

Cons:

- Can only be used for XLPE cable
- Failure of structure may result in prolonged outage

Termination Station

Pros:

- Works with both cable systems
- More switching capabilities
- Increased protection capabilities/schemes
- SCADA can be installed in the station
- Voltage regulation, if required can be incorporated

Cons:

- Larger footprint
- Higher cost
- Higher maintenance costs

V. COST ESTIMATE

Introduction

The cost estimate for the cable system was compiled using quotations from high voltage cable manufacturers and contractors familiar with the installation of high voltage underground cable systems.

Cost Estimate Assumptions

1) Single point bonding of XLPE cable sheaths was assumed.
2) Materials used in the cost estimates meet all applicable industry standards.
3) It was assumed construction will be performed by craftsmen experienced in installing high voltage underground transmission systems.
4) XCEL to obtain all environmental, local, state, and federal permits as required.
5) No contingency for internal XCEL costs.
6) No contingency for dewatering costs.
7) A 15% contingency was added.
8) No contingency for rock excavation costs.

Summary of Cost Estimates

A summary of the costs for the cable investigated has been included in Table 5 below.

Table 5: Cost Summary Table *

Description	Material (One Circuit)	Labor (One Circuit)	Total (One Circuit)	Total (Two Circuits)
345kV XLPE 5000 kcmil Copper Conductor	$64,631,645	$33,099,965	$97,731,610	$195,463,220
345kV HPFF 2500 kcmil Copper Conductor	$25,426,148	$19,675,275	$45,101,423	$90,202,846

* A 15 % contingency is included in the estimates.

The costs included in the table above for multiple circuits can be accounted for by simply summing the relevant individual circuit costs.

VI. Installation Methods

Overview of Horizontal Directional Drilling (HDD)

Development and Uses

Originally used in the 1970s, directional crossings are a marriage of conventional road boring and directional drilling of oil wells. Pipelines have been installed for carrying oil, natural gas, water and other products using HDD. Ducts have been installed to carry electric and fiber optic cables. Besides crossing under rivers and waterways, HDD installations have been made crossing under highways, railroads, airport runways, shore approaches, islands, areas congested with buildings, pipeline corridors and future water channels.

Technology Limits

The longest installation, since the inception of HDD, has been about 6,000 feet with pipe diameters up to 60 inches. Although directional drilling was originally used primarily on the U.S. Gulf Coast through alluvial soils, more and more crossings are being undertaken through gravel, cobble, glacial till and hard rock. Adequate space must be available to allow rigs to set up for the duration of the installation.

Advantages

HDD installations have the least environmental impact of any alternate method. The technology also offers maximum depth of cover under the obstacle, thereby affording maximum protection and minimizing maintenance costs. HDD crossings have a reasonably predictable and short construction schedule. Directional drilling may minimize social impacts such as extensive highway closures and traffic congestion under the right conditions. Perhaps most significant advantage is that HDD crossings are in select cases, less expensive than other methods.

Machine Types

There are several types of machines available for HDD. They are primarily separated into small or mini, medium and large sizes, according to thrust and pull back force capabilities.

Small or mini size rigs have thrust and pull back forces of less than 30,000 pounds. Typically these rigs have ranges limited to 2 to 300 feet and can install 2 to 6 inch product casings.

Medium size rigs have thrust and pull back forces in the range of 30 to 100,000 pounds. Ranges are longer with the upper limit approaching 1,500 to 2,000 feet. These rigs can install 6 to 20 inch product casings, depending on length and specific forces.

Large size rigs have thrust and pull back forces in the range of 125 to 750,000 pounds. Ranges of installation can exceed 5,000 feet and product casings can be 6 to 60 inches.

Technique

A pilot hole is drilled beginning at a prescribed angle from horizontal and continues under and across the obstacle along a design profile made up of straight tangents and long radius arcs. Concurrent to drilling the pilot hole, the contractor may elect to run a larger diameter "wash pipe" that will encase the pilot drill string. The wash pipe acts as a conductor casing providing rigidity to the smaller diameter pilot drill string and will also save the drilled hole, should it be necessary to retract the pilot string for bit changes. The directional control is brought about by a small bend in the drill string just behind the cutting head. The pilot drill string is not rotated except to orient the bend. If the bend is oriented to the right, the drill path then proceeds in a smooth radius bend to the right. The drill path is monitored by an electronic package housed in the pilot drill string near the cutting head. The electronic package detects the relationship of the drill string to the earth's magnetic field, gravitational field and its inclination. This data is transmitted back to the surface where calculations are made as to the location of the cutting head. Surface location of the drill head also can be used where there is reasonable access.

Once the pilot hole is complete, the hole must be enlarged to a suitable diameter for the product pipeline. For instance, if the pipeline to be installed is 36 inch in diameter, the hole may be enlarged to 48 inch diameter or larger. This is accomplished by "pre-reaming" the hole to successively larger diameters. Generally, the reamer is attached to the drill string on the bank opposite the drilling rig and pulled back into the pilot hole. Joints of drill pipe are added as the reamer makes its way back to the drilling rig. Large quantities of slurry are pumped into the hole to maintain the integrity of the hole and to flush out cuttings.

Once the drilled hole is enlarged, the product pipeline can be pulled through it. The pipeline is pre-fabricated at the end of the bore opposite the drilling rig. A reamer is attached to the drill string and then connected to the pipeline pullhead via a swivel. The swivel prevents any translation of the reamer's rotation into the pipeline string allowing for a smooth pull into the drilled hole. The drilling rig then begins the pullback operation, rotating and pulling on the drill string and once again circulating high volumes of drilling slurry. The pullback continues until the reamer and pipeline break ground at the drilling rig.

After the pipe has been pulled through the drilled hole, bore spacers and conduit are installed in the pipe. The bore spacers are typically spaced five feet apart to allow support of the conduit. Once the conduit is installed, one end of the pipe is temporarily sealed and grout is pumped into the opposite end until the pipe system is full.

Prior to construction there are several activities that must be accomplished. These activities include: soil borings, thermal resistivity testing of the soil and surveying the route. The daily activities for a typical HDD operation are presented below. This timetable is based on drilling 1200 feet.

Mobilize: The mobilization of the HDD equipment will require a minimum of 30 days with an additional minimum 30 days notice.

Day 1: The drilling equipment is setup. (This assumes setup location has been identified and approved by Xcel and Permitting Agencies)

Day 1-5: Product casing is laid out and prepared on exit side of the drilling operation.

Day 2: Excavation and setup of entry position and the anticipated exit position is located.

Day 2-4: The pilot hole is drilled beginning at the prescribed angle and under and across the obstacle along the designed profile. Expected minimum drilling rate of 40 feet/hour for the pilot hole (30 drilling hours based on 12 hour shifts).

Day 5: The drilling equipment is reset for back ream and pullback of product pipe.

Day 6-8: The drilled hole is enlarged and the product pipe (casing) is pulled into the enlarged borehole. Expected drilling rate of 35 feet/hour for the back ream and casing installation. (30 drilling hours based on 12 hour shifts).

Day 8: The area around the exit hole is excavated and the casing lowered to design depth and configuration.

Day 9: The drilling equipment is disassembled and demobilized.

Day 10: The area around the entry hole is excavated and the casing lowered to the design depth and configuration. The equipment for the conduit installation is setup.

Day 11-12: The installation of the bore spacers and conduit are installed in the pipe. Once the conduit is installed, grout is pumped into the pipe system.

Day 13: Installation of the land-side duct bank begins.

Layout and Design

Heavy equipment is required at both ends of the installation. This equipment must remain in position while the installation progresses to completion.

Work Space

The rig spread requires a minimum 100-foot wide by 150-feet long area as shown in Figure 3. This area should extend from the entry point away from the installation, although the entry point should be at least 10 feet inside the prescribed area. Since many components of the rig spread have no predetermined position, the rig site can be made up of smaller irregular areas. Operations are facilitated if the area is level, hard standing and clear of overhead obstructions. The drilling operation requires large volumes of water for the mixing of the drilling slurry. A nearby source of water is necessary.

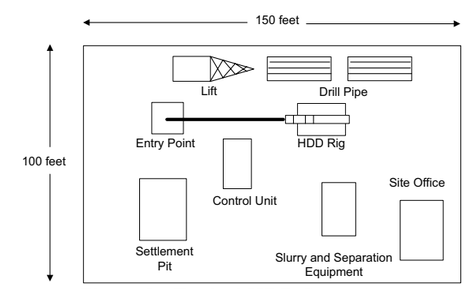


Figure 3: Typical HDD Setup Area

Strong consideration should be given to provide a sufficient length of workspace to fabricate the product pipeline into one string. The width will be as necessary for normal pipeline construction although a workspace of 100-feet wide by 150-feet long should be provided at the exit point. The length will assure that during the pullback the pipe can be installed in one uninterrupted operation. Tie-ins of successive strings during the pullback operation increase the risk considerably because of the tension changes going from dynamic friction to static friction with respect to the product being used. If manholes are located 600 feet apart, then a space of 600 feet should be available beyond the exit pit for product pipe laydown prior to pulling it into the drilled path.

Once the work locations have been chosen, the area should be surveyed and detailed drawings prepared. The eventual accuracy of the drill profile and alignment is dependent on the accuracy of the survey information.

Profile Design Parameters

Once the installation profile has been taken and the geotechnical investigation completed, a determination of the depth of cover under the existing groundline is made. Factors considered may be the presence of existing pipeline or cable crossings at the locations along the desired route. Minimum depth recommended is 10 feet to prevent loss of drilling fluids.

An entry angle between 8° and 20° can be used for most installations. It is preferable that straight tangent sections are drilled before the introduction of a long radius curve. The radius of the curve is determined by the bending characteristic of the product pipeline, increasing with the diameter. A general “rule of thumb” for the radius of curvature is 100 feet/inch diameter for steel line pipe. The curve usually brings the profile to the elevation providing the design cover of the pipeline under groundline and obstructions. Long horizontal runs can be made at this elevation before curving up towards the exit point. Exit angle should be kept between 5° and 12° to facilitate handling of the product pipeline during pullback. Most downhole survey tools are electronic devices that give a magnetic azimuth (for “right/left” control) and inclination (for “up/down” control). Surface locators can also be used in conjunction with the downhole electronic package.

The accuracy of the drill profile is largely dependent on variations in the earth’s magnetic field. For instance, large steel structures (bridges, pilings, other pipelines, etc.) and electric power transmission lines affect magnetic field readings. However, a reasonable drill target at the pilot hole exit location is 10 feet left or right, and -10 feet to + 30 feet in length, although greater accuracy has been achieved.

Normally, survey calculations are conducted every 30 feet during pilot hole operations. The contractor should provide as-built drawings that are based on these calculations. Alternate methods such as gyroscoping, ground penetrating radar or sound transmitting devices may also be used to determine the as-built position.

Special Considerations for Water Crossings

When crossing any body of water a number of concerns arise, and generally these concerns are area specific. The main issues involve the type of the body of water to be crossed, whether or not the area is environmentally sensitive, the location of any access points, environmental control, and permitting. When performing any work around bodies of water special permitting is usually required, as is an environmental impact study. In addition, extensive measures must be taken in preserving the natural water flow. This can range anywhere from erosion control to complete removal of all excavated soils. Because horizontal directional drilling uses bentonite, a clay type drilling fluid to stabilize the bore and reduce mechanical wear, concerns of frac-out into the water body arise. However, because bentonite is of a natural origin, fracing-out into the body of water generally is not a large concern

VII. Operation and Reliability

Overhead Transmission

Overhead line is relatively easy to operate, maintain, troubleshoot and repair. Overhead lines are susceptible to outages resulting from lightning, high wind, wind blown debris, equipment failure and vandalism. At the 345kV level, phase spacing is sufficient to eliminate most problems from flying debris such as tree limbs and proper design eliminates problems with conductor slap. This leaves lightning, high winds, equipment failure and vandalism as the predominant causes of outages. In the case of a short circuit the protective relays normally detect the fault and trip the circuit opens within three to five cycles. Since the line is above ground, faulted sections are usually quickly identified by line patrols with direction from fault locating relays and digital fault recorders. Repair time for most components can be completed within a few hours.

Overhead line currents are limited by annealing of the conductor material which reduces the mechanical strength. High currents also increase the sag due to thermal expansion which reduces ground clearance. Transmission lines with ACSR conductors are designed for normal operation at about 75° C but they can be operated up to 100° C for a number of hours during emergency conditions and may be operated up to 125° C for a short duration.

Underground Transmission

Underground line is relatively easy to operate and maintain although it is more difficult to troubleshoot and repair. Maintenance procedures for XLPE systems include various items such as visual and/or operational inspections of the cable terminations, manholes, and temperature monitoring system inspection and testing. With proper maintenance, the design life of an underground line is approximately 40 years. Underground lines are susceptible to outages resulting from dig in's and cable, splice or equipment failure.

Generally, the conductor of an underground transmission line will be twice the size of an equivalent overhead transmission line. This is a result of the limited heat dissipation due to cable insulation and below grade encasement. This extra mass of copper or aluminum combined with the slow thermal transients of the encasement provides a significant advantage when it comes to short-term overloads. A typical underground transmission line may operate at 20-30 percent above nominal rating for up to 3 days without any degradation to the cable.

Operating losses in cable systems include conductor losses, dielectric losses, proximity effect losses, and sheath losses. Generally, underground cable losses are higher than that for an equivalent overhead circuit.

Underground transmission lines may be designed for future upgrade with a relatively small capital cost. Even lines that were not originally planned for upgrade may be converted by any of the following options:

- Reconductoring
- Accepting a higher voltage stress on the cable.
- Changing cable insulation for higher voltage operation by using a reduced wall thickness or changing from laminated paper insulation to LPP insulation.
- Dynamic ampacity ratings associated with continuous monitoring.

VIII. Comparison of Environmental Impacts of Overhead and Underground Transmission Line Construction

The environmental impacts of overhead transmission line construction differs substantially from underground construction. These differences are discussed below:

Right of Way Widths

Underground right of way widths can be limited to the area containing the line and an area on each side of the line set aside to protect the line from unintentional excavation damage and for access. The underground line can be placed adjacent to the existing 161kV overhead line river crossing. Assuming a separation of 25-ft to the north of the overhead lines, a right of way of 235-ft would be sufficient for the 345kV HPFF cable system installation. For the 345kV XLPE installation, approximately 360-ft would be required.

Ground Disturbance

Ground disturbance for overhead construction is limited to structure locations. Underground construction involves extensive ground disturbance including trenching along the entire line length, bore pit excavation at each end of a directional boring, and installation of splicing and pull-through vaults as necessary.

Long underground cable systems may also require intermediate stations to install reactors. Each of these stations will require installation of equipment inside a fenced area with a footprint of about 40,000 square feet.

Sensitive features such as streams and rivers, etc. exist in the line route. While overhead construction has the flexibility to span features such as rivers, streams and wetlands, underground construction does not have as much flexibility and requires construction through these sensitive features if they are crossed by the line route. Directional drilling or boring may be required for underground construction in order to avoid impacts to streams, rivers and wetlands. However, where directional drilling is not feasible, trenching through sensitive areas would be required for underground construction.

Underground construction requires extensive coordination with other underground utilities to avoid damage during construction. This level of coordination usually exceeds that required for overhead construction. The potential to disrupt or damage underground utilities is usually greater with underground construction.

Replacement or repair activities may have additional ground disturbance for underground lines. Overhead repair work usually involves light impact at the structure locations. Secondary off-site ground disturbing impacts may be required for underground lines if selective fill is required for heat dissipation. Materials source sites must be excavated to obtain this select fill material.

Land Use and Aesthetics

Overhead construction can be visually intrusive in sensitive visual environments. Urban underground construction, if properly rehabilitated, typically has lower visual impacts than overhead construction. In rural areas, underground rights of way may be highly visual due to the clearing required for the right of way.

Overhead construction may not be suitable for congested urban areas and may impact urban land uses more than underground construction. In rural settings, underground construction may be much more disruptive to agricultural or rural land uses than overhead construction. Farming can usually be conducted under overhead lines (with the exception of structure locations) while it would be prohibited over underground lines to avoid damaging the line.

Electric fields, magnetic fields and Noise

Underground construction in pipes or shielded cable eliminates electrical fields at the right of way boundary. Magnetic fields are generally higher directly over an underground installation compared to an overhead installation. Magnetic fields tend to decrease more rapidly with distance for underground installations compared to overhead.

Overhead lines emit a hiss or low hum (corona) during rainstorms or humid periods. Underground lines are silent for the most part with the exception of the immediate area near termination points.

Right of Way Clearing and Vegetation Control

In undeveloped areas, underground construction requires the right of way to be totally cleared to allow for construction and establishment of the right of way. This includes trees, brush, and ground cover. While low growing vegetation can be reestablished over an underground installation, trees or plants with woody roots cannot be allowed to grow over the line.

Overhead construction requires complete clearing only in the area of the structures and removal of trees along the line route to provide for electrical clearance and maintenance. Lower vegetation such as brush, shrubs, and ground covers can usually be left as long as it will not interfere with maintenance and access to the line. Both underground and overhead construction techniques may require long term vegetation control in the right of way.

Erosion Control in Unstable Areas

Extensive erosion control measures are required for underground lines because a trench is dug the entire line length and the right of way is totally cleared. In areas with hilly terrain and erosive soils, significant erosion and sedimentation impacts can arise from underground construction. Due to less ground disturbing activity, overhead lines usually result in lesser erosion impacts.

Careful placement of structure locations or engineered foundation arrangements can avoid or mitigate unstable geology or soils in overhead construction. Underground construction does not have the flexibility to avoid unstable areas encountered by the line route; thus the potential for impacts to unstable areas may be greater with underground construction.

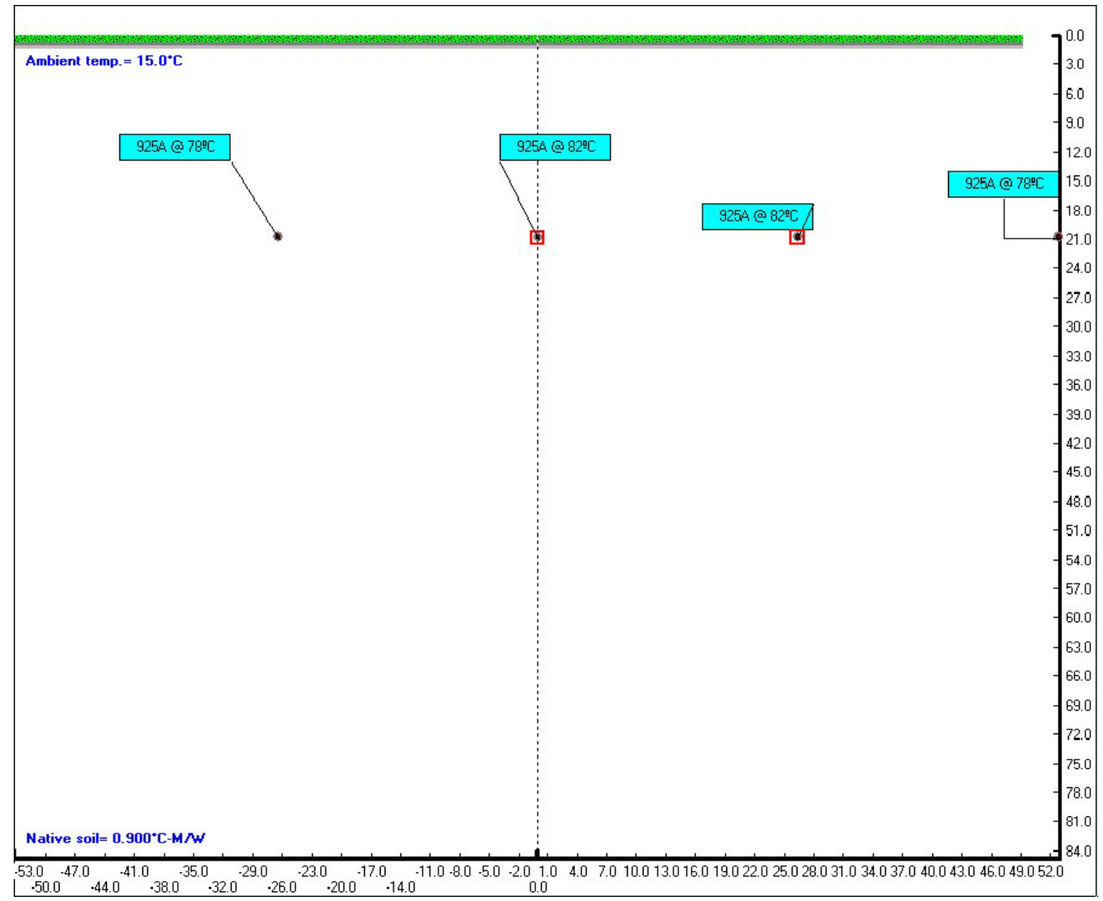
Ampacity Studies

Summary Results

Study: Xcel Energy 345kV HPFF River Crossing
Execution: 02 345kV 2500kcmil Cu 600milPPP rho=90 15°C, d=25',925A@82°C
Date: 4/23/2008
Frequency: 60 Hz
Conductor Resistances: IEC-228

Installation Type: Buried Pipes

Parameter	Unit	Value
Ambient Soil Temperature at Installation Depth	°C	15
Thermal Resistivity of Native Soil	°C.m/W	0.9
Non-Isothermal Earth surface modeling	Enabled/Disabled	Disabled



Summary Results							
Solution converged							
Cable\Cable type no	Circuit	Phase	Location		Load Factor	Temperature	Ampacity
			X[ft]	Y[ft]	[p.u.]	[°C]	[A]
1 \ 1	1	ABC	0	20.833	0.75	82.4	925
2 \ 1	2	ABC	26.416	20.833	0.75	82.4	925
3 \ 1	3	ABC	-26.416	20.833	0.75	78	925
4 \ 1	4	ABC	52.833	20.833	0.75	78	925

Cables input data

Study: Xcel Energy 345kV HPFF River Crossing
Execution: 02 345kV 2500kcmil Cu 600milPPP rho=90 15°C, d=25',925A@82°C
Date: 4/23/2008

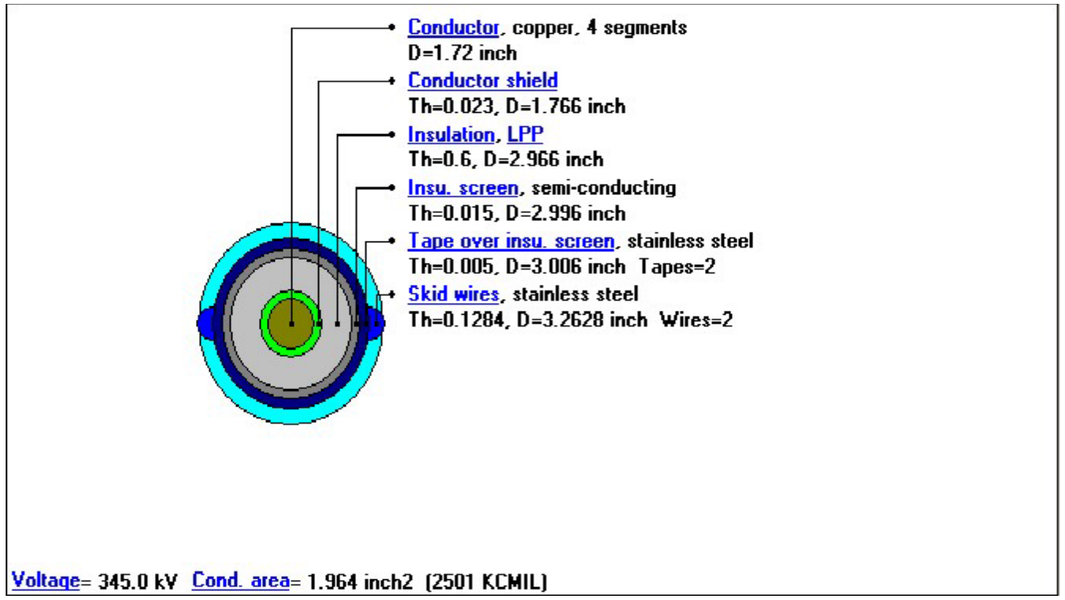
No	Description	Unit	1
General cable information			
1	Cable type no		1
2	Number of cores		3
3	Voltage	kV	345
4	Conductor area	$inch^2$	1.964
5	Maximum Steady-State Conductor Temperature	°C	85
6	Maximum Emergency Conductor Temperature	°C	105
Construction			
Conductor			
7	Material		copper
8	Resistivity @20°C	uΩ.cm	1.7241
9	Temperature coefficient	1/K	0.00393
10	Construction		4 segments
11	Is cable dried?		No
12	ks (Skin effect coefficient)		0.44
13	kp (Proximity effect coefficient)		0.37
14	Diameter	inch	1.72
Conductor shield			
15	Is layer present?		Yes
16	Thickness	inch	0.023
17	Diameter	inch	1.766
Insulation			
18	Is layer present?		Yes
19	Material		LPP
20	Thermal resistivity	K.m/w	6.5
21	Dielectric loss factor - (tan δ)		0.001
22	Relative permeability (ε)		3.5
23	Thickness	inch	0.6
24	Diameter	inch	2.966
Insulation screen			
25	Is layer present?		Yes
26	Material		semi-conducting
27	Thickness	inch	0.015
28	Diameter	inch	2.996
Sheath reinforcing tape/Tape over insulation screen			
29	Is layer present?		Yes
30	Material		stainless steel
31	Resistivity @20°C	uΩ.cm	70
32	Temperature coefficient	1/K	

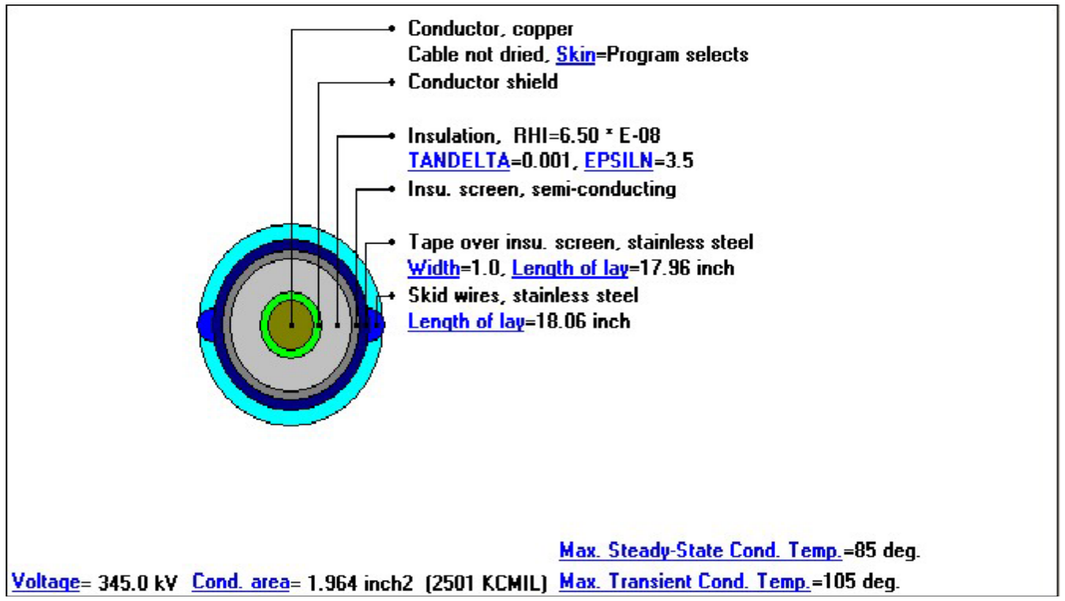
33	Tape width	inch	1
34	Length of lay	inch	17.96
35	Number of tapes		2
36	Thickness	inch	0.005
37	Diameter	inch	3.006
Concentric neutral/Skid wires			
38	Is layer present?		Yes
39	Is around each core? (Only for Three core cable)		No
40	Material		stainless steel
41	Resistivity @20°C	uΩ.cm	70
42	Temperature coefficient	1/K	
43	Length of lay	inch	18.06
44	Number of wires		2
45	Wire gauge		Unknown
46	Thickness	inch	0.1284
47	Diameter	inch	3.2628

No	Description/Value	Unit	1
SPECIFIC INSTALLATION DATA			
Loss factor constant			
1	Loss factor constant		0.3
Duct construction			
2	High pressure oil filled pipe type		Yes
3	Resistivity (RH)		0
Cables touching			
4	Single conductor cables touching		Yes
Pipe coating			
5	Polyethylene		Yes
6	Resistivity (RH)		6
Pipe material			
7	Steel pipe		Yes
8	Pipe material factor		1.7
Duct/Pipe dimensions			
9	Inside diameter of Duct/Pipe	inch	10.0200003
10	Outside diameter of Duct/Pipe	inch	10.7500003
11	Pipe coating diameter	inch	10.8500003

No	Symbol	Description	Unit	1	2	3	4
Temperature calculations							
1		Cable type no		1	1	1	1
2		Circuit no		1	2	3	4
3		Phase		ABC	ABC	ABC	ABC
4	θ_c	Conductor temperature	°C	82.4	82.4	78	78
5	θ_i	Sheath/Shield temperature	°C	70.4	70.4	66.2	66.2
6	θ_j	Armour/Pipe or Jacket temperature	°C	65.7	65.7	61.2	61.2
7	θ_s	Exterior duct temperature	°C	65.3	65.3	60.8	60.8
8	θ_a	Ambient temperature	°C	15	15	15	15

Cable type no: 1
Cable type: PIPE TYPE (TRIANGULAR)
Cable ID: 345CU2.50H
Cable title: 345kV 2500kcmil Cu 600 mils LPP HPFF





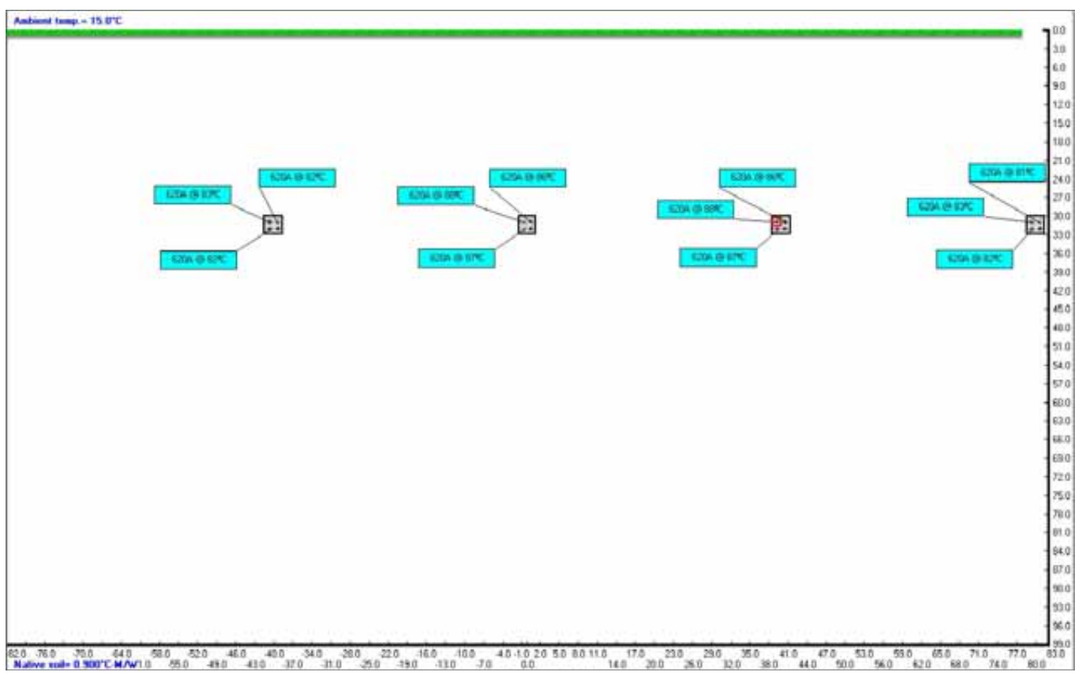
Summary Results

Study: Xcel Energy 345kV River Crossing
Execution: 05 345kV 5000kcmil CU 1023mil XLPE, d=30', 620A, 87°C
Date: 5/9/2008
Frequency: 60 Hz
Conductor Resistances: IEC-228

Installation Type: Multiple Duct Banks Backfills

Parameter	Unit	Value
Ambient Soil Temperature at Installation Depth	°C	15
Thermal Resistivity of Native Soil	°C.m/W	0.9

Layers		Dimensions [ft]				Type	Thermal Resistivity [°C.m/W]
No.	Name	X Center	Y Center	Width	Height		
1	DB 2X2	-40	31.469	2.938	2.938	Standard ductbank	0.6
2	DB 2X2	0	31.469	2.938	2.938	Standard ductbank	0.6
3	DB 2X2	40	31.469	2.938	2.938	Standard ductbank	0.6
4	DB 2X2	80	31.469	2.938	2.938	Standard ductbank	0.6



Summary Results

Solution converged

Cable\Cable type no	Circuit	Phase	Location X[ft]	Location Y[ft]	Load Factor [p.u.]	Temperature [°C]	Ampacity [A]
1 \ 1	1	A	-40.609	30.977	0.75	82.8	620
2 \ 1	1	B	-39.391	30.977	0.75	81.6	620
3 \ 1	1	C	-40.609	32.195	0.75	82.2	620
4 \ 1	2	A	-0.609	30.977	0.75	87.5	620
5 \ 1	2	B	0.609	30.977	0.75	86	620
6 \ 1	2	C	-0.609	32.195	0.75	87.1	620
7 \ 1	3	A	39.391	30.977	0.75	87.6	620
8 \ 1	3	B	40.609	30.977	0.75	86	620
9 \ 1	3	C	39.391	32.195	0.75	87.1	620
10 \ 1	4	A	79.391	30.977	0.75	82.9	620
11 \ 1	4	B	80.609	30.977	0.75	81.2	620
12 \ 1	4	C	79.391	32.195	0.75	82.3	620

Cables input data

Study: Xcel Energy 345kV River Crossing
Execution: 05 345kV 5000kcmil CU 1023mil XLPE, d=30', 620A, 87°C
Date: 5/9/2008

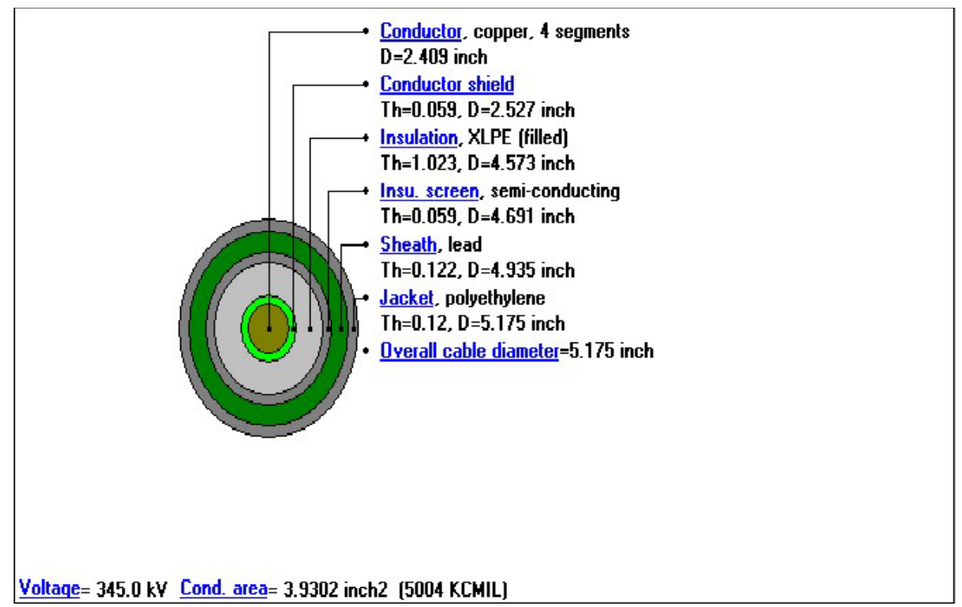
No	Description	Unit	1
General cable information			
1	Cable type no		1
2	Number of cores		1
3	Voltage	kV	345
4	Conductor area	$inch^2$	3.9302
5	Maximum Steady-State Conductor Temperature	°C	90
6	Maximum Emergency Conductor Temperature	°C	105
Construction			
Conductor			
7	Material		copper
8	Resistivity @20°C	uΩ.cm	1.7241
9	Temperature coefficient	1/K	0.00393
10	Construction		4 segments
11	Is cable dried?		No
12	ks (Skin effect coefficient)		0.44
13	kp (Proximity effect coefficient)		0.37
14	Diameter	inch	2.409
Conductor shield			
15	Is layer present?		Yes
16	Thickness	inch	0.059
17	Diameter	inch	2.527
Insulation			
18	Is layer present?		Yes
19	Material		XLPE (filled)
20	Thermal resistivity	K.m/w	3.5
21	Dielectric loss factor - (tan δ)		0.005
22	Relative permeability (ε)		3
23	Thickness	inch	1.023
24	Diameter	inch	4.573
Insulation screen			
25	Is layer present?		Yes
26	Material		semi-conducting
27	Thickness	inch	0.059
28	Diameter	inch	4.691
Sheath			
29	Is layer present?		Yes
30	Is around each core? (Only for Three core cable)		No
31	Material		lead
32	Resistivity @20°C	uΩ.cm	21.4
33	Temperature coefficient	1/K	0.004
34	Corrugated construction		Non-corrugated
35	Thickness	inch	0.122
36	Diameter	inch	4.935
Jacket			
37	Is layer present?		Yes
38	Material		polyethylene
39	Thermal resistivity	K.m/w	3.5
40	Thickness	inch	0.12
41	Diameter	inch	5.175
Overall cable diameter			
42	Diameter	inch	5.175

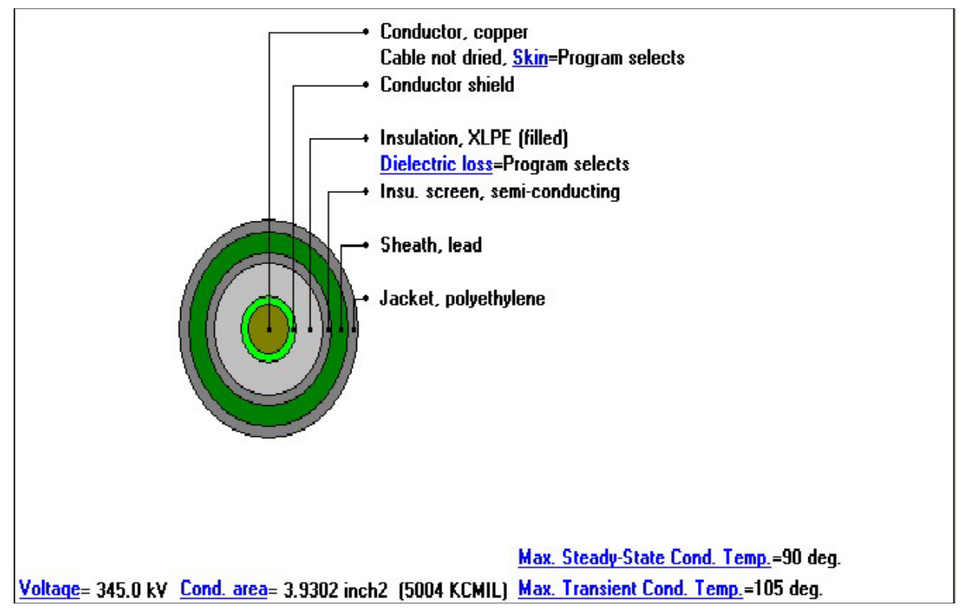
No	Description/Value	Unit	1
SPECIFIC INSTALLATION DATA			
Bonding			
1	1-CON, sheaths single point bonded, triang. configuration		Yes
Loss factor constant			
2	Loss factor constant		0.3
Duct construction			
3	PVC duct in concrete or buried		Yes
4	Resistivity (RH)		6
Cables touching			
5	Single conductor cables NOT touching		Yes

No	Symbol	Description	Unit	1	2	3	4	5
Temperature calculations								
1		Cable type no		1	1	1	1	1
2		Circuit no		1	1	1	2	2
3		Phase		A	B	C	A	B
4	θ_c	Conductor temperature	°C	82.8	81.6	82.2	87.5	86
5	θ_i	Sheath/Shield temperature	°C	77.3	76.1	76.7	82.1	80.6
6	θ_j	Armour/Pipe or Jacket temperature	°C	76.6	75.5	76	81.4	79.9
7	θ_s	Exterior duct temperature	°C	69.7	68.5	69.1	74.6	73.1
8	θ_a	Ambient temperature	°C	15	15	15	15	15

6	7	8	9	10	11	12
1	1	1	1	1	1	1
2	3	3	3	4	4	4
C	A	B	C	A	B	C
87.1	87.6	86	87.1	82.9	81.2	82.3
81.6	82.1	80.5	81.6	77.4	75.7	76.9
80.9	81.5	79.8	81	76.8	75.1	76.2
74.1	74.7	73	74.2	69.9	68.1	69.3
15	15	15	15	15	15	15

Cable type no: 1
Cable type: EXTRUDED
Cable ID: 345CU5.00X
Cable title: 345kV 5000 kcmil Cu 1023 mils XLPE 122 mils Pb Sheath





POWER ENGINEERS

Preliminary

Xcel Energy, CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing
345kV HPFF Transmission Line

Prepared by: JWH
Checked by:

2500 kcmil Cu
4 Cables/phase
3700 Amps
6900 feet - Total Length
1 Number of Operational Circuits
0 Number of Spare Pipes (Pipe only, no Cable)
0 Number of communication ducts

Description	Quantity	Material Price	Total Material Price	Labor Price	Total Labor Price	Total Price
Pipe and Accessories Section:						
Cable pipe, 10" nominal, Pritec, per foot	14500	$40.00	$580,000	$65.00	$942,500	$1,522,500
Cable pipe, 10" nominal, Fusion Bonded, per foo	13200	$45.00	$594,000	$65.00	$858,000	$1,452,000
Cable pipe field flares, each	11	$85.00	$935	$226.00	$2,486	$3,421
Cable pipe chill rings, each	382	$34.50	$13,179	$224.00	$85,568	$98,747
Cable pipe joint and pipe-coating repair sleeves,	400	$22.00	$8,800	$125.00	$50,000	$58,800
Trifurcator, each	8	$9,500.00	$76,000	$5,000.00	$40,000	$116,000
Riser pipe stainless steel 5-inch, per foot	960	$50.00	$48,000	$29.00	$27,840	$75,840
Cathodic Protection:						
Anodes/grounding, each	5	$200.00	$1,000	$100.00	$500	$1,500
Rectifiers, each	1	$4,000.00	$4,000	$4,800.00	$4,800	$8,800
Isolator Protectors, each	4	$8,200.00	$32,800	$4,800.00	$19,200	$52,000
Cathodic Protection Test Stations, each	8	$1,500.00	$12,000	$1,100.00	$8,800	$20,800
Anode Junction boxes, each	1	$1,500.00	$1,500	$1,100.00	$1,100	$2,600
Pressurization Plant, each	1	$500,000.00	$500,000	$50,000.00	$50,000	$550,000
Polybutene dielectric fluid (HPFF) (gal.)	89200	$11.00	$981,200	$6.00	$535,200	$1,516,400
Other (provide a description)						
Cable and Accessories Section:						
Cable, feet	86800	$113.00	$9,808,400	$15.00	$1,302,000	$11,110,400
Terminators, each	24	$81,000.00	$1,944,000	$15,000.00	$360,000	$2,304,000
Arresters, each	24	$10,000.00	$240,000	$2,500.00	$60,000	$300,000
Splices, each	24	$28,500.00	$684,000	$66,000.00	$1,584,000	$2,268,000
Spare Terminations	2	$81,000.00	$162,000	$0.00	$0	$162,000
Earthwork:						
Excavation, no rock, per cubic yard, including ha	22100	$15.00	$331,500	$30.00	$663,000	$994,500
Soil Backfill, including hauling, per cubic yard	20484	$25.00	$512,100	$25.00	$512,100	$1,024,200
Concrete Encasement, per cubic yard	1616	$130.00	$210,080	$20.00	$32,320	$242,400
Vault, each	8	$40,000.00	$320,000	$25,000.00	$200,000	$520,000
Horizontal direction drill, per foot	13200	$300.00	$3,960,000	$500.00	$6,600,000	$10,560,000
Dewatering, per trench foot	14400	$8.00	$115,200	$15.00	$216,000	$331,200
Sheeting and shoring, per trench foot	1500	$20.00	$30,000	$25.00	$37,500	$67,500
Landscape restoration, lot	144000	$2.50	$360,000	$2.50	$360,000	$720,000
Loam and seed, per square foot	360000	$0.25	$90,000	$0.25	$90,000	$180,000
Termination Work						
Substation Termination Structures	8	$20,000.00	$160,000	$16,000.00	$128,000	$288,000
Substation Foundations	8	$8,000.00	$64,000	$12,000.00	$96,000	$160,000
Transition Structures, includes relay equipment	0	$40,000.00	$0	$15,000.00	$0	$0
Transition Structure Foundations	0	$20,000.00	$0	$10,000.00	$0	$0
Other (provide a description)						
Substation	1	$265,000.00	$265,000	$650,000.00	$650,000	$915,000
			$0		$0	$0
Subtotal			$22,109,694		$15,516,914	$37,626,608
Contingency	15%		$3,316,454		$2,327,537	$5,643,991
Subtotal			$25,426,148		$17,844,451	$43,270,599
Unallocated Costs:						
2% Engineering, lot	1	$0.00	$0	$865,411.98	$865,412	$865,412
2% Construction Management, lot	1	$0.00	$0	$865,411.98	$865,412	$865,412
Mobilization, each	1	$0.00	$0	$50,000.00	$50,000	$50,000
Demobilization, each	1	$0.00	$0	$50,000.00	$50,000	$50,000
0% Real Estate/Permitting	0	$0.00	$0	$0.00	$0	$0
Total Price (should add up to Lump Sum			$25,426,148		$19,675,275	$45,101,423

HLY 019-166 (DES-02) XCEL (12/30/09)JH 113714 I REV. D

Cost Estimates

POWER ENGINEERS

Preliminary

Summary of Costs	Quantity	Material Price	Labor Price	Unit Cost	Total Price
Earthwork, ft	14400	$1,648,880	$1,910,920	$248	$3,559,800
Trenchless Installations, ft	13200	$3,960,000	$6,600,000	$800	$10,560,000
Manholes,ea	8	$320,000	$200,000	$65,000	$520,000
Cable,ft	86800	$9,808,400	$1,302,000	$128	$11,110,400
Splices, ea	24	$684,000	$1,584,000	$94,500	$2,268,000
Terminations, ea	26	$2,106,000	$360,000	$94,847	$2,466,000
Arresters, ea	24	$240,000	$60,000	$12,500	$300,000
Pipe, ft	27700	$1,174,000	$1,800,500	$108	$2,974,500
Pipe Accessories, ft	801	$1,628,114	$791,094	$3,021	$2,419,208
Cathodic Protection System, ea	1	$51,300	$34,400	$85,700	$85,700
Termination Structures, ea	8	$489,000	$874,000	$170,375	$1,363,000
Subtotal	0	$22,109,694	$15,516,914		$37,626,608
15% Contingency		$3,316,454	$2,327,537		$5,643,991
MOB & DEMOB	1	$0	$100,000		$100,000
4% Engineering & Construction Man.	1	$0	$1,730,824		$1,730,824
0% Real Estate/Permitting	1	$0	$0		$0
Total		$25,426,148	$19,675,275		$45,101,423
0% Escalation Factor		$0	$0		$0
Grand Total		$25,426,148	$19,675,275		$45,101,423

POWER ENGINEERS

Preliminary

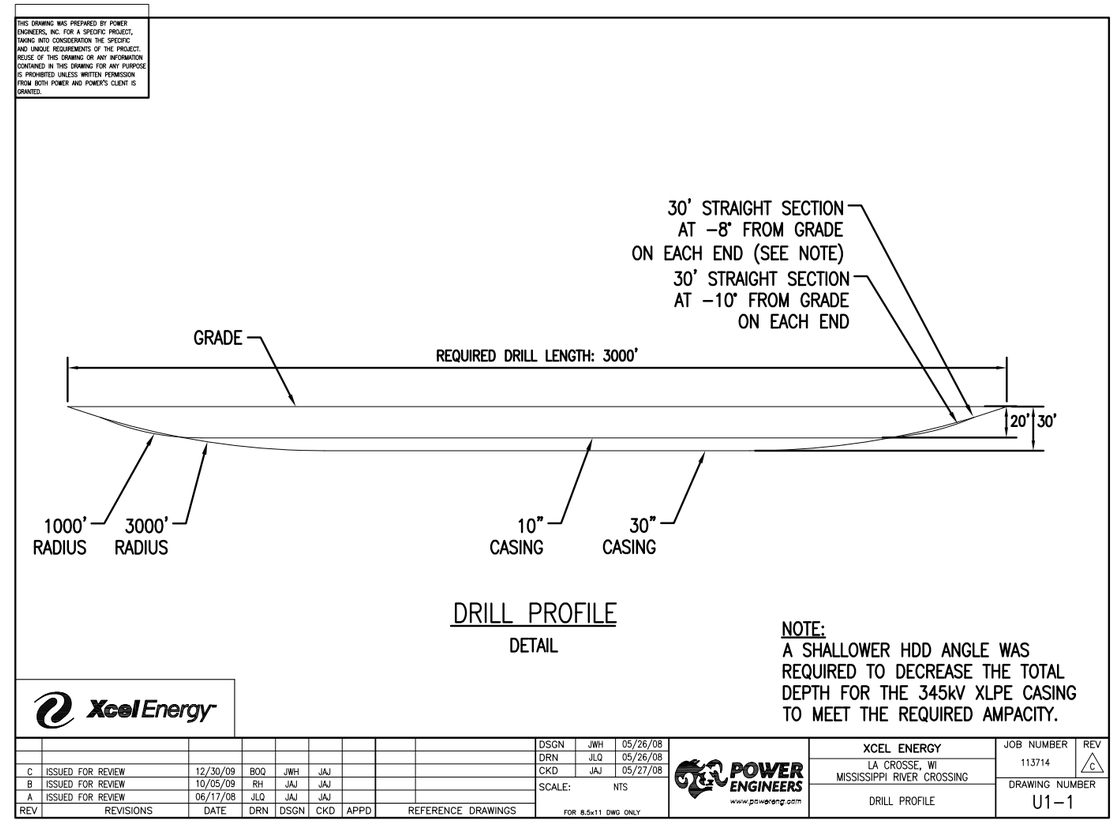
Xcel Energy, CapX Hampton – Rochester – La Crosse 345kV Project Alma Mississippi River Underground Crossing
345 kV XLPE Transmission Line

Prepared by: JWH
Checked by:

5000 kcmil CU
18 Cables
1600 Amps
6900 feet
1 Number of Duct Banks
24 Number of Cable Ducts
0 Number of Comm Ducts

Description	Quantity	Material Price	Total Material Price	Labor Price	Total Labor Price	Total Price
Cable and Accessories Section:						
XLPE cable, per foot	132100	$225.00	$29,722,500	$15.00	$1,981,500	$31,704,000
Terminators, each	36	$81,000.00	$2,916,000	$15,000.00	$540,000	$3,456,000
Arresters, each	36	$10,000.00	$360,000	$2,500.00	$90,000	$450,000
Splices, each	36	$30,000.00	$1,080,000	$70,000.00	$2,520,000	$3,600,000
Grounding system for vaults, each	24	$2,500.00	$60,000	$3,500.00	$84,000	$144,000
Link boxes, single phases	24	$5,000.00	$120,000	$500.00	$12,000	$132,000
Cable clamps, each	600	$200.00	$120,000	$100.00	$60,000	$180,000
Continuity conductor, per foot	15000	$4.00	$60,000	$2.00	$30,000	$90,000
Continuity conduit	41900	$1.50	$62,850	$8.00	$335,200	$398,050
Jacket Integrity Test, cable segment	18	$0.00	$0	$2,500.00	$45,000	$45,000
Other (provide a description)						
Duct Bank and Earthwork:						
Conduit, per foot	167300	$7.00	$1,171,100	$15.00	$2,509,500	$3,680,600
Spacers, each	34560	$8.00	$276,480	$15.00	$518,400	$794,880
Bore Spacers, each	3960	$175.00	$693,000	$15.00	$59,400	$752,400
Excavation, no rock, per cubic yard, including	9200	$15.00	$138,000	$30.00	$276,000	$414,000
Soil Backfill, including hauling, per cubic yard	6000	$25.00	$150,000	$25.00	$150,000	$300,000
Duct encasement concrete, per cubic yard	3200	$130.00	$416,000	$20.00	$64,000	$480,000
Vault, each	24	$40,000.00	$960,000	$25,000.00	$600,000	$1,560,000
Horizontal direction drill, per foot	19800	$300.00	$5,940,000	$500.00	$9,900,000	$15,840,000
30" Bore Casing, per foot	19800	$500.00	$9,900,000	$200.00	$3,960,000	$13,860,000
Casing Fill, cubic yards	2898	$150.00	$434,700	$75.00	$217,350	$652,050
Dewatering, per trench foot	21600	$8.00	$172,800	$15.00	$324,000	$496,800
Sheeting and shoring, per trench foot	2200	$20.00	$44,000	$25.00	$55,000	$99,000
Landscape restoration, lot	216000	$2.50	$540,000	$2.50	$540,000	$1,080,000
Loam and seed, per square foot	540000	$0.25	$135,000	$0.25	$135,000	$270,000
Other (provide a description)						
Termination Work						
Substation Termination Structures	12	$20,000.00	$240,000	$10,000.00	$120,000	$360,000
Substation Foundations	12	$3,000.00	$36,000	$2,000.00	$24,000	$60,000
Other (provide a description)						
Substation	1	$398,000.00	$398,000	$225,000.00	$225,000	$623,000
Subtotal			$56,201,430		$25,430,350	$81,631,780
15% Contingency			$8,430,215		$3,814,553	$12,244,768
Subtotal			$64,631,645		$29,244,903	$93,876,548
Unallocated Costs:						
Engineering, lot (2%)	1	$0.00	$0	$1,877,530.96	$1,877,531	$1,877,531
Construction Management, lot (2%)	1	$0.00	$0	$1,877,530.96	$1,877,531	$1,877,531
Mobilization, lot	1	$0.00	$0	$50,000.00	$50,000	$50,000
Demobilization, lot	1	$0.00	$0	$50,000.00	$50,000	$50,000
Real Estate/Permitting	0	$0.00	$0	$0.00	$0	$0
Other (provide a description)						
Total Price (should add up to Lump Sum		$	$64,631,645	$	$33,099,965	$97,731,610

Summary of Costs	Quantity	Material Price	Labor Price	Unit Cost	Total Price
Duct Bank, ft	20700	$14,126,080	$8,863,650	$1,111	$22,989,730
Trenchless Installations, ft	19800	$5,940,000	$9,900,000	$800	$15,840,000
Manholes,ea	24	$960,000	$600,000	$65,000	$1,560,000
Cable,ft	132100	$29,722,500	$1,981,500	$240	$31,704,000
Splices, ea	36	$1,080,000	$2,520,000	$100,000	$3,600,000
Terminations, ea	36	$2,916,000	$540,000	$96,000	$3,456,000
Arresters, ea	36	$360,000	$90,000	$12,500	$450,000
Additional Cable Accessories, ft	20700	$422,850	$566,200	$48	$989,050
Termination Structures, ea	12	$674,000	$369,000	$86,917	$1,043,000
15% Contingency		$8,430,215	$3,814,553		$12,244,768
MOB & DEMOB	1	$0	$100,000		$100,000
Engineering Construction Management Services	1	$0	$3,755,062		$3,755,062
Total		$64,631,645	$33,099,965		$97,731,610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30' STRAIGHT SECTION AT -8° FROM GRADE ON EACH END (SEE NOTE)
30' STRAIGHT SECTION AT -10° FROM GRADE ON EACH END
GRADE
REQUIRED DRILL LENGTH: 3000'
20'
30'
1000' RADIUS
3000' RADIUS
10" CASING
30" CASING
DRILL PROFILE
DETAIL
NOTE:
A SHALLOWER HDD ANGLE WAS REQUIRED TO DECREASE THE TOTAL DEPTH FOR THE 345kV XLPE CASING TO MEET THE REQUIRED AMPACITY.
Xcel Energy
REV | REVISIONS | DATE | DRN | DSGN | CKD | APPD
C | ISSUED FOR REVIEW | 12/30/09 | BOQ | JWH | JAJ
B | ISSUED FOR REVIEW | 10/05/09 | RH | JAJ | JAJ
A | ISSUED FOR REVIEW | 06/17/08 | JLQ | JAJ | JAJ
REFERENCE DRAWINGS
DSGN JWH 05/26/08
DRN JLQ 05/26/08
CKD JAJ 05/27/08
SCALE: NTS
FOR 8.5x11 DWG ONLY
POWER ENGINEERS
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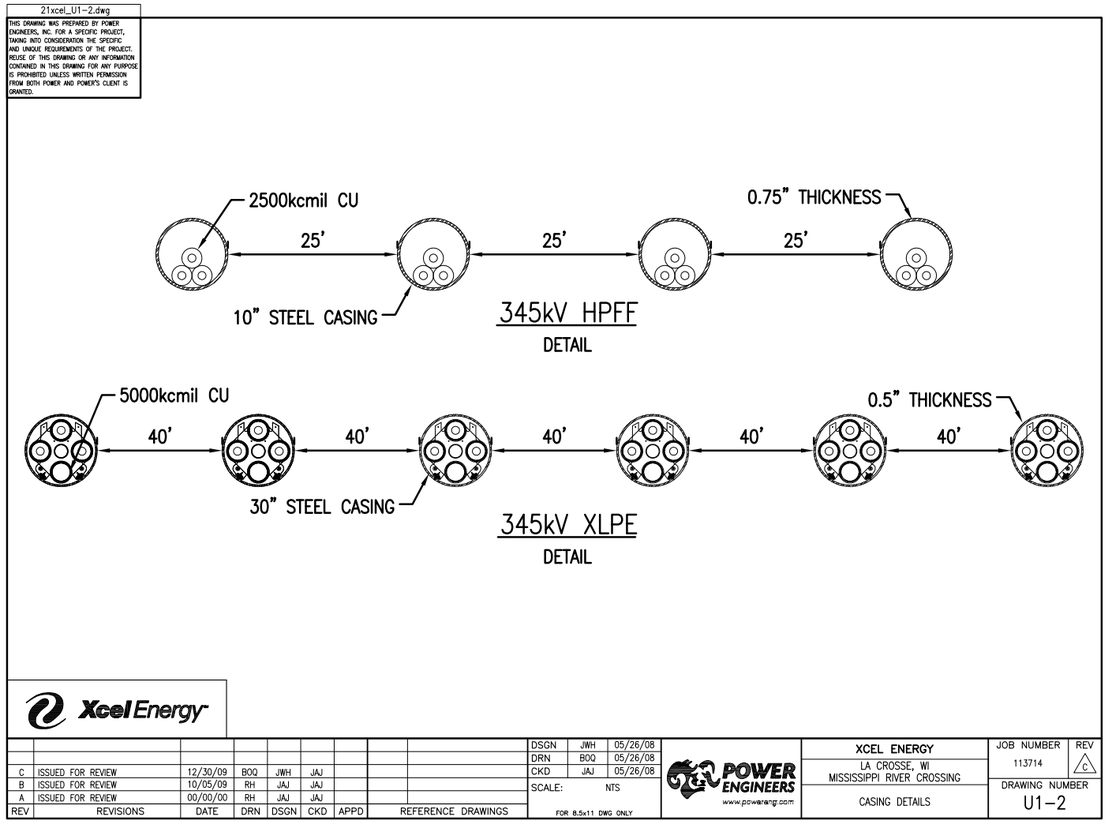
XCEL ENERGY
LA CROSSE, WI
MISSISSIPPI RIVER CROSSING
DRILL PROFILE
JOB NUMBER 113714
REV C
DRAWING NUMBER U1-1

HDD Details



Termination Details

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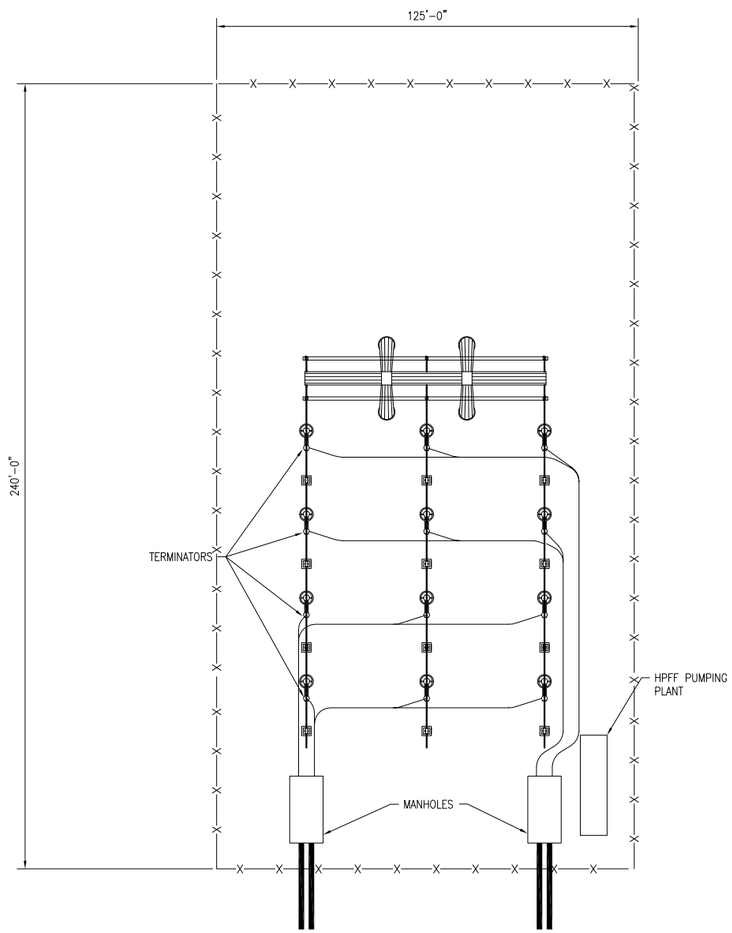
REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	12/30/09	BOQ	JAJ	JAJ	
B	ISSUED FOR REVIEW	10/05/09	RH	JAJ	JAJ	
A	ISSUED FOR REVIEW	06/17/08	JLQ	JAJ	JAJ	



Xcel Energy

DSGN	JAJ	06/16/08	
DRN	JLQ	06/16/08	
CKD	JAJ	06/16/08	
SCALE:	NTS		
FOR 8.5x11 DWG ONLY			

FILE

REFERENCE DRAWINGS

POWER ENGINEERS www.powereng.com

XCEL ENERGY
LA CROSSE, WI
MISSISSIPPI RIVER CROSSING

HPFF TERMINATION STATION DETAILS

JOB NUMBER 113714

REV C

DRAWING NUMBER S1-1

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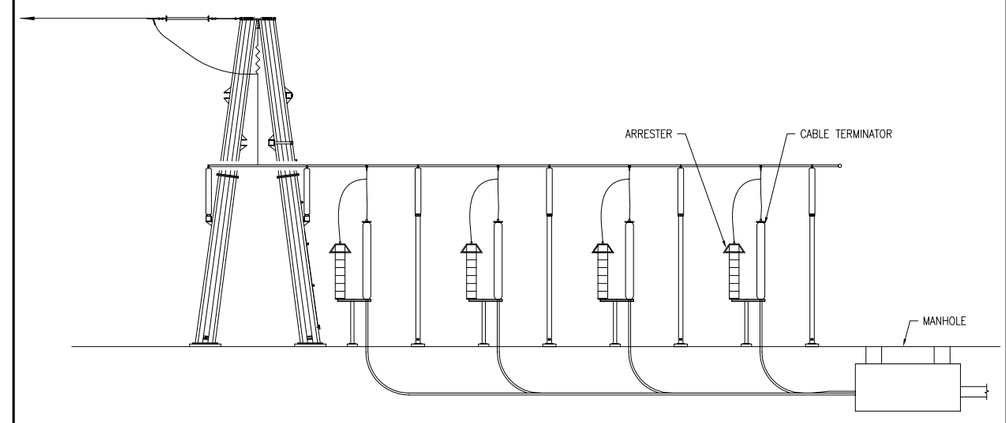
REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	12/30/09	BOQ	JAJ	JAJ	
B	ISSUED FOR REVIEW	10/05/09	RH	JAJ	JAJ	
A	ISSUED FOR REVIEW	06/17/08	JLQ	JAJ	JAJ	



Xcel Energy

DSGN	JAJ	06/16/08	
DRN	JLQ	06/16/08	
CKD	JAJ	06/16/08	
SCALE:	NTS		
FOR 8.5x11 DWG ONLY			

21XCEL_S1-2.DWG

REFERENCE DRAWINGS

POWER ENGINEERS www.powereng.com

XCEL ENERGY
LA CROSSE, WI
MISSISSIPPI RIVER CROSSING

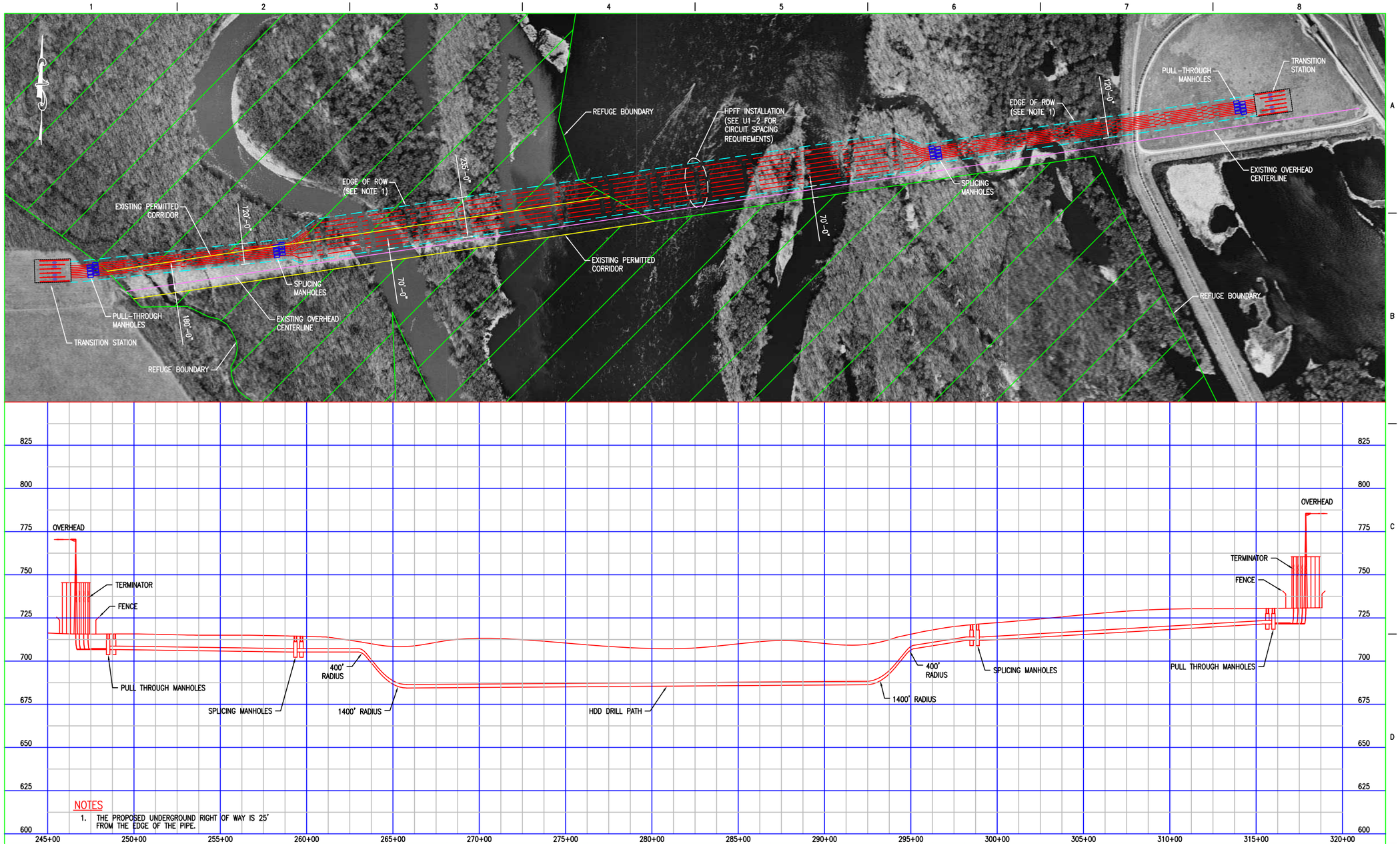
HPFF TERMINATION STATION DETAILS

JOB NUMBER 113714

REV C

DRAWING NUMBER S1-2

Plan and Profile



NOTES

1. THE PROPOSED UNDERGROUND RIGHT OF WAY IS 25' FROM THE EDGE OF THE PIPE.

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2:\XCEL_P1-1.DWG

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
0	ISSUED FINAL	01/06/10	BOQ	JWH	JAJ	JAJ

REFERENCE DRAWINGS

DSGN	JAJ	06/16/08
DRN	BOQ	06/16/08
CKD	JAJ	06/16/08

SCALE: NTS

FOR 22x34 DWG ONLY

POWER ENGINEERS
www.powereng.com

XCEL ENERGY
LA CROSSE, WI
MISSISSIPPI RIVER CROSSING
HPFF PLAN AND PROFILE

JOB NUMBER 113714
REV 0
DRAWING NUMBER P1-1

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AGRICULTURAL IMPACT MITIGATION PLAN

CapX2020 345 kV Electric Transmission Projects in Minnesota

CapX2020

June 2009

AGRICULTURAL IMPACT MITIGATION PLAN

CapX2020

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Appendix A: Definitions A-1

Appendix B: Mitigative Actions for Organic Agricultural Land B-1

AGRICULTURAL IMPACT MITIGATION PLAN

CapX2020

Purpose

This Agricultural Impact Mitigation Plan ("AIMP" or 'the plan') was developed by Northern States Power Company, a Minnesota corporation and wholly-owned subsidiary of Xcel Energy Inc., and Great River Energy, a Minnesota generation and transmission cooperative (together, referred to as "the Utilities"), representing the CapX2020 utility consortium and with the Minnesota Department of Agriculture ("MDA"). The overall objective of this AIMP is to identify measures the Utilities will take to avoid, mitigate, repair and/or provide compensation for impacts that may result from 345 kV electric transmission line construction of the CapX2020 projects on Agricultural Land in Minnesota.

CapX2020 ("CapX2020") is a joint initiative of 11 transmission-owning utilities in Minnesota and the surrounding region. The purpose of CapX2020 is to study, develop, permit and construct electric transmission infrastructure as needed to implement long-term and cost-effective solutions for customers to meet the growth in energy use expected by the year 2020. The three CapX2020 projects included in this AIMP are described as:

1) the 345 kV transmission line from Brookings County, South Dakota to Hampton, Minnesota;

2) the 345 kV transmission line from Monticello, Minnesota to St. Cloud to the Fargo area, North Dakota; and

3) the 345 kV transmission line from Hampton, Minnesota to Rochester to La Crosse, Wisconsin.

Collectively, these three transmission lines are referred to as the "CapX2020 Projects".

The construction standards and policies in this plan apply only to construction activities occurring partially or wholly on privately owned Agricultural Land. The measures do not apply to construction activities occurring entirely on public rights-of-way, railroad rights-of-way, publicly owned land, or private land that is not Agricultural Land. The Utilities will, however, adhere to the same construction standards relating to the repair of agricultural tile (Item No. 3 in the AIMP) when Tiles are encountered on public highway rights-of-way, railroad rights-of-way, or publicly or privately owned land.

Appendix B of this AIMP applies only to Organic Agricultural Land as described in the National Organic Program Rules, 7 CFR Parts 205.100, 205.202, and 205.101.

Unless the Easement or other agreement, regardless of nature, between the Utilities and the Landowner or Tenant specifically provides to the contrary, the mitigative actions specified in the construction standards and policies set forth in this AIMP will be implemented in accordance with the General Provisions.

General Provisions

The mitigative actions are subject to change by Landowners or Tenants, provided such changes are negotiated with and acceptable to the Utilities.

Certain provisions of this AIMP require the Utilities to consult with the Landowner and Tenant of a property. The Utilities will engage in a good faith effort to secure the agreement of both Landowner and Tenant in such cases.

Unless otherwise specified, the Utilities will retain qualified contractors to execute mitigative actions. However, the Utilities may negotiate with Landowners or Tenants to carry out the mitigative actions that Landowners or Tenants wish to perform themselves.

Mitigative actions employed by the Utilities pursuant to this AIMP, unless otherwise specified in this AIMP or in an Easement or other agreement negotiated with an individual Landowner or Tenant, will be implemented within 45 days following completion of Final Clean-up on an affected property, weather permitting, or unless otherwise delayed by mutual agreement between Landowner or Tenant and Utility. Temporary repairs will be made by the Utilities during construction as needed to minimize the risk of additional property damage or interference with the Landowner's or Tenant's access to or use of the property that may result from an extended time period to implement mitigative actions.

The Utilities will implement the mitigative actions contained in this AIMP to the extent that they do not conflict with the requirements of any applicable federal and/or state rules and regulations and other permits and approvals that are obtained by the Utilities for the project or they are not determined to be unenforceable by reason of other requirements of federal and state permits issued for the project. To the extent a mitigative action required by this agreement is determined to be unenforceable in the future due to requirements of other federal or state permits issued for the project, the Utilities will so inform the Landowner or Tenant and will work with them to develop a reasonable alternative mitigative action.

Prior to the construction of the transmission line, the Utilities will provide each Landowner and Tenant with a telephone number and address which can be used to contact the Utilities, both during and following the completion of construction, regarding the agricultural impact mitigation work which is performed on their property or other construction-related matter. If the contact information changes at any time before completion of Final Clean-up and/or after the completion of construction, the Utilities will provide the Landowner and Tenant with updated contact information. The Utilities will respond to Landowner and Tenant telephone calls and correspondence within a reasonable time.

The Utilities will use good faith efforts to obtain a written acknowledgement of completion from each Landowner and Tenant upon the completion of Final Clean-up on their respective property.

If any provision of this AIMP is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the AIMP will be interpreted as if it did not contain the unenforceable provision.

Mitigative Actions

The Utilities will reasonably restore or compensate Landowners and/or Tenants, as appropriate, for damages caused by the Utilities as a result of transmission line construction, and as outlined in this plan. The decision to restore land or compensate Landowners will be made by the Utilities after discussion with the Landowner or Tenant.

1. Pole Placement

During the design of the project, the Utilities' engineering, land rights and permitting staff will work together to address pole placement issues. Utilities' staff will work with Landowners on pole placement. When the preliminary design is complete, the land rights agents will review the staked pole locations with the Landowners.

2. Soil and Rock Removal for Bored Holes

Any excess soil and rock will be removed from the site unless otherwise requested by the Landowner.

3. Damaged and Adversely Affected Tile

The Utilities will contact affected Landowners or Tenants for their knowledge of Tile locations prior to the transmission line's installation. Utilities will make every attempt to probe for Tile if the Landowner does not know if Tile is located in the proposed pole location. Tile that is damaged, cut, or removed as a result of this probe will be immediately repaired. The repair will be reported to the Inspector.

If Tile is damaged by the transmission line installation, the Tile will be repaired in a manner that restores the Tile's operating condition at the point of repair. If Tiles on or adjacent to the transmission line's construction area are adversely affected by the construction of the transmission line, the Utilities will take such actions as are necessary to restore the functioning of the Tile, including the relocation, reconfiguration, and replacement of the existing Tile. The affected Landowner or Tenant may elect to negotiate a fair settlement with the Utilities for the Landowner or Tenant to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile. In the event the Landowner or Tenant chooses to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile, the Utilities will not be responsible for correcting Tile repairs after completion of the transmission line (the Utilities are responsible for correcting Tile repairs after completion of the transmission line, provided the repairs were made by the Utilities or their agents or designees).

Where the damaged Tile is repaired by the Utilities, the following standards and policies will apply to the Title repair:

A. Tiles will be repaired with materials of the same or better quality as that which was damaged.

B. If water is flowing through a damaged Tile, temporary repairs will be promptly installed and maintained until such time that permanent repairs can be made.

C. Before completing permanent Tile repairs, Tiles will be examined within the work area to check for Tile that might have been damaged by construction equipment. If Tiles are found to be damaged, they will be repaired so they operate as well after construction as before construction began.

D. The Utilities will make efforts to complete permanent Tile repairs within a reasonable timeframe after Final Clean-up, taking into account weather and soil conditions.

E. Following completion of the Final Clean-up and damage settlement, the Utilities will be responsible for correcting and repairing Tile breaks, or other damages to Tile systems that are discovered on the Right-of-Way to the extent that such breaks are the result of transmission line construction. These damages are usually discovered after the first significant rain event. The Utilities will not be responsible for Tile repairs the Utilities have paid the Landowner or Tenant to perform.

4. Installation of Additional Tiles

The Utilities will be responsible for installing such additional Tile and other drainage measures as are necessary to properly drain wet areas on the Right-of-Way caused by the construction of the transmission line.

5. Construction Debris

Construction-related debris and material which are not an integral part of the transmission line, and which have been placed there by the Utilities, will be removed from the Landowner's property at the Utilities' cost. Such material to be removed would include excess construction materials or litter generated by the construction crews.

6. Compaction, Rutting, Fertilization, Liming, and Soil Restoration

A. Compaction will be alleviated as needed on Cropland traversed by construction equipment. Cropland that has been compacted will be plowed using appropriate deep-tillage and draft equipment. Alleviation of compaction of the topsoil will be performed during suitable weather conditions, and must not be performed when weather conditions have caused the soil to become so wet that activity to alleviate compaction would damage the future production capacity of the land as determined by the Agricultural Monitor.

B. The Utilities will restore rutted land to as near as practical to its pre-construction condition.

C. If there is a dispute between the Landowner or Tenant and the Utilities as to what areas need to be ripped or chiseled, the depth at which compacted areas should be

ripped or chiseled, or the necessity or rates of lime, fertilizer, and organic material application, the Agricultural Monitor's opinion will be considered by the Utilities.

7. Damaged Soil Conservation Practices

Soil conservation practices such as terraces and grassed waterways which are damaged by the transmission line's construction, will be restored to their pre-construction condition.

8. Weed Control

On land which is owned by Utilities for substation facilities, the Utilities will work with Landowners if requested on weed control activities outside of the substations with the intent to not allow the spread of weeds onto adjacent Agricultural Land. Any weed control spraying will be in accordance with State of Minnesota regulations.

9. Irrigation Systems

A. If the transmission line and/or temporary work areas intersect an operational (or soon to be operational) spray irrigation system, the Utilities will establish with the Landowner or Tenant, an acceptable amount of time the irrigation system may be out of service.

B. If, as a result of the transmission line construction activities, an irrigation system interruption results in crop damages, either on the Right-of-Way or off the Right-of-Way, compensation of Landowners and/or Tenants, as appropriate, will be determined as described in section 11 of this AIMP.

C. If it is feasible and mutually acceptable to the Utilities and the Landowner or Tenant, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the transmission line is also being constructed. Utilities will work with the Landowner or Tenant to identify a preferable construction time.

10. Temporary Roads

The location of temporary roads to be used for construction purposes will be discussed with the Landowner or Tenant.

A. The temporary roads will be designed so as to not impede proper drainage and will be built to mitigate soil erosion on or near the temporary roads.

B. Upon abandonment, temporary roads may be left intact through mutual agreement of the Landowner or Tenant and the Utilities unless otherwise restricted by federal, state or local regulations.

C. If a temporary road is to be removed, the Agricultural Land upon which the temporary road is constructed will be returned to its previous use and restored to equivalent condition as existed prior to their construction.

11. Construction in Wet Conditions

If it is necessary to construct during wet conditions, and if the Agricultural Monitor believes conditions are too wet for continued construction, damages which may result from such construction will be paid for by the Utilities and/or appropriate restoration will be conducted. Compensation for Landowners and/or Tenants, as appropriate, will be determined as described in section 12 of this AIMP.

12. Procedures for Determining Construction-Related Damages and Providing Compensation

A. The Utilities will develop and put into place a procedure for the processing of anticipated Landowners' or Tenants' claims for construction-related damages. The procedure will be intended to standardize and minimize Landowner and Tenant concerns in the recovery of damages, to provide a degree of certainty and predictability for Landowners, Tenants and the Utilities, and to foster good relationships among the Utilities, Landowners and their Tenants over the long term.

B. Negotiations between the Utilities and any affected Landowner or Tenant will be voluntary in nature and no party is obligated to follow any particular method for computing the amount of loss for which compensation is sought or paid. The compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner or Tenant to establish the amount of damages the Utilities must pay. In the event the Utilities and a Landowner or Tenant are unable to reach an agreement on the amount of damages, the Landowner or Tenant may seek recourse through mediation.

13. Advance Notice of Access to Private Property

The Utilities will endeavor to provide the Landowner and/or Tenant advanced notice before beginning construction on the property. Prior notice will consist of a personal contact, email, letter or a telephone contact, whereby the Landowner and the Tenant are informed of the Utilities' intent to access the land.

14. Role and Responsibilities of Agricultural Monitor

The Agricultural Monitor will be retained and funded by the Utilities, but will report directly to the MDA. The primary function of the Agricultural Monitor will be to audit the Utilities' compliance with this AIMP. The Agricultural Monitor will not have the authority to direct construction activities and will not have authority to stop construction. The Agricultural Monitor will notify the Utilities' Inspector if he/she believes a compliance issue has been identified. The Agricultural Monitor will have full access to Agricultural Land crossed by the CapX2020 projects and will have the option of

attending meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include, but are not limited to the following:

1. Participate in preconstruction training activities sponsored by the Utilities.
2. Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this AIMP.
3. Report instances of noncompliance to the Utilities Inspector.
4. Prepare regular compliance reports and submit to MDA, as requested by the MDA.
5. Act as liaison between Landowners and Tenants and MDA, if necessary.
6. Maintain a written log of communications from Landowners and/or Tenants regarding compliance with this AIMP. Report Landowner complaints to the Utilities Inspector and/or Right-of-Way representative.
7. In disputes between Utilities and a Landowner and/or Tenant over restoration, determine if agricultural restoration is reasonably adequate in consultation with the Utilities Inspector.

15. Qualifications and Selection of Agricultural Monitor

The Agricultural Monitor will have a bachelor's degree in agronomy, soil science or equivalent work experience. The Agricultural Monitor will have demonstrated practical experience with pipeline or electric transmission line construction and restoration on Agricultural Land. Final selection of the Agricultural Monitor will be a joint decision between the MDA and the Utilities.

16. Role of the Utilities Inspector

The Utilities Inspector will:

1. Be full-time member of the Utilities inspection team.
2. Be responsible for verifying the Utilities compliance with provisions of this AIMP during construction.
3. Work collaboratively with other Utilities Inspectors, Right-of-Way agents, and the Agricultural Monitor in achieving compliance with this AIMP.
4. Observe construction activities on Agricultural Land on a regular basis.
5. Have the authority to stop construction activities that are determined to be out of compliance with provisions of this AIMP.

6. Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed.
7. Provide construction personnel with training on provisions of this AIMP before construction begins.
8. Provide construction personnel with field training on specific topics as needed.

Appendix A: **Definitions**

Agricultural Land	Land that is actively managed for cropland, hayland, or pasture, and land in government set-aside programs.
Agricultural Monitor	Monitor retained and funded by the Utilities, reporting directly to the Minnesota Department of Agriculture ("MDA") and responsible for auditing the Utilities' compliance with provisions of this AIMP.
Cropland	Land actively managed for growing row crops, small grains, or hay.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by the Utilities by virtue of which it has the right to construct, operate and maintain the transmission line together with such other rights and obligations as may be set forth in such agreement.
Final Clean-up	Transmission line activity that occurs after the power line has been constructed. Final Clean-up activities include but are not limited to: removal of construction debris, de-compaction of soil as required, installation of permanent erosion control structures, final grading, and restoration of fences and required reseeding. Once Final Clean-up is finished, Landowners will be contacted to settle all damage issues and will be provided a form to sign confirming final settlement.
Landowner	Person(s) holding legal title to Agricultural Land on the transmission line route from whom the Utilities is seeking, or has obtained, a temporary or permanent Easement, or their representatives.
Non-Agricultural Land	Any land that is not "Agricultural Land" as defined above.
Right-of-Way	The Agricultural Land included in permanent and temporary Easements which the Utilities acquires for the purpose of constructing, operating and maintaining the transmission line.
Tenant	Any Person lawfully renting or sharing land for agricultural production which makes up the "Right-of-Way" as defined in this AIMP.
Tile	Artificial subsurface drainage system.
Topsoil	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter.
Utilities Inspector	Full-time on-site inspector retained by the Utilities to verify compliance with requirements of this AIMP during construction of the transmission line. The Inspector will have demonstrated experience with transmission line construction on Agricultural Land.

Appendix B: Mitigative Actions for Organic Agricultural Land

Introduction

The Utilities recognize that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features. This Appendix identifies mitigation measures that apply specifically to farms that are Organic Certified or farms that are in active transition to become Organic Certified, and is intended to address the unique management and certification requirements of these operations. All protections provided in the Agricultural Impact Mitigation Plan will also be provided to Organic Agricultural Land in addition to the provisions of this Appendix.

The provisions of this Appendix will apply to Organic Agricultural Land for which the Landowner or Tenant has provided to the Utilities a true, correct and current version of the Organic System Plan within 60 days after the signing of the Easement for such land or 60 days after the issuance of a Route Permit to the Utilities by the PUC, whichever is sooner, or, in the event the Easement is signed later than 60 days after the issuance of the Route Permit. The provisions of this Appendix are applicable when the Organic System Plan is provided to the Utilities at the time of the signing of the Easement.

Organic System Plan

The Utilities recognize the importance of the individualized Organic System Plan (OSP) to the Organic Certification process. The Utilities will work with the Landowner or Tenant, the Landowner or Tenant's Certifying Agent, and/or a mutually acceptable third-party Organic consultant to identify site-specific construction practices that will minimize the potential for Decertification as a result of construction activities. Possible practices may include, but are not limited to: equipment cleaning, planting a deep-rooted cover crop in lieu of mechanical decompaction, applications of composted manure or rock phosphate, preventing the introduction of disease vectors from tobacco use, restoration and replacement of beneficial bird and insect habitat, maintenance of organic buffer zones, use of organic seeds for any cover crop, or similar measures. The Utilities recognizes that Organic System Plans are proprietary in nature and will respect the need for confidentiality.

Prohibited Substances

The Utilities will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, fuel or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic and lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

Temporary Road Impacts

Topsoil and subsoil layers that are removed during construction on Organic Agricultural Land for temporary road impacts will be stored separately and replaced in the proper sequence after the transmission line is installed. Unless otherwise specified in the site-specific plan described above, the Utilities will not use this soil for other purposes, including creating access ramps at road crossings. No topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

Erosion Control

On Organic Agricultural Land, the Utilities will, to the extent feasible, implement erosion control methods consistent with the Landowner or Tenant's Organic System Plan. On land adjacent to Organic Agricultural Land, the Utilities' erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the Right-of-Way and be deposited on Organic Agricultural Land. Treated lumber, non-organic hay bales, non-approved metal fence posts, etc. will not be used in erosion control on Organic Agricultural Land.

Weed Control

On Organic Agricultural Land, the Utilities will, to the extent feasible, implement weed control methods consistent with the Landowner's or Tenant's Organic System Plan. Prohibited Substances will not be used in weed control on Organic Agricultural Land. In addition, the Utilities will not use Prohibited Substances in weed control on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

Monitoring

In addition to the responsibilities of the Agricultural Monitor described in the AIMP, the following will apply:

A. The Agricultural Monitor will monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document any activities that may result in Decertification.

B. Instances of non-compliance will be documented according to Independent Organic Inspectors Association protocol consistent with the Landowner's Organic System Plan, and will be made available to the MDA, the Landowner, the Tenant, the Landowner's or Tenant's Certifying Agent, the Utilities Inspector and to the Utilities.

If the Agricultural Monitor is responsible for monitoring activities on Organic Agricultural Land, he/she will be trained, at the Utilities' expense, in organic inspection, by the Independent Organic Inspectors Association, unless the Agricultural Monitor received such training during the previous three years.

Compensation for Construction Damages

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures. Unless the Landowner or Tenant of Organic Agricultural Land and Company agree otherwise, at the Utilities expense, a mutually agreed upon professional agronomist will make crop yield determinations, and the Minnesota Department of Agriculture Fruit and Vegetable Inspection Unit will make crop quality determinations. If the crop yield and/or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to the Utilities and the Landowner or Tenant. Field work for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Minnesota. The Utilities will be responsible for the cost of sampling, testing and additional restoration activities, if needed. Landowners or Tenants may elect to settle damages with the Utilities in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

Compensation for Damages Due to Decertification

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification so long as a good faith effort is made by the Landowner or Tenant to regain Certification.

Definitions

Unless otherwise provided to the contrary in this Appendix, capitalized terms used in this Appendix shall have the meanings provided below and in the AIMP. In the event of a conflict between this Appendix and the AIMP with respect to definitions, the definition provided in this Appendix will prevail but only to the extent such conflicting terms are used in this Appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certifying Agent	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.
Decertified or Decertification	Loss of Organic Certification.
Organic Agricultural Land	Farms or portions thereof described in 7 CFR Parts 205.100, 205.202, and 205.101.
Organic Buffer Zone	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.
Organic Certification or Organic Certified	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.100 and 7 CFR Part 205.101.
Organic System Plan	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.
Prohibited Substance	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.600 through 7 CFR 205.605 using the criteria provided in 7 USC 6517 and 7 USC 6518.

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Segment 1 – Rare Species

					Route Alternatives																
Common Name	**Scientific Name**	**Type**	**MN Status**	**U.S. Status**	**1P**	**1P-001**	**1P-002**	**1P-003**	**1P-004**	**1P-005**	**1P-006**	**1P-007**	**1P-008**	**1P-009**	**1B-001**	**1B-003**	**1B-005**	**1A-001**	**1A-003**	**1A-004**	**1A**
Dwarf trout lily	*Erythronium propullans*	Vascular Plant	END	LE	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Prairie bush clover	*Lespedeza leptostachya*	Vascular Plant	THR	LT										X	X	X	X	X	X	X	X
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE					X	X				X	X	X	X	X		X	X
Kitten tails	*Besseya bullii*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tubercled rein-orchid	*Platanthera flava var. herbiola*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Valerian	*Valeriana edulis var. ciliata*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X		X					
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE										X	X	X	X	X	X	X	X
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR	NONE	X	X	X		X	X	X	X	X		X	X		X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE										X			X				
Loggerhead shrike	*Lanius ludovicianus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								
American ginseng	*Panax quinquefolius*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hill's thistle	*Cirsium hillii*	Vascular Plant	SPC	NONE										X							
Moschatel	*Adoxa moschatellina*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X								
Plains wild indigo	*Baptisia bracteata var. leucophaea*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rattlesnake-master	*Eryngium yuccifolium*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Snow trillium	*Trillium nivale*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White wild indigo	*Baptisia alba*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black sandshell	*Ligumia recta*	Invertebrate Animal	SPC	NONE										X	X	X	X	X	X	X	X
Creek heelsplitter	*Lasmigona compressa*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SPC	NONE	X	X	X		X	X	X	X	X		X	X		X	X	X	X
Spike	*Elliptio dilatata*	Invertebrate Animal	SPC	NONE										X	X	X	X	X		X	X
Bald eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
North American racer	*Coluber constrictor*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X								
Plains pocket mouse	*Perognathus flavescens*	Vertebrate Animal	SPC	NONE										X	X	X	X	X	X	X	X
Prairie vole	*Microtus ochrogaster*	Vertebrate Animal	SPC	NONE											X	X	X	X	X	X	X
Long-bearded hawkweed	*Hieracium longipilum*	Vascular Plant	NON	NONE			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American brook lamprey	*Lampetra appendix*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X							
Sandhill crane	*Grus canadensis*	Vertebrate Animal	NON	NONE		X	X	X													
Upland sandpiper	*Bartramia longicauda*	Vertebrate Animal	NON	NONE											X	X	X	X	X	X	X
Western fox snake	*Elaphe vulpina*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Western harvest mouse	*Reithrodontomys megalotis*	Vertebrate Animal	NON	NONE										X	X	X	X	X	X	X	X

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "SPC" refers to state-special concern species, "NON" refers to non-status, tracked species, "LE" refers to federally-endangered species, "LT" refers to federally-threatened species, and "NONE" refers to no federal status

For Species, an "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline. Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 1 – Rare Communities

					Route Alternatives																
Common Name	**Scientific Name**	**Type**	**MN Status**	**U.S. Status**	**1P**	**1P-001**	**1P-002**	**1P-003**	**1P-004**	**1P-005**	**1P-006**	**1P-007**	**1P-008**	**1P-009**	**1B-001**	**1B-003**	**1B-005**	**1A-001**	**1A-003**	**1A-004**	**1A**
Dwarf trout lily	*Erythronium propullans*	Vascular Plant	END	LE	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Prairie bush clover	*Lespedeza leptostachya*	Vascular Plant	THR	LT										X	X	X	X	X	X	X	X
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE					X	X				X	X	X	X	X		X	X
Kitten tails	*Besseya bullii*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tubercled rein-orchid	*Platanthera flava var. herbiola*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Valerian	*Valeriana edulis var. ciliata*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X		X					
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE										X	X	X	X	X	X	X	X
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR	NONE	X	X	X		X	X	X	X	X		X	X		X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE										X			X				
Loggerhead shrike	*Lanius ludovicianus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								
American ginseng	*Panax quinquefolius*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hill's thistle	*Cirsium hillii*	Vascular Plant	SPC	NONE										X							
Moschatel	*Adoxa moschatellina*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X								
Plains wild indigo	*Baptisia bracteata var. leucophaea*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rattlesnake-master	*Eryngium yuccifolium*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Snow trillium	*Trillium nivale*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White wild indigo	*Baptisia alba*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black sandshell	*Ligumia recta*	Invertebrate Animal	SPC	NONE										X	X	X	X	X	X	X	X
Creek heelsplitter	*Lasmigona compressa*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SPC	NONE	X	X	X		X	X	X	X	X		X	X		X	X	X	X
Spike	*Elliptio dilatata*	Invertebrate Animal	SPC	NONE										X	X	X	X	X		X	X
Bald eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
North American racer	*Coluber constrictor*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X								
Plains pocket mouse	*Perognathus flavescens*	Vertebrate Animal	SPC	NONE										X	X	X	X	X	X	X	X
Prairie vole	*Microtus ochrogaster*	Vertebrate Animal	SPC	NONE											X	X	X	X	X	X	X
Long-bearded hawkweed	*Hieracium longipilum*	Vascular Plant	NON	NONE			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American brook lamprey	*Lampetra appendix*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X							
Sandhill crane	*Grus canadensis*	Vertebrate Animal	NON	NONE		X	X	X													
Upland sandpiper	*Bartramia longicauda*	Vertebrate Animal	NON	NONE											X	X	X	X	X	X	X
Western fox snake	*Elaphe vulpina*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Western harvest mouse	*Reithrodontomys megalotis*	Vertebrate Animal	NON	NONE										X	X	X	X	X	X	X	X

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "SPC" refers to state-special concern species, "NON" refers to non-status, tracked species, "LE" refers to federally-endangered species, "LT" refers to federally-threatened species, and "NONE" refers to no federal status

For Species, an "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline. Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 2 – Rare Species

Common Name	Scientific Name	Type	MN Status	U.S. Status	2P	2B-001	2A-001	2A-002	2A-003	2A	2C3-001-2	2C3-002-2	2C3-003-2	2C3-004-2	2C3-005-2	2C3-006-2	2C3-007-2	2C3-008-2
					Route Alternatives													
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X			X	X	X	X
Tuberous Indian-plantain	*Arnoglossum plantagineum*	Vascular Plant	THR	NONE	X	X					X	X	X	X	X	X	X	X
Elktoe	*Alasmidonta marginata*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X			X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood turtle	*Clemmys insculpta*	Vertebrate Animal	THR	NONE	X	X		X	X	X	X	X	X	X	X	X	X	X
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X				X	X		X
American ginseng	*Panax quinquefolius*	Vascular Plant	SPC	NONE		X	X	X	X	X								
Creek heelsplitter	*Lasmigona compressa*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X			X	X	X	X
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SPC	NONE	X	X	X	X		X	X	X	X	X	X	X	X	X
Ozark minnow	*Notropis nubilus*	Vertebrate Animal	SPC	NONE		X	X	X	X	X								
Ratsnake	*Elaphe obsoleta*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American brook lamprey	*Lampetra appendix*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X				X	X		X
Black redhorse	*Moxostoma duquesnei*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "SPC" refers to state-special concern species, "NON" refers to non-status, tracked species, and "NONE" refers to no federal status

For Species, an "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline. Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 2 – Rare Communities

Type	2P	2B-001	2A-001	2A-002	2A-003	2A	2C3-001-2	2C3-002-2	2C3-003-2	2C3-004-2	2C3-005-2	2C3-006-2	2C3-007-2	2C3-008-2
	Route Alternatives													
Animal Assemblages	**Animal Assemblages - Number in ROW/Number within 1 Mile**													
Freshwater Mussel Concentration Area	0/1	0/1	0/1			0/1	0/1				0/1	0/1		0/1
Native Plant Communities	**Native Plant Communities - Acres in ROW/Acres within 1 Mile**													
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest		107.9	123.6	123.6	123.6	123.6								
Sugar Maple - Basswood - (Bitternut Hickory) Forest		27	92.5	134.9	159.2	92.5								
Red Oak - White Oak Forest		38.2		38.2	38.2	38.2			123.6	123.6		101.6		
MCBS Sites of Biodiversity Significance	**MCBS Sites of Biodiversity Significance - Acres in ROW/Acres within 1 Mile**													
Outstanding biodiversity significance														
High biodiversity significance	120.2	178.7	0.7/156.0	1.4/156	0.7/156.0	0.7/155.9	5.1/198.0	39.2			120.2	96.6	39.3	96.6
Moderate biodiversity significance	20.1	184.7	311.2	4.0/444.1	1.2/530.4	329.0	20.2	20.2	1.1/211.6	1.1/211.6	20.2	185.3	20.2	

Cells with numbers indicate the presence of animal assemblage, native plant community, or MCBS site within 1 mile of the proposed centerline, while a blank cell indicates that a particular animal assemblage, native plant community, or MCBS site has not been documented within 1 mile of the proposed centerline.

Cells in pink indicate the presence of that particular animal assemblage, native plant community, or MCBS site within the proposed ROW.

"MCBS" refers to Minnesota County Biological Survey.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 3(a) – Rare Species

					Route Alternatives														
Common Name	Scientific Name	Type	MN Status	U.S. Status	3P	3-P-Kellogg	3-P-Zumbro-N	3-P-Zumbro-S	3P-001	3P-002	3P-003	3P-004	3P-005	3P-006	3P-007	3P-008	3P-009	3P-010	3P-011
Sheepnose	*Plethobasus cyphyus*	Invertebrate Animal	END	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rock pocketbook	*Arcidens confragosus*	Invertebrate Animal	END	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sweet-smelling Indian-plantain	*Cacalia suaveolens*	Vascular Plant	END	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Elktoe	*Alasmidonta marginata*	Invertebrate Animal	THR	NONE	X	X			X	X	X	X	X	X	X	X		X	X
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Monkeyface	*Quadrula metanevra*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR	NONE			X	X									X		
Pistolgrip	*Tritogonia verrucosa*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Round pigtoe	*Pleurobema coccineum*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Washboard	*Megalonaias nervosa*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Davis' sedge	*Carex davisii*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
James' sedge	*Carex jamesii*	Vascular Plant	THR	NONE			X												
Spreading sedge	*Carex laxiculmis*	Vascular Plant	THR	NONE			X												
Tuberous Indian-plantain	*Arnoglossum plantagineum*	Vascular Plant	THR	NONE	X	X			X	X	X	X	X	X	X	X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood turtle	*Clemmys insculpta*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Loggerhead shrike	*Lanius ludovicianus*	Vertebrate Animal	THR	NONE			X												
Peregrine falcon	*Falco peregrinus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Metaphidippus arizonensis*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Phidippus apacheanus*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Sassacus papenhoei*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black sandshell	*Ligumia recta*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Creek heelsplitter	*Lasmigona compressa*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Hickorynut	*Obovaria olivaria*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Leonard's skipper	*Hesperia leonardus leonardus*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American ginseng	*Panax quinquefolius*	Vascular Plant	SPC	NONE			X	X									X		
Cattail sedge	*Carex typhina*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Clasping milkweed	*Asclepias amplexicaulis*	Vascular Plant	SPC	NONE	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Cliff goldenrod	*Solidago sciaphila*	Vascular Plant	SPC	NONE			X												
Clustered broomrape	*Orobanche fasciculata*	Vascular Plant	SPC	NONE			X	X									X		
Creeping juniper	*Juniperus horizontalis*	Vascular Plant	SPC	NONE															
Goldie's fern	*Dryopteris goldiana*	Vascular Plant	SPC	NONE			X												
Hill's thistle	*Cirsium hillii*	Vascular Plant	SPC	NONE			X	X									X		
Moschatel	*Adoxa moschatellina*	Vascular Plant	SPC	NONE			X	X									X		
One-flowered broomrape	*Orobanche uniflora*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rhombic-petaled evening primrose	*Oenothera rhombipetala*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	x	X	X	X
Rock sandwort	*Minuartia dawsonensis*	Vascular Plant	SPC	NONE			X	X									X		
Squirrel-corn	*Dicentra canadensis*	Vascular Plant	SPC	NONE			X												
Stemless tick-trefoil	*Desmodium nudiflorum*	Vascular Plant	SPC	NONE			X	X											
Twinleaf	*Jeffersonia diphylla*	Vascular Plant	SPC	NONE			X												
White wild indigo	*Baptisia alba*	Vascular Plant	SPC	NONE											X				X
Widgeon-grass	*Ruppia maritima*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood's sedge	*Carex woodii*	Vascular Plant	SPC	NONE			X												
Yellow-fruited sedge	*Carex annectens*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Acadian flycatcher	*Empidonax virescens*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bald eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blue sucker	*Cycleptus elongatus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Crystal Darter	*Ammocrypta asprella*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eastern pipistrelle	*Pipistrellus subflavus*	Vertebrate Animal	SPC	NONE			X												
Gophersnake	*Pituophis catenifer*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lake sturgeon	*Acipenser fulvescens*	Vertebrate Animal	SPC	NONE		X													
Louisiana waterthrush	*Seiurus motacilla*	Vertebrate Animal	SPC	NONE			X												
North American racer	*Coluber constrictor*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Segment 3(a) – Rare Species (cont'd)

Common Name	Scientific Name	Type	MN Status	U.S. Status	3P	3-P-Kellogg	3-P-Zumbro-N	3-P-Zumbro-S	3P-001	3P-002	3P-003	3P-004	3P-005	3P-006	3P-007	3P-008	3P-009	3P-010	3P-011
Pallid shiner	*Notropis amnis*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pirate perch	*Aphredoderus sayanus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Red-shouldered hawk	*Buteo lineatus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Buttonbush	*Cephalanthus occidentalis*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gray's sedge	*Carex grayi*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Green dragon	*Arisaema dracontium*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jewelled shooting star	*Dodecatheon amethystinum*	Vascular Plant	NON	NONE	X	X	X		X	X	X	X	X	X	X	X	X		X
Kentucky coffee-tree	*Gymnocladus dioica*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lilia-leaved Twayblade	*Liparis liliifolia*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Long-bearded hawkweed	*Hieracium longipilum*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Muskingum sedge	*Carex muskingumensis*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Silvery spleenwort	*Deparia acrostichoides*	Vascular Plant	NON	NONE			X												
Swamp white oak	*Quercus bicolor*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White baneberry	*Actaea pachypoda*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American brook lamprey	*Lampetra appendix*	Vertebrate Animal	NON	NONE															
Bell's vireo	*Vireo bellii*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black redhorse	*Moxostoma duquesnei*	Vertebrate Animal	NON	NONE															
Eastern hognose snake	*Heterodon platirhinos*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Milk snake	*Lampropeltis triangulum*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pugnose minnow	*Opsopoeodus emiliae*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sandhill crane	*Grus canadensis*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Upland sandpiper	*Bartramia longicauda*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Western fox snake	*Elaphe vulpina*	Vertebrate Animal	NON	NONE		X	X	X									X		

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "SPC" refers to state-special concern species, "NON" refers to non-status, tracked species, "C" refers to federal candidate species, and "NONE" refers to no federal status

For Species, an "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline. Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 3(b) – Rare Species

					Route Alternatives															
Common Name	Scientific Name	Type	MN Status	U.S. Status	3B-003	3A-001	3A-003	3A-004	3-A-Crossover	3-A-Kellogg	3A	2C3-001-3a	2C3-001-3b	2C3-002-3	2C3-003-3	2C3-004-3	2C3-005-3	2C3-006-3	2C3-007-3	2C3-008-3
Sheepnose	*Plethobasus cyphyus*	Invertebrate Animal	END	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rock pocketbook	*Arcidens confragosus*	Invertebrate Animal	END	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sweet-smelling Indian-plantain	*Cacalia suaveolens*	Vascular Plant	END	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Elktoe	*Alasmidonta marginata*	Invertebrate Animal	THR	NONE	X							X	X	X	X	X	X	X	X	X
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE	X							X	X	X			X	X	X	X
Monkeyface	*Quadrula metanevra*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR	NONE																
Pistolgrip	*Tritogonia verrucosa*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Round pigtoe	*Pleurobema coccineum*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Washboard	*Megalonaias nervosa*	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Davis' sedge	*Carex davisii*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE	X							X	X	X			X	X	X	X
James' sedge	*Carex jamesii*	Vascular Plant	THR	NONE		X	X	X		X	X				X					
Spreading sedge	*Carex laxiculmis*	Vascular Plant	THR	NONE		X	X	X		X	X				X					
Tuberous Indian-plantain	*Arnoglossum plantagineum*	Vascular Plant	THR	NONE	X							X	X	X		X	X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood turtle	*Clemmys insculpta*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Loggerhead shrike	*Lanius ludovicianus*	Vertebrate Animal	THR	NONE		X	X	X		X	X				X					
Peregrine falcon	*Falco peregrinus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Metaphidippus arizonensis*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Phidippus apacheanus*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A jumping spider	*Sassacus papenhoei*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black sandshell	*Ligumia recta*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Creek heelsplitter	*Lasmigona compressa*	Invertebrate Animal	SPC	NONE	X							X	X	X			X	X	X	X
Fluted-shell	*Lasmigona costata*	Invertebrate Animal	SPC	NONE	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Hickorynut	*Obovaria olivaria*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Leonard's skipper	*Hesperia leonardus leonardus*	Invertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American ginseng	*Panax quinquefolius*	Vascular Plant	SPC	NONE		X	X	X	X	X	X				X					
Cattail sedge	*Carex typhina*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Clasping milkweed	*Asclepias amplexicaulis*	Vascular Plant	SPC	NONE		X	X	X	X		X	X	X	X	X	X	X	X	X	X
Cliff goldenrod	*Solidago sciaphila*	Vascular Plant	SPC	NONE	X	X	X	X		X	X				X					
Clustered broomrape	*Orobanche fasciculata*	Vascular Plant	SPC	NONE																
Creeping juniper	*Juniperus horizontalis*	Vascular Plant	SPC	NONE	X															
Goldie's fern	*Dryopteris goldiana*	Vascular Plant	SPC	NONE		X	X	X		X	X				X					
Hill's thistle	*Cirsium hillii*	Vascular Plant	SPC	NONE		X	X	X	X	X	X				X					
Moschatel	*Adoxa moschatellina*	Vascular Plant	SPC	NONE		X	X	X	X	X	X				X					
One-flowered broomrape	*Orobanche uniflora*	Vascular Plant	SPC	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rhombic-petaled evening primrose	*Oenothera rhombipetala*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rock sandwort	*Minuartia dawsonensis*	Vascular Plant	SPC	NONE																
Squirrel-corn	*Dicentra canadensis*	Vascular Plant	SPC	NONE		X	X	X	X	X	X				X					
Stemless tick-trefoil	*Desmodium nudiflorum*	Vascular Plant	SPC	NONE		X	X	X	X	X	X				X					
Twinleaf	*Jeffersonia diphylla*	Vascular Plant	SPC	NONE		X	X	X		X	X				X					
White wild indigo	*Baptisia alba*	Vascular Plant	SPC	NONE																
Widgeon-grass	*Ruppia maritima*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood's sedge	*Carex woodii*	Vascular Plant	SPC	NONE		X	X	X		X	X				X					
Yellow-fruited sedge	*Carex annectens*	Vascular Plant	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Acadian flycatcher	*Empidonax virescens*	Vertebrate Animal	SPC	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bald eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blue sucker	*Cycleptus elongatus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Crystal Darter	*Ammocrypta asprella*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eastern pipistrelle	*Pipistrellus subflavus*	Vertebrate Animal	SPC	NONE		X	X	X		X	X				X					
Gophersnake	*Pituophis catenifer*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lake sturgeon	*Acipenser fulvescens*	Vertebrate Animal	SPC	NONE	X					X										
Louisiana waterthrush	*Seiurus motacilla*	Vertebrate Animal	SPC	NONE		X	X	X		X	X				X					
North American racer	*Coluber constrictor*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Segment 3(b) – Rare Species (cont'd)

Common Name	Scientific Name	Type	MN Status	U.S. Status	3B-003	3A-001	3A-003	3A-004	3-A-Crossover	3-A-Kellogg	3A	2C3-001-3a	2C3-001-3b	2C3-002-3	2C3-003-3	2C3-004-3	2C3-005-3	2C3-006-3	2C3-007-3	2C3-008-3
Pallid shiner	*Notropis amnis*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pirate perch	*Aphredoderus sayanus*	Vertebrate Animal	SPC	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Red-shouldered hawk	*Buteo lineatus*	Vertebrate Animal	SPC	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Buttonbush	*Cephalanthus occidentalis*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gray's sedge	*Carex grayi*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Green dragon	*Arisaema dracontium*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jewelled shooting star	*Dodecatheon amethystinum*	Vascular Plant	NON	NONE	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Kentucky coffee-tree	*Gymnocladus dioica*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lilia-leaved Twayblade	*Liparis liliifolia*	Vascular Plant	NON	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Long-bearded hawkweed	*Hieracium longipilum*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Muskingum sedge	*Carex muskingumensis*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Silvery spleenwort	*Deparia acrostichoides*	Vascular Plant	NON	NONE		X	X	X		X	X				X					
Swamp white oak	*Quercus bicolor*	Vascular Plant	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White baneberry	*Actaea pachypoda*	Vascular Plant	NON	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American brook lamprey	*Lampetra appendix*	Vertebrate Animal	NON	NONE								X	X							
Bell's vireo	*Vireo bellii*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black redhorse	*Moxostoma duquesnei*	Vertebrate Animal	NON	NONE								X	X							
Eastern hognose snake	*Heterodon platirhinos*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Milk snake	*Lampropeltis triangulum*	Vertebrate Animal	NON	NONE		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pugnose minnow	*Opsopoeodus emiliae*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sandhill crane	*Grus canadensis*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Upland sandpiper	*Bartramia longicauda*	Vertebrate Animal	NON	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Western fox snake	*Elaphe vulpina*	Vertebrate Animal	NON	NONE	X					X										

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "SPC" refers to state-special concern species, "NON" refers to non-status, tracked species, "C" refers to federal candidate species, and "NONE" refers to no federal status

For Species, an "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline. Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 3(a) – Rare Communities

Type	3P	3-P-Kellogg	3-P-Zumbro-N	3-P-Zumbro-S	3P-001	3P-002	3P-003	3P-004	3P-005	3P-006	3P-007	3P-008	3P-009	3P-010	3P-011
	Route Alternatives														
Animal Assemblages	**Animal Assemblages - Number in ROW/Number within 1 Mile**														
Bat Colony			0/1												
Freshwater Mussel Concentration Area		0/1	0/1	0/1											
Native Plant Communities	**Native Plant Communities - Acres in ROW/Acres within 1 Mile**														
Calcareous Fen (Southeastern)	8.8	2.1/8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Dry Bedrock Bluff Prairie (Southern)	6.8/363.03	6.8/363.0	6.8/241.5	6.8/241.5	6.8/363.0	6.8/363.0	6.8/363.0	6.8/363.0	6.8/363.0	6.8/341.9	6.8/341.9	6.8/363.0	6.8/610.2	6.8/363.0	6.8/341.9
Dry Limestone - Dolomite Cliff (Southern)			7.5/123.6												
Dry Sand - Gravel Prairie (Southern)			9.3/138.3	9.3/138.3									4.6		
Red Oak - White Oak - (Sugar Maple) Forest	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6
Red Oak - White Oak Forest	1.8/222.5	1.83/222.5	1.8/247.2	1.8/247.2	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5	1.8/370.7	1.8/247.2	1.8/222.5
Sedge Meadow	247.2	177.5	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2
Seepage Meadow/Carr, Tussock Sedge Subtype	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6
Silver Maple - (Virginia Creeper) Floodplain Forest	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0
Southern Dry Cliff			56.9												
Spikerush - Bur Reed Marsh (Northern)	123.6	88.8	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6
Sugar Maple - Basswood - (Bitternut Hickory) Forest	83	83			83	83	83	83	83	84.2	84.7	83	83	19.2	83
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest			207.2												
Swamp White Oak Terrace Forest	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9
White Pine - Oak - Sugar Maple Forest			138.1												
White Pine - Oak Woodland (Sand)			123.6	7.9/123.6											
Willow - Dogwood Shrub Swamp	123.6	88.8	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6
MCBS Sites of Biodiversity Significance	**MCBS Sites of Biodiversity Significance - Acres in Row/Acres within 1 Mile**														
Outstanding biodiversity significance	8.5/859.6	8.5/796.6	12.2/1145.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/15.7	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6
High biodiversity significance	15.7/1468.3	1.3/1021.0	26.3/1838.2	26.3/1691.2	15.7/1409.6	15.7/1468.3	15.7/1409.6	15.7/1468.3	15.7/1468.3	15.7/1468.3	15.7/1468.3	15.7/1468.3	15.7/1497.4	15.7/1468.3	15.7/1468.3
Moderate biodiversity significance	23.4/1853.9	23.4/3671.5	14.7/4822.0	9.5/1486.0	23.4/1852.7	23.4/1853.9	23.4/1852.7	23.4/1853.9	23.4/1853.9	12.2/1830.0	11.8/1842.0	23.4/1853.9	24.3/2243.7	23.4/1810.7	11.5/1805.6

Cells with numbers indicate the presence of animal assemblage, native plant community, or MCBS site within 1 mile of the proposed centerline, while a blank cell indicates that a particular animal assemblage, native plant community, or MCBS site has not been documented within 1 mile of the proposed centerline.

Cells in pink indicate the presence of that particular animal assemblage, native plant community, or MCBS site within the proposed ROW.

"MCBS" refers to Minnesota County Biological Survey.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Segment 3(b) – Rare Communities

Type	3B-003	3A-001	3A-003	3A-004	3-A-Crossover	3-A-Kellogg	3A	2C3-001-3a	2C3-001-3b	2C3-002-3	2C3-003-3	2C3-004-3	2C3-005-3	2C3-006-3	2C3-007-3	2C3-008-3
	Route Alternatives															
Animal Assemblages	**Animal Assemblages - Number in ROW/Number within 1 Mile**															
Bat Colony		0/1	0/1	0/1		0/1	0/1				0/1					
Freshwater Mussel Concentration Area	0/1	0/1	0/1	0/1	0/1	0/2	0/1	0/1	0/1		0/1					
Native Plant Communities	**Native Plant Communities - Acres in ROW/Acres within 1 Mile**															
Calcareous Fen (Southeastern)		8.8	8.8	8.8	8.8	2.1/8.9	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Dry Bedrock Bluff Prairie (Southern)	188.2	13.7/487.1	13.7/487.1	13.7/487.1	13.7/487.1	13.7/487.1	13.7/487.1	6.8/363.0	6.8/363.0	6.8/363.0	13.7/487.1	6.8/363.0	6.8/363.0	6.8/363.0	6.8/363.0	6.8/363.0
Dry Limestone - Dolomite Cliff (Southern)	33.7	7.5/123.6	7.5/123.6	7.5/123.6		7.5/123.6	7.5/123.6				7.5/123.6					
Dry Sand - Gravel Prairie (Southern)		14.7	14.7	14.7		14.7	14.7				14.7					
Red Oak - White Oak - (Sugar Maple) Forest		4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6	4.6/123.6
Red Oak - White Oak Forest	336.2	1.8/247.2	1.8/247.2	1.8/247.2	1.8/247.2	1.8/247.2	1.8/247.2	1.8/222.5	1.8/222.5	1.8/222.5	1.8/247.2	1.8/346.1	1.8/222.5	1.8/222.5	1.8/222.5	1.8/222.5
Sedge Meadow		247.2	247.2	247.2	247.2	177.5	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2	247.2
Seepage Meadow/Carr, Tussock Sedge Subtype		123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6
Silver Maple - (Virginia Creeper) Floodplain Forest	5.4/123.6	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0	5.4/213.0
Southern Dry Cliff		56.9	56.9	56.9		56.9	56.9				56.9					
Spikerush - Bur Reed Marsh (Northern)		123.6	123.6	123.6	123.6	88.8	123.6	123.6	123.6	123.6	123.6	123.2	123.6	123.6	123.6	123.6
Sugar Maple - Basswood - (Bitternut Hickory) Forest	83							83	83	83	207.2	83	83	83	83	83
Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest		207.2	207.2	207.2		207.2	207.2				207.2					
Swamp White Oak Terrace Forest	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9
White Pine - Oak - Sugar Maple Forest		138.1	138.1	138.1		138.1	138.1				138.1					
White Pine - Oak Woodland (Sand)																
Willow - Dogwood Shrub Swamp		123.6	123.6	123.6	123.6	88.8	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6	123.6
MCBS Sites of Biodiversity Significance	**MCBS Sites of Biodiversity Significance - Acres in ROW/Acres within 1 Mile**															
Outstanding biodiversity significance	8.5/810.0	12.2/1145.6	12.2/1145.6	12.2/1145.6	8.5/859.6	12.2/1082.6	12.2/1145.6	8.5/859.6	8.5/859.6	8.5/859.6	12.2/1145.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6	8.5/859.6
High biodiversity significance	0.1/385.0	15.7/1540.9	15.7/1540.9	15.7/1540.9	15.7/1393.9	1.3/1093.6	15.7/1540.9	20.8/1591.9	20.8/1591.9	15.7/1433.1	15.7/1540.9	15.7/1393.9	15.7/1433.1	15.7/1409.6	15.7/1433.1	15.7/1468.3
Moderate biodiversity significance	13.8/2212.6	22.6/2816.2	22.6/2816.2	22.6/2816.2	17.5/2256.5	22.6/2816.2	22.6/2816.2	23.4/1872.8	23.4/1872.8	23.4/1872.8	22.9/2816.1	24.5/2064.2	23.4/1872.8	23.4/2038.0	23.4/1872.8	23.4/1853.9

Cells with numbers indicate the presence of animal assemblage, native plant community, or MCBS site within 1 mile of the proposed centerline, while a blank cell indicates that a particular animal assemblage, native plant community, or MCBS site has not been documented within 1 mile of the proposed centerline.

Cells in pink indicate the presence of that particular animal assemblage, native plant community, or MCBS site within the proposed ROW.

"MCBS" refers to Minnesota County Biological Survey.

Source: Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database

Blufflands ECS Subsection – Species of greatest conservation need (SGCN) by habitatat

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
AM	Acris crepitans	Northern Cricket Frog	END	NL	6	1	3													x	x			x
AM	Necturus maculosus	Common Mudpuppy	NL	NL	14	0	3									x			x	x				
AM	Rana palustris	Pickerel Frog	NL	NL	2	57	4				x							x			x		x
BI	Ammodramus henslowii	Henslow's Sparrow	END	NL	7	4	3								x			x						x
BI	Ammodramus savannarum	Grasshopper Sparrow	NL	NL	14	6	3								x			x					x	
BI	Arenaria interpres	Ruddy Turnstone	NL	NL	20	0	2														x			x
BI	Bartramia longicauda	Upland Sandpiper	NL	NL	19	0	6	x							x			x				x	x	x
BI	Buteo lineatus	Red-shouldered Hawk	SPC	NL	12	36	3				x		x	x										
BI	Calidris alpina	Dunlin	NL	NL	24	0	2														x			x
BI	Calidris fuscicollis	White-rumped Sandpiper	NL	NL	20	0	2														x			x
BI	Calidris pusilla	Semipalmated Sandpiper	NL	NL	25	0	2														x			x
BI	Caprimulgus vociferus	Whip-poor-will	NL	NL	21	1	2					x		x										
BI	Catharus fuscescens	Veery	NL	NL	22	25	5			x	x	x	x	x										
BI	Chlidonias niger	Black Tern	NL	NL	18	5	2										x							x
BI	Chordeiles minor	Common Nighthawk	NL	NL	25	0	2		x												x			
BI	Circus cyaneus	Northern Harrier	NL	NL	25	1	6			x					x			x				x	x	x
BI	Cistothorus palustris	Marsh Wren	NL	NL	20	17	4			x							x					x		x
BI	Cistothorus platensis	Sedge Wren	NL	NL	25	15	5			x					x			x				x		x
BI	Coccyzus erythropthalmus	Black-billed Cuckoo	NL	NL	25	20	6				x	x	x	x								x	x	
BI	Contopus virens	Eastern Wood-pewee	NL	NL	25	278	5				x	x	x	x				x						
BI	Dendroica cerulea	Cerulean Warbler	SPC	NL	10	81	2				x			x										
BI	Dolichonyx oryzivorus	Bobolink	NL	NL	25	7	6	x							x			x				x	x	x
BI	Empidonax minimus	Least Flycatcher	NL	NL	25	24	4				x	x	x	x										
BI	Empidonax traillii	Willow Flycatcher	NL	NL	13	27	3															x	x	x
BI	Empidonax virescens	Acadian Flycatcher	SPC	NL	6	55	2				x			x										
BI	Falco peregrinus	Peregrine Falcon	THR	NL	6	6	10		x	x					x		x	x		x	x	x	x	x
BI	Gallinula chloropus	Common Moorhen	SPC	NL	7	12	2										x							x
BI	Haliaeetus leucocephalus	Bald Eagle	SPC	THR	21	129	7				x	x	x	x		x			x				x	
BI	Hylocichla mustelina	Wood Thrush	NL	NL	20	70	3					x	x	x										
BI	Ixobrychus exilis	Least Bittern	NL	NL	16	3	3										x					x		x

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
BI	Lanius ludovicianus	Loggerhead Shrike	THR	NL	10	5	3								x			x					x	
BI	Limnodromus griseus	Short-billed Dowitcher	NL	NL	22	0	1																	x
BI	Limosa haemastica	Hudsonian Godwit	NL	NL	18	0	1																	x
BI	Melanerpes erythrocephalus	Red-headed Woodpecker	NL	NL	22	19	8	x	x		x		x	x	x			x					x	
BI	Melospiza georgiana	Swamp Sparrow	NL	NL	25	18	3			x												x		x
BI	Numenius phaeopus	Whimbrel	NL	NL	13	0	1														x			
BI	Pheucticus ludovicianus	Rose-breasted Grosbeak	NL	NL	25	154	5				x	x	x	x				x						
BI	Pluvialis dominica	American Golden-plover	NL	NL	24	0	2														x			x
BI	Protonotaria citrea	Prothonotary Warbler	NL	NL	6	18	2				x									x				
BI	Rallus elegans	King Rail	END	NL	2	0	3										x					x		x
BI	Rallus limicola	Virginia Rail	NL	NL	23	4	3										x					x		x
BI	Recurvirostra americana	American Avocet	NL	NL	16	0	2														x			x
BI	Scolopax minor	American Woodcock	NL	NL	22	1	4						x		x							x	x	
BI	Seiurus aurocapillus	Ovenbird	NL	NL	22	157	4				x	x	x	x										
BI	Seiurus motacilla	Louisiana Waterthrush	SPC	NL	5	61	2				x								x					
BI	Sphyrapicus varius	Yellow-bellied Sapsucker	NL	NL	23	66	4				x	x	x	x										
BI	Spiza americana	Dickcissel	NL	NL	11	1	4	x							x			x					x	
BI	Spizella pusilla	Field Sparrow	NL	NL	13	104	3								x			x					x	
BI	Stelgidopteryx serripennis	Northern Rough-winged Swallow	NL	NL	25	42	3								x				x		x			
BI	Sturnella magna	Eastern Meadowlark	NL	NL	20	22	2								x			x						
BI	Toxostoma rufum	Brown Thrasher	NL	NL	25	14	2		x														x	
BI	Tringa melanoleuca	Greater Yellowlegs	NL	NL	25	0	2														x			x
BI	Troglodytes troglodytes	Winter Wren	NL	NL	18	8	3			x	x	x												
BI	Tryngites subruficollis	Buff-breasted Sandpiper	NL	NL	23	0	4	x	x						x			x						
BI	Vermivora pinus	Blue-winged Warbler	NL	NL	6	64	4						x	x				x					x	
BI	Vireo bellii	Bell's Vireo	NL	NL	6	9	2															x	x	
FI	Acipenser fulvescens	Lake Sturgeon	SPC	NL	14	45	2									x				x				
FI	Alosa chrysochloris	Skipjack Herring	SPC	NL	4	18	2										x			x				
FI	Ammocrypta asprella	Crystal Darter	SPC	NL	3	53	2												x	x				
FI	Ammocrypta clara	Western Sand Darter	NL	NL	3	250	2												x	x				

Blufflands ECS Subsection – Species of greatest conservation need (SGCN) by habitatat (cont'd)

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																								
FI	Anguilla rostrata	American Eel	NL	NL	3	35	2												x	x				
FI	Aphredoderus sayanus	Pirate Perch	SPC	NL	2	43	1													x				
FI	Clinostomus elongatus	Redside Dace	NL	NL	3	10	1												x					
FI	Cycleptus elongatus	Blue Sucker	SPC	NL	3	136	2												x	x				
FI	Erimystax x-punctata	Gravel Chub	SPC	NL	3	4	1												x					
FI	Etheostoma asprigene	Mud Darter	NL	NL	3	375	1													x				
FI	Etheostoma chlorosoma	Bluntnose Darter	NL	NL	2	2	1													x				
FI	Hybognathus nuchalis	Mississippi Silvery Minnow	NL	NL	2	65	2												x	x				
FI	Ictiobus niger	Black Buffalo	SPC	NL	3	13	1													x				
FI	Lampetra appendix	American Brook Lamprey	NL	NL	7	91	1												x					
FI	Lepomis gulosus	Warmouth	NL	NL	2	88	1													x				
FI	Lythrurus umbratilis	Redfin Shiner	NL	NL	3	0	1												x					
FI	Macrhybopsis aestivalis	speckled chub	NL	NL	5	73	2												x	x				
FI	Morone mississippiensis	Yellow Bass	SPC	NL	1	35	1													x				
FI	Moxostoma carinatum	River Redhorse	NL	NL	3	468	1													x				
FI	Moxostoma duquesnei	Black Redhorse	NL	NL	3	7	1												x					
FI	Notropis amnis	Pallid Shiner	SPC	NL	2	19	1													x				
FI	Notropis nubilus	Ozark Minnow	SPC	NL	3	0	1												x					
FI	Opsopoeodus emiliae	Pugnose Minnow	NL	NL	2	825	1													x				
FI	Phenacobius mirabilis	Suckermouth Minnow	NL	NL	4	7	1												x					
FI	Polyodon spathula	Paddlefish	THR	NL	3	91	1													x				
FI	Scaphirhynchus platorynchus	Shovelnose Sturgeon	NL	NL	4	90	2												x	x				
IN	Aflexia rubranura	Red Tailed Prairie Leafhopper	SPC	NL	10	0	1											x						
IN	Atrytone arogos	Arogos Skipper	SPC	NL	9	0	1											x						
IN	Cicindela patruela patruela	A Tiger Beetle	SPC	NL	5	3	4		x			x		x									x	
IN	Cicindela splendida cyanocephalata	A Tiger Beetle	SPC	NL	1	1	4		x					x					x		x			
IN	Erynnis persius	Persius Duskywing	END	NL	5	1	1																x	
IN	Euphyes bimacula illinois	Two-spotted Skipper	NL	NL	7	0	1																	x
IN	Gomphus crassus	Handsome Clubtail	NL	NL	1	0	1												x					
IN	Gomphus ventricosus	Skillet Clubtail	NL	NL	2	0	1												x					

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																								
IN	Hesperia leonardus leonardus	Leonard's Skipper	SPC	NL	7	2	2											x					x	
IN	Hesperia ottoe	Ottoe Skipper	THR	NL	6	3	1											x						
IN	Lycaeides melissa samuelis	Karner Blue	END	END	3	1	3					x		x									x	
IN	Oarisma powesheik	Powesheik Skipper	SPC	NL	6		1											x						
IN	Papaipema beeriana	Blazing Star Stem Borer	NL	NL	9	0	1											x						
IN	Schinia indiana	Phlox Moth	SPC	NL	5	0	2											x					x	
IN	Speyeria idalia	Regal Fritillary	SPC	NL	11	0	1											x						
MA	Cryptotis parva	Least Shrew	SPC	NL	2	0	4		x						x			x					x	
MA	Microtus ochrogaster	Prairie Vole	SPC	NL	12	0	4	x							x			x					x	
MA	Microtus pinetorum	Woodland Vole	SPC	NL	1	2	2				x			x										
MA	Myotis septentrionalis	Northern Myotis	SPC	NL	5	10	9		x	x	x	x	x	x	x								x	x
MA	Pipistrellus subflavus	Eastern Pipistrelle	SPC	NL	7	13	7		x		x		x	x	x			x					x	
MA	Reithrodontomys megalotis	Western Harvest Mouse	NL	NL	10	2	4	x							x			x					x	
MA	Spermophilus franklinii	Franklin's Ground Squirrel	NL	NL	23	0	5								x			x				x	x	x
MA	Spilogale putorius	Eastern Spotted Skunk	THR	NL	19	0	8		x		x		x	x	x			x				x	x	
MA	Taxidea taxus	American Badger	NL	NL	24	0	7	x	x			x		x	x			x					x	
MO	Actinonaias ligamentina	Mucket mussel	THR	NL	11	9	2												x	x				
MO	Actinonaias ligamentina	Mucket mussel	THR	NL	11	13	2												x	x				
MO	Alasmidonta marginata	Elktoe	THR	NL	7	17	2												x	x				
MO	Arcidens confragosus	Rock Pocketbook	END	NL	3	17	1													x				
MO	Cumberlandia monodonta	Spectaclecase	THR	CAND	3	0	1													x				
MO	Cyclonaias tuberculata	Purple Wartyback	THR	NL	5	4	1													x				
MO	Ellipsaria lineolata	Butterfly	THR	NL	4	22	1													x				
MO	Elliptio crassidens	Elephant-ear	END	NL	3	9	1													x				
MO	Elliptio dilatata	Spike	SPC	NL	10	30	2												x	x				
MO	Epioblasma triquetra	Snuffbox	THR	NL	3	0	1													x				
MO	Fusconaia ebena	Ebonyshell	END	NL	4	27	1													x				
MO	Lampsilis higginsii	Higgins Eye	END	END	4		1													x				
MO	Lampsilis teres	Yellow Sandshell	END	NL	3	14	1													x				
MO	Lasmigona compressa	Creek Heelsplitter	SPC	NL	24	6	1												x					

Blufflands ECS Subsection – Species of greatest conservation need (SGCN) by habitatat (cont'd)

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
MO	Lasmigona costata	Fluted-shell	SPC	NL	12	20	2												x	x				
MO	Ligumia recta	Black Sandshell	SPC	NL	25	54	2												x	x				
MO	Megalonaias nervosa	Washboard	THR	NL	3	22	1													x				
MO	Obovaria olivaria	Hickorynut	SPC	NL	5	74	1													x				
MO	Plethobasus cyphyus	Sheepnose	END	CAND	4	3	1													x				
MO	Pleurobema coccineum	Round Pigtoe	THR	NL	6	44	2												x	x				
MO	Quadrula fragosa	Winged Mapleleaf	END	END	4	1	1													x				
MO	Quadrula metanevra	Monkeyface	THR	NL	10	33	2												x	x				
MO	Quadrula nodulata	Wartyback	END	NL	5	18	1													x				
MO	Simpsonaias ambigua	Salamander Mussel	THR	NL	4	0	1													x				
MO	Tritogonia verrucosa	Pistolgrip	THR	NL	5	12	1													x				
MO	Truncilla donaciformis	Fawnsfoot	NL	NL	5	21	1													x				
MO	Venustaconcha ellipsiformis	Ellipse	THR	NL	8	18	1												x					
MO	Vertigo hubrichti variabilis n. subsp.	Variable Pleistocene Vertigo	THR	NL	1	0	1							x										
RE	Apalone mutica	Smooth Softshell	SPC	NL	3	37	2													x	x			
RE	Chelydra serpentina	Common Snapping Turtle	SPC	NL	25	0	5									x	x		x	x				x
RE	Clemmys insculpta	Wood Turtle	THR	NL	11	15	1												x					
RE	Cnemidophorus sexlineatus	Six-lined Racerunner	NL	NL	3	0	4								x			x			x		x	
RE	Coluber constrictor	Eastern Racer	SPC	NL	5	19	3								x			x					x	
RE	Crotalus horridus	Timber Rattlesnake	THR	NL	3	134	5							x	x			x			x		x	
RE	Elaphe obsoleta	Eastern Rat Snake	SPC	NL	1	2	3							x				x					x	
RE	Elaphe vulpina	Eastern Fox Snake	NL	NL	9	44	6	x			x			x	x			x					x	
RE	Emydoidea blandingii	Blanding's Turtle	THR	NL	13	26	7								x		x	x	x	x		x		x
RE	Eumeces fasciatus	Five-lined Skink	SPC	NL	3	6	5							x	x			x			x		x	
RE	Heterodon nasicus	Western Hognose Snake	SPC	NL	9	0	2								x			x						
RE	Heterodon platirhinos	Eastern Hognose Snake	NL	NL	6	12	7				x	x		x	x			x			x		x	
RE	Lampropeltis triangulum	Milk Snake	NL	NL	6	61	4		x					x				x					x	
RE	Liochlorophis vernalis	Smooth Green Snake	NL	NL	15	0	3								x			x					x	
RE	Pituophis catenifer	Gopher Snake	SPC	NL	7	28	4								x			x			x		x	
RE	Sistrurus catenatus	Eastern Massasauga	END	CAND	1	0	7				x				x				x	x		x	x	x

Blufflands ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
SP	Metaphidippus arizonensis	A Jumping Spider	SPC	NL	4	3	1												x					
SP	Phidippus apacheanus	A Jumping Spider	SPC	NL	1	0	1												x					
SP	Sassacus papenhoei	A Jumping Spider	SPC	NL	1	1	2				x								x					

"END" referes to endangered, "THR" refers to threatened, "SPC" refers to special concern, "NL" refers to not listed, and "CAND" referes to candidate species

Key habitats are in bold

Source: DNR

Oak Savanna ECS Subsection – Species of greatest conservation need (SGCN) by habitatat

Oak Savanna ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
AM	Acris crepitans	Northern Cricket Frog	END	NL	6	0	3													x	x			x
AM	Necturus maculosus	Common Mudpuppy	NL	NL	14	0	3									x			x	x				
BI	Ammodramus henslowii	Henslow's Sparrow	END	NL	7	1	3								x			x						x
BI	Ammodramus savannarum	Grasshopper Sparrow	NL	NL	14	9	3								x			x					x	
BI	Arenaria interpres	Ruddy Turnstone	NL	NL	20	0	2														x			x
BI	Asio flammeus	Short-eared Owl	SPC	NL	11	1	5			x					x			x				x		x
BI	Bartramia longicauda	Upland Sandpiper	NL	NL	19	12	6	x							x			x				x	x	x
BI	Buteo lineatus	Red-shouldered Hawk	SPC	NL	12	0	3				x		x	x										
BI	Buteo swainsoni	Swainson's Hawk	NL	NL	6	0	2								x			x						
BI	Calidris alpina	Dunlin	NL	NL	24	0	2														x			x
BI	Calidris fuscicollis	White-rumped Sandpiper	NL	NL	20	0	2														x			x
BI	Calidris pusilla	Semipalmated Sandpiper	NL	NL	25	0	2														x			x
BI	Catharus fuscescens	Veery	NL	NL	22	2	5			x	x	x	x	x										
BI	Chordeiles minor	Common Nighthawk	NL	NL	25	0	2		x												x			
BI	Circus cyaneus	Northern Harrier	NL	NL	25	1	6			x					x			x				x	x	x
BI	Cistothorus palustris	Marsh Wren	NL	NL	20	2	4			x							x					x		x
BI	Cistothorus platensis	Sedge Wren	NL	NL	25	6	5			x					x			x				x		x
BI	Coccyzus erythropthalmus	Black-billed Cuckoo	NL	NL	25	5	6				x	x	x	x								x	x	
BI	Contopus virens	Eastern Wood-pewee	NL	NL	25	21	5				x	x	x	x				x						
BI	Dendroica cerulea	Cerulean Warbler	SPC	NL	10	1	2				x			x										
BI	Dolichonyx oryzivorus	Bobolink	NL	NL	25	9	6	x							x			x				x	x	x
BI	Empidonax minimus	Least Flycatcher	NL	NL	25	0	4				x	x	x	x										
BI	Empidonax traillii	Willow Flycatcher	NL	NL	13	2	3															x	x	x
BI	Empidonax virescens	Acadian Flycatcher	SPC	NL	6	5	2				x			x										
BI	Gallinula chloropus	Common Moorhen	SPC	NL	7	0	2										x							x
BI	Hylocichla mustelina	Wood Thrush	NL	NL	20	9	3					x	x	x										
BI	Ixobrychus exilis	Least Bittern	NL	NL	16	0	3										x					x		x
BI	Lanius ludovicianus	Loggerhead Shrike	THR	NL	10	41	3								x			x					x	
BI	Limnodromus griseus	Short-billed Dowitcher	NL	NL	22	0	1																	x
BI	Limosa haemastica	Hudsonian Godwit	NL	NL	18	0	1																	x

Oak Savanna ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
BI	Melanerpes erythrocephalus	Red-headed Woodpecker	NL	NL	22	3	8	x	x		x		x	x	x			x					x	
BI	Melospiza georgiana	Swamp Sparrow	NL	NL	25	2	3			x												x		x
BI	Pheucticus ludovicianus	Rose-breasted Grosbeak	NL	NL	25	20	5				x	x	x	x				x						
BI	Pluvialis dominica	American Golden-plover	NL	NL	24	0	2														x			x
BI	Podiceps grisegena	Red-necked Grebe	NL	NL	17	0	2										x							x
BI	Podiceps nigricollis	Eared Grebe	NL	NL	9	0	1										x							
BI	Protonotaria citrea	Prothonotary Warbler	NL	NL	6	0	2				x									x				
BI	Rallus limicola	Virginia Rail	NL	NL	23	0	3										x					x		x
BI	Recurvirostra americana	American Avocet	NL	NL	16	0	2														x			x
BI	Scolopax minor	American Woodcock	NL	NL	22	1	4						x		x							x	x	
BI	Seiurus aurocapillus	Ovenbird	NL	NL	22	10	4				x	x	x	x										
BI	Sphyrapicus varius	Yellow-bellied Sapsucker	NL	NL	23	3	4				x	x	x	x										
BI	Spiza americana	Dickcissel	NL	NL	11	3	4	x							x			x					x	
BI	Spizella pusilla	Field Sparrow	NL	NL	13	10	3								x			x					x	
BI	Stelgidopteryx serripennis	Northern Rough-winged Swallow	NL	NL	25	0	3								x				x		x			
BI	Sturnella magna	Eastern Meadowlark	NL	NL	20	4	2								x			x						
BI	Toxostoma rufum	Brown Thrasher	NL	NL	25	4	2		x														x	
BI	Tringa melanoleuca	Greater Yellowlegs	NL	NL	25	0	2														x			x
BI	Tryngites subruficollis	Buff-breasted Sandpiper	NL	NL	23	0	4	x	x						x			x						
BI	Vireo bellii	Bell's Vireo	NL	NL	6	0	2															x	x	
FI	Campostoma oligolepis	Largescale Stoneroller	NL	NL	5	3	1												x					
FI	Clinostomus elongatus	Redside Dace	NL	NL	3	2	1												x					
FI	Erimystax x-punctata	Gravel Chub	SPC	NL	3	0	1												x					
FI	Etheostoma microperca	Least Darter	SPC	NL	9	14	2									x			x					
FI	Lampetra appendix	American Brook Lamprey	NL	NL	7	9	1												x					
FI	Lythrurus umbratilis	Redfin Shiner	NL	NL	3	3	1												x					
FI	Macrhybopsis aestivalis	speckled chub	NL	NL	5	1	2												x	x				
FI	Moxostoma duquesnei	Black Redhorse	NL	NL	3	3	1												x					
FI	Notropis nubilus	Ozark Minnow	SPC	NL	3	39	1												x					
FI	Noturus exilis	Slender Madtom	SPC	NL	1	3	1												x					

Oak Savanna ECS Subsection – Species of greatest conservation need (SGCN) by habitatat (cont'd)

Oak Savanna ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name (AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders)	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	**Grassland**	Lake- Deep	Lake- Shallow	**Prairie**	**River- Headwater to large**	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	**Shrub/woodland- Upland**	**Wetland- Non-forest**
FI	Phenacobius mirabilis	Suckermouth Minnow	NL	NL	4	12	1												x					
FI	Scaphirhynchus platorynchus	Shovelnose Sturgeon	NL	NL	4	0	2												x	x				
IN	Aflexia rubranura	Red Tailed Prairie Leafhopper	SPC	NL	10	0	1											x						
IN	Atrytone arogos	Arogos Skipper	SPC	NL	9	0	1											x						
IN	Euphyes bimacula illinois	Two-spotted Skipper	NL	NL	7	0	1																	x
IN	Hesperia ottoe	Ottoe Skipper	THR	NL	6	0	1											x						
IN	Oarisma powesheik	Powesheik Skipper	SPC	NL	6	0	1											x						
IN	Papaipema beeriana	Blazing Star Stem Borer	NL	NL	9	0	1											x						
IN	Speyeria idalia	Regal Fritillary	SPC	NL	11	0	1											x						
MA	Microtus ochrogaster	Prairie Vole	SPC	NL	12	3	4	x							x			x					x	
MA	Mustela nivalis	Least Weasel	SPC	NL	12	0	8	x				x		x	x			x			x	x		x
MA	Pipistrellus subflavus	Eastern Pipistrelle	SPC	NL	7	0	7		x		x		x	x	x			x					x	
MA	Reithrodontomys megalotis	Western Harvest Mouse	NL	NL	10	1	4	x							x			x					x	
MA	Reithrodontomys megalotis	Western Harvest Mouse	NL	NL	10	4	4	x							x			x					x	
MA	Spermophilus franklinii	Franklin's Ground Squirrel	NL	NL	23	0	5								x			x				x	x	x
MA	Spilogale putorius	Eastern Spotted Skunk	THR	NL	19	0	8		x		x		x	x	x			x				x	x	
MA	Taxidea taxus	American Badger	NL	NL	24	0	7	x	x			x		x	x			x					x	
MO	Actinonaias ligamentina	Mucket mussel	THR	NL	11	3	2												x	x				
MO	Actinonaias ligamentina	Mucket mussel	THR	NL	11	4	2												x	x				
MO	Elliptio dilatata	Spike	SPC	NL	10	18	2												x	x				
MO	Lasmigona compressa	Creek Heelsplitter	SPC	NL	24	42	1												x					
MO	Lasmigona costata	Fluted-shell	SPC	NL	12	7	2												x	x				
MO	Ligumia recta	Black Sandshell	SPC	NL	25	3	2												x	x				
MO	Plethobasus cyphyus	Sheepnose	END	CAND	4	1	1													x				
MO	Pleurobema coccineum	Round Pigtoe	THR	NL	6	8	2												x	x				
MO	Quadrula metanevra	Monkeyface	THR	NL	10	1	2												x	x				
MO	Venustaconcha ellipsiformis	Ellipse	THR	NL	8	10	1												x					
RE	Chelydra serpentina	Common Snapping Turtle	SPC	NL	25	0	5									x	x		x	x				x
RE	Clemmys insculpta	Wood Turtle	THR	NL	11	16	1												x					
RE	Coluber constrictor	Eastern Racer	SPC	NL	5	0	3								x			x					x	

Oak Savanna ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name (AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders)	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	**Grassland**	Lake- Deep	Lake- Shallow	**Prairie**	**River- Headwater to large**	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	**Shrub/woodland- Upland**	**Wetland- Non-forest**
RE	Elaphe vulpina	Eastern Fox Snake	NL	NL	9	6	6	x			x			x	x			x					x	
RE	Emydoidea blandingii	Blanding's Turtle	THR	NL	13	12	7								x		x	x	x	x		x		x
RE	Heterodon nasicus	Western Hognose Snake	SPC	NL	9	0	2								x			x						
RE	Liochlorophis vernalis	Smooth Green Snake	NL	NL	15	0	3								x			x					x	
RE	Pituophis catenifer	Gopher Snake	SPC	NL	7	2	4								x			x			x		x	

"END" referes to endangered, "THR" refers to threatened, "SPC" refers to special concern, "NL" refers to not listed, and "CAND" referes to candidate species

Key habitats are in bold

Source: DNR

Rochester Plateau ECS Subsection – Species of greatest conservation need (SGCN) by habitatat

Rochester Plateau ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
AM	Acris crepitans	Northern Cricket Frog	END	NL	6	0	3													x	x			x
AM	Necturus maculosus	Common Mudpuppy	NL	NL	14	0	3									x			x	x				
AM	Rana palustris	Pickerel Frog	NL	NL	2	6	4				x								x			x		x
BI	Ammodramus henslowii	Henslow's Sparrow	END	NL	7	1	3								x			x						x
BI	Ammodramus savannarum	Grasshopper Sparrow	NL	NL	14	2	3								x			x					x	
BI	Arenaria interpres	Ruddy Turnstone	NL	NL	20	0	2														x			x
BI	Bartramia longicauda	Upland Sandpiper	NL	NL	19	2	6	x							x			x				x	x	x
BI	Buteo lineatus	Red-shouldered Hawk	SPC	NL	12	1	3				x		x	x										
BI	Calidris alpina	Dunlin	NL	NL	24	0	2														x			x
BI	Calidris fuscicollis	White-rumped Sandpiper	NL	NL	20	0	2														x			x
BI	Calidris pusilla	Semipalmated Sandpiper	NL	NL	25	0	2														x			x
BI	Caprimulgus vociferus	Whip-poor-will	NL	NL	21	0	2					x		x										
BI	Catharus fuscescens	Veery	NL	NL	22	4	5			x	x	x	x	x										
BI	Chordeiles minor	Common Nighthawk	NL	NL	25	0	2		x												x			
BI	Circus cyaneus	Northern Harrier	NL	NL	25	0	6			x					x			x				x	x	x
BI	Cistothorus palustris	Marsh Wren	NL	NL	20	0	4			x							x					x		x
BI	Cistothorus platensis	Sedge Wren	NL	NL	25	3	5			x					x			x				x		x
BI	Coccyzus erythropthalmus	Black-billed Cuckoo	NL	NL	25	0	6				x	x	x	x								x	x	
BI	Contopus virens	Eastern Wood-pewee	NL	NL	25	20	5				x	x	x	x				x						
BI	Dendroica cerulea	Cerulean Warbler	SPC	NL	10	3	2				x			x										
BI	Dolichonyx oryzivorus	Bobolink	NL	NL	25	5	6	x							x			x				x	x	x
BI	Empidonax minimus	Least Flycatcher	NL	NL	25	2	4				x	x	x	x										
BI	Empidonax traillii	Willow Flycatcher	NL	NL	13	2	3															x	x	x
BI	Empidonax virescens	Acadian Flycatcher	SPC	NL	6	1	2				x			x										
BI	Gallinula chloropus	Common Moorhen	SPC	NL	7	0	2										x							x
BI	Hylocichla mustelina	Wood Thrush	NL	NL	20	7	3					x	x	x										
BI	Lanius ludovicianus	Loggerhead Shrike	THR	NL	10	27	3								x			x					x	
BI	Limnodromus griseus	Short-billed Dowitcher	NL	NL	22	0	1																	x
BI	Limosa haemastica	Hudsonian Godwit	NL	NL	18	0	1																	x
BI	Melanerpes erythrocephalus	Red-headed Woodpecker	NL	NL	22	1	8	x	x		x		x	x	x			x					x	

Rochester Plateau ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
BI	Melospiza georgiana	Swamp Sparrow	NL	NL	25	2	3			x												x		x
BI	Pheucticus ludovicianus	Rose-breasted Grosbeak	NL	NL	25	6	5				x	x	x	x				x						
BI	Pluvialis dominica	American Golden-plover	NL	NL	24	0	2														x			x
BI	Protonotaria citrea	Prothonotary Warbler	NL	NL	6	0	2				x									x				
BI	Rallus limicola	Virginia Rail	NL	NL	23	0	3															x		x
BI	Recurvirostra americana	American Avocet	NL	NL	16	0	2														x			x
BI	Scolopax minor	American Woodcock	NL	NL	22	0	4						x		x							x	x	
BI	Seiurus aurocapillus	Ovenbird	NL	NL	22	17	4				x	x	x	x										
BI	Seiurus motacilla	Louisiana Waterthrush	SPC	NL	5	0	2				x								x					
BI	Sphyrapicus varius	Yellow-bellied Sapsucker	NL	NL	23	3	4				x	x	x	x										
BI	Spiza americana	Dickcissel	NL	NL	11	3	4	x							x			x					x	
BI	Spizella pusilla	Field Sparrow	NL	NL	13	8	3								x			x					x	
BI	Stelgidopteryx serripennis	Northern Rough-winged Swallow	NL	NL	25	2	3								x				x		x			
BI	Sturnella magna	Eastern Meadowlark	NL	NL	20	3	2								x			x						
BI	Toxostoma rufum	Brown Thrasher	NL	NL	25	0	2		x														x	
BI	Tringa melanoleuca	Greater Yellowlegs	NL	NL	25	0	2														x			x
BI	Tryngites subruficollis	Buff-breasted Sandpiper	NL	NL	23	0	4	x	x						x			x						
BI	Vermivora pinus	Blue-winged Warbler	NL	NL	6	4	4						x	x				x					x	
BI	Vireo bellii	Bell's Vireo	NL	NL	6	0	2															x	x	
FI	Ammocrypta asprella	Crystal Darter	SPC	NL	3	0	2												x	x				
FI	Campostoma oligolepis	Largescale Stoneroller	NL	NL	5	41	1												x					
FI	Clinostomus elongatus	Redside Dace	NL	NL	3	7	1												x					
FI	Erimystax x-punctata	Gravel Chub	SPC	NL	3	25	1												x					
FI	Etheostoma microperca	Least Darter	SPC	NL	9	0	2									x			x					
FI	Lampetra appendix	American Brook Lamprey	NL	NL	7	39	1												x					
FI	Lythrurus umbratilis	Redfin Shiner	NL	NL	3	2	1												x					
FI	Macrhybopsis aestivalis	speckled chub	NL	NL	5	0	2												x	x				
FI	Moxostoma duquesnei	Black Redhorse	NL	NL	3	22	1												x					
FI	Notropis nubilus	Ozark Minnow	SPC	NL	3	18	1												x					
FI	Phenacobius mirabilis	Suckermouth Minnow	NL	NL	4	24	1												x					

Rochester Plateau ECS Subsection – Species of greatest conservation need (SGCN) by habitatat (cont'd)

Rochester Plateau ECS Subsection - Species in greatest conservation need (SGCN) by habitat

Taxa	Scientific Name	Common Name	State Legal	Fed Legal	# of subsections	# of occurrences	# of habitats	Cropland	Developed	Forest- Lowland Conifer	Forest- Lowland Deciduous	Forest- Upland Conifer	Forest- Upland Deciduous (Aspen)	Forest- Upland Deciduous (Hardwood)	Grassland	Lake- Deep	Lake- Shallow	Prairie	River- Headwater to large	River- Very Large	Shoreline-dunes-cliff/talus	Shrub- Lowland	Shrub/woodland- Upland	Wetland- Non-forest
	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
IN	Aflexia rubranura	Red Tailed Prairie Leafhopper	SPC	NL	10	0	1											x						
IN	Atrytone arogos	Arogos Skipper	SPC	NL	9	0	1											x						
IN	Euphyes bimacula illinois	Two-spotted Skipper	NL	NL	7	0	1																	x
IN	Hesperia ottoe	Ottoe Skipper	THR	NL	6	0	1											x						
IN	Oarisma powesheik	Powesheik Skipper	SPC	NL	6		1											x						
IN	Papaipema beeriana	Blazing Star Stem Borer	NL	NL	9	0	1											x						
IN	Schinia indiana	Phlox Moth	SPC	NL	5	0	2											x					x	
IN	Speyeria idalia	Regal Fritillary	SPC	NL	11	0	1											x						
MA	Microtus ochrogaster	Prairie Vole	SPC	NL	12	0	4	x							x			x					x	
MA	Pipistrellus subflavus	Eastern Pipistrelle	SPC	NL	7	5	7		x		x		x	x	x			x					x	
MA	Reithrodontomys megalotis	Western Harvest Mouse	NL	NL	10	0	4	x							x			x					x	
MA	Spermophilus franklinii	Franklin's Ground Squirrel	NL	NL	23	0	5								x			x				x	x	x
MA	Spilogale putorius	Eastern Spotted Skunk	THR	NL	19	0	8		x		x		x	x	x			x				x	x	
MA	Taxidea taxus	American Badger	NL	NL	24	0	7	x	x			x		x	x			x					x	
MO	Actinonaias ligamentina	Mucket mussel	THR	NL	11	1	2												x	x				
MO	Alasmidonta marginata	Elktoe	THR	NL	7	11	2												x	x				
MO	Elliptio dilatata	Spike	SPC	NL	10	2	2												x	x				
MO	Lasmigona compressa	Creek Heelsplitter	SPC	NL	24	16	1												x					
MO	Lasmigona costata	Fluted-shell	SPC	NL	12	5	2												x	x				
MO	Ligumia recta	Black Sandshell	SPC	NL	25	0	2												x	x				
MO	Pleurobema coccineum	Round Pigtoe	THR	NL	6	0	2												x	x				
MO	Quadrula metanevra	Monkeyface	THR	NL	10	0	2												x	x				
MO	Venustaconcha ellipsiformis	Ellipse	THR	NL	8	27	1												x					
RE	Chelydra serpentina	Common Snapping Turtle	SPC	NL	25	0	5									x	x		x	x				x
RE	Clemmys insculpta	Wood Turtle	THR	NL	11	5	1												x					
RE	Cnemidophorus sexlineatus	Six-lined Racerunner	NL	NL	3	0	4								x			x			x		x	
RE	Coluber constrictor	Eastern Racer	SPC	NL	5	1	3								x			x					x	
RE	Crotalus horridus	Timber Rattlesnake	THR	NL	3	6	5							x	x			x			x		x	
RE	Elaphe vulpina	Eastern Fox Snake	NL	NL	9	10	6	x			x			x	x			x					x	
RE	Emydoidea blandingii	Blanding's Turtle	THR	NL	13	12	7								x		x	x	x	x		x		x

Rochester Plateau ECS Subsection - Species in greatest conservation need (SGCN) by habitat

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	AM = amphibians, BI = birds, FI = fish, IN = insects, MA = mammals, MO = mollusks, RE = reptiles, SP = spiders																							
RE	Heterodon nasicus	Western Hognose Snake	SPC	NL	9	0	2								x			x						
RE	Heterodon platirhinos	Eastern Hognose Snake	NL	NL	6	0	7				x	x		x	x			x			x		x	
RE	Lampropeltis triangulum	Milk Snake	NL	NL	6	4	4		x					x				x					x	
RE	Liochlorophis vernalis	Smooth Green Snake	NL	NL	15	0	3								x			x					x	
RE	Pituophis catenifer	Gopher Snake	SPC	NL	7	0	4								x			x			x		x	
"END" referes to endangered, "THR" refers to threatened, "SPC" refers to special concern, "NL" refers to not listed, and "CAND" referes to candidate species																								
Key habitats are in bold																								
Source: DNR																								

Segment 1 - Archaeological Resources within One-Half Mile of Proposed Centerline

				Route Alternatives															
Site Number	County	Site Name	NRHP Status	1P	1P-001	1P-002	1P-003	1P-004	1P-005	1P-006	1P-007	1P-008	1P-009	1B-001	1B-003	1B-005	1A-001	1A-003	1A-004
21DKaj	Dakota	John M. Bell Sod Tavern	No	X	X	X	X	X	X	X	X	X	X			X			
21DKc	Dakota	J. W. Thompson	No											X	X		X	X	X
21DKf	Dakota	Hampton Mill	No	X	X	X	X	X	X	X	X	X	X			X			
21GD0140	Goodhue	Marion Schmidt	No	X	X	X		X	X	X	X	X							
21GD0141	Goodhue	Doffing	No	X		X		X	X	X	X	X							
21GD0175	Goodhue	Lake Byllesby IV	No		X	X	X												
21GDao	Goodhue	Fagen	No											X	X		X	X	X
21GDw	Goodhue	Spring Creek	No											X	X	X	X	X	X
21GDah	Goodhue	Finseth Station	No											X	X		X	X	X
21GDba	Goodhue	Cascade	No											X	X		X	X	X
			Total number of sites	4	4	5	3	4	4	4	4	4	2	5	5	3	5	5	5

Segment 1 - Historical Resources within One-Half Mile of Proposed Centerline

				Route Alternatives																
Inventory Number	County	Property Name	NRHP Status	1P	1P-001	1P-002	1P-003	1P-004	1P-005	1P-006	1P-007	1P-008	1P-009	1B-001	1B-003	1B-005	1A-001	1A-003	1A-004	1A
DK-HMC-001	Dakota	St. Mathias Catholic Church		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-002	Dakota	Thurme Barn		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-003	Dakota	M. Doffing Building		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-004	Dakota	Reinhardy Building		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-005	Dakota	cafe		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-006	Dakota	State Bank of Hampton		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-007	Dakota	Daleiden Furniture		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-008	Dakota	commercial building		X	X	X	X	X	X	X	X	X	X			X				
DK-HMC-009	Dakota	Turek Blacksmith Shop		X	X	X	X	X	X	X	X	X	X			X				
DK-HMT-001	Dakota	Wales Cabin		X	X	X	X	X	X	X	X	X	X			X				
DK-HMT-002	Dakota	Kranz Farmstead		X	X	X	X	X	X	X	X	X								
DK-HMT-003	Dakota	Pederson Farmhouse		X	X	X	X	X	X	X	X	X		X	X		X	X	X	X
DK-RDC-001	Dakota	bank											X			X				
DK-RDC-002	Dakota	Hotel Randolph											X			X				
DK-RDC-003	Dakota	GTA Elevator											X	X	X	X	X	X	X	X
DK-RDC-004	Dakota	United Methodist Church											X	X	X	X	X	X	X	X
DK-RDC-005	Dakota	Randolph Baptist Church												X	X		X	X	X	X
DK-RDC-006	Dakota	Bridge No. L3208												X	X		X	X	X	X
DK-RDC-007	Dakota	Bridge No. 6525											X			X				
DK-RDT-001	Dakota	barn		X	X	X	X	X	X	X	X	X								
DK-RDT-002	Dakota	barn		X	X	X	X	X	X	X	X	X								
DK-RDT-004	Dakota	Byllesby Dam			X	X	X													
DK-VMT-015	Dakota	Geifer Farmstead												X	X		X	X	X	X
DK-VMT-017	Dakota	farmstead		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GD-CFC-001	Goodhue	First English Lutheran Church		X	X	X		X	X	X	X	X								
GD-CFC-006	Goodhue	house		X		X		X	X	X	X	X								
GD-CFC-020	Goodhue	gas station		X		X		X	X	X	X	X								
GD-CFC-021	Goodhue	Edward Bremer House		X	X	X		X	X	X	X	X								
GD-CFC-025	Goodhue	house		X	X	X		X	X	X	X	X								
GD-CFC-027	Goodhue	house		X		X		X	X	X	X	X								
GD-CFC-028	Goodhue	Alonzo T. Conley House		X		X		X	X	X	X	X								
GD-CFC-033	Goodhue	Arault House		X	X	X		X	X	X	X	X								
GD-CFC-034	Goodhue	band shell		X		X		X	X	X	X	X								
GD-CFC-039	Goodhue	St. Paul's Evangelical Lutheran Church		X		X		X	X	X	X	X								
GD-CFC-051	Goodhue	Cannon Valley Fair Ground		X				X	X	X	X	X								
GD-CFC-051	Goodhue	Cannon Valley Fair Ground		X				X	X	X	X	X								
GD-CFC-095	Goodhue	Bridge No. 5843		X		X		X	X	X	X	X								
GD-CFT-016	Goodhue	house		X	X	X		X	X	X	X	X								
GD-CGR-004	Goodhue	grain elevator															X			
GD-CGR-005	Goodhue	Bombay Store															X			
GD-CGR-006	Goodhue	chesse factory												X	X	X	X	X	X	X
GD-CGR-007	Goodhue	grain elevator															X			
GD-CGR-008	Goodhue	feed mill															X			
GD-DNC-002	Goodhue	carpenter shop												X	X		X	X	X	X
GD-DNC-003	Goodhue	house												X	X		X	X	X	X
GD-DNC-004	Goodhue	Dennison Lutheran Church												X	X		X	X	X	X
GD-DNC-005	Goodhue	house												X	X		X	X	X	X
GD-DNC-006	Goodhue	farmstead												X	X		X	X	X	X
GD-DNC-007	Goodhue	house												X	X		X	X	X	X

Segment 2 - Archaeological Resources within One-Half Mile of Proposed Centerline

				Route Alternatives													
Site Number	County	Site Name	NRHP Status	2P	2B-001	2A-001	2A-002	2A-003	2A	2C3-001-2	2C3-002-2	2C3-003-2	2C3-004-2	2C3-005-2	2C3-006-2	2C3-007-2	2C3-008-2
21GD0248	Goodhue	Goodhue Good View		X	X						X			X	X	X	X
21GD0249	Goodhue	O'Brien		X	X					X				X	X		X
21GDs	Goodhue	Pine Island Mill				X	X	X	X								
21GDt	Goodhue	Howard and Haggard Mill								X							
21OL0027	Olmsted	Traxler I. F.		X	X					X				X	X		X
21OL0028	Olmsted	Middle Zumbro Terrace		X	X					X				X	X		X
21OL0031	Olmsted	Middle Zumbro I. F.		X	X					X				X	X		X
21OL0041	Olmsted	Grassle/Kaul/Schultz Farmstead		X	X	X	X	X	X	X	X	X	X	X	X	X	X
21OLh	Olmsted	Durango			X												
21OLk	Olmsted	New Haven			X	X	X	X	X								
21OLs	Olmsted	Douglas			X		X	X	X								
			Total number of sites	6	9	3	4	4	4	6	2	1	1	6	6	2	6

Segment 2 Historical Resoruces within One-Half Mile of Proposed Centerline

				Route Alternatives													
Inventory Number	County	Property Name	NRHP Status	2P	2B-001	2A-001	2A-002	2A-003	2A	2C3-001-2	2C3-002-2	2C3-003-2	2C3-004-2	2C3-005-2	2C3-006-2	2C3-007-2	2C3_008_2
GD-PIC-002	Goodhue	Newhouse Building								X							
GD-PIC-003	Goodhue	L.F. Irish Building								X							
GD-PIC-004	Goodhue	IOOF Building								X							
GD-PIC-005	Goodhue	Farmers Co-op Creamery & Cheese Factory								X							
GD-PIC-006	Goodhue	Gibson Lumber Company								X							
GD-PIC-007	Goodhue	Pine Island Farmers Elevator								X							
GD-PIC-008	Goodhue	elevator								X							
GD-PIC-009	Goodhue	fertilizer warehouse								X							
GD-PIC-010	Goodhue	Koening Electric and Locker Plant								X							
GD-PIC-016	Goodhue	commercial buildings								X							
GD-PIC-027	Goodhue	United Methodist Church								X							
GD-PIC-028	Goodhue	Grace Episcopal Church								X							
GD-PIC-029	Goodhue	house								X							
GD-PIC-030	Goodhue	house								X							
GD-PIC-031	Goodhue	house								X							
GD-PIC-032	Goodhue	house								X							
GD-PIC-033	Goodhue	house								X							
GD-PIC-035	Goodhue	house								X							
GD-PIC-036	Goodhue	A.B. Collins House								X							
GD-PIC-038	Goodhue	house								X							
GD-PIC-039	Goodhue	grain elevators								X							
GD-PIC-040	Goodhue	house								X							
GD-PIC-041	Goodhue	foot bridge								X							
GD-PIC-042	Goodhue	Pine Island Water Pump House								X							
GD-PIC-043	Goodhue	Pine Island School								X							
GD-PIC-044	Goodhue	Pine Island Library								X							
GD-PIC-048	Goodhue	house								X							
GD-PIC-054	Goodhue	Pine Island				X	X	X	X								
GD-PIC-055	Goodhue	Bridge No. 757								X							
GD-PIC-069	Goodhue	W. W. Jewell Drug Store								X							
GD-PIT-007	Goodhue	St. Peter's Evangelical Lutheran Church										X	X				
GD-PIT-009	Goodhue	farmhouse										X	X				
GD-PIT-010	Goodhue	Pine Island Township Hall										X	X				
GD-PIT-011	Goodhue	George Baslington Farmhouse	Registered									X	X				
GD-PIT-012	Goodhue	barn										X	X		X		
GD-PIT-013	Goodhue	District School No. 18				X	X	X	X						X		
GD-PIT-014	Goodhue	farmstead				X	X	X	X								
GD-PIT-015	Goodhue	farmhouse				X	X	X	X						X		
GD-PIT-016	Goodhue	farmstead		X	X	X	X	X	X	X	X			X		X	X
GD-PIT-018	Goodhue	farmhouse														X	
GD-PIT-019	Goodhue	farmhouse														X	
GD-PIT-021	Goodhue	farmhouse				X	X	X	X								
GD-PIT-022	Goodhue	R.J. Robinson Farmstead								X							
GD-PIT-024	Goodhue	District School No. 76									X						
GD-PIT-026	Goodhue	farmstead		X	X					X				X	X		X
GD-PIT-027	Goodhue	Swarthoat Farmstead		X	X					X				X	X		X
GD-PIT-028	Goodhue	Edison Barn								X							
GD-PIT-029	Goodhue	Manthei Farmstead		X	X					X	X			X	X	X	X
GD-PIT-030	Goodhue	farmstead		X	X					X	X			X	X	X	X
GD-PIT-031	Goodhue	Dickinson Farmstead		X	X	X	X	X	X	X	X			X	X	X	X
GD-PIT-032	Goodhue	Walter Farmstead								X							
GD-PIT-033	Goodhue	house								X							
GD-ROS-012	Goodhue	farmhouse										X	X				
OL-CAS-014	Olmsted	farmstead		X						X	X	X	X	X	X	X	X
OL-CAS-015	Olmsted	farmstead		X	X	X	X	X	X	X	X	X	X	X	X	X	X
OL-CAS-016	Olmsted	farmstead		X	X	X	X	X	X	X	X	X	X	X	X	X	X
OL-CAS-017	Olmsted	Chicago and Northwestern Railway (Cascade Twp. Segment)		X	X	X	X	X	X	X	X	X	X	X	X	X	X
OL-CAS-018	Olmsted	Chicago Great Western Railroad (Cascade Twp. Segment)		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Segment 3 - Archaeological Resources wthin One-Half Mile of Proposed Centerline

				Route Alternatives											
Site Number	County	Site Name	NRHP Status	3P	3P-Kellogg	3P-Zumbro-N	3P-Zumbro-S	3P-001	3P-002	3P-003	3P-004	3P-005	3P-006	3P-007	3P-008
21GD0248	Goodhue	Goodhue Good View		X	X	X	X	X	X	X	X	X	X	X	X
21GD0249	Goodhue	O'Brien													
21GDt	Goodhue	Howard and Haggard Mill													
21WB0015	Wabasha	Kellogg I			X										
21WB0043	Wabasha	McDonough			X										
21WB0047	Wabasha	Kachelmyer			X										
21WB0059	Wabasha	Petersen Farm II		X	X	X	X	X	X	X	X	X	X	X	X
21WB0083	Wabasha			X	X	X	X	X	X	X	X	X	X	X	X
21WB0084	Wabasha			X	X	X	X	X	X	X	X	X	X	X	X
21WB0096	Wabasha					X									
21WB0120	Wabasha			X	X	X	X	X	X	X	X	X	X	X	X
21WB0124	Wabasha					X									
21WBh	Wabasha	Fitzgerald		X	X	X	X	X	X	X	X	X	X	X	X
21WBh	Wabasha	Fitzgerald		X	X	X	X	X	X	X	X	X	X	X	X
			Total number of sites	7	10	9	7	7	7	7	7	7	7	7	7

				Route Alternatives									
Site Number	County	Site Name	NRHP Status	3P-009	3P-010	3P-011	3B-003	3A-001	3A-003	3A-004	3A-Cross	3A-Kellogg	3A
21GD0248	Goodhue	Goodhue Good View		X	X	X	X						
21GD0249	Goodhue	O'Brien											
21GDt	Goodhue	Howard and Haggard Mill											
21WB0015	Wabasha	Kellogg I					X					X	
21WB0043	Wabasha	McDonough										X	
21WB0047	Wabasha	Kachelmyer										X	
21WB0059	Wabasha	Petersen Farm II		X	X	X	X	X	X	X	X	X	X
21WB0083	Wabasha			X	X	X		X	X	X	X	X	X
21WB0084	Wabasha			X	X	X		X	X	X	X	X	X
21WB0096	Wabasha							X	X	X		X	X
21WB0120	Wabasha			X	X	X	X	X	X	X	X	X	X
21WB0124	Wabasha						X	X	X	X		X	X
21WBh	Wabasha	Fitzgerald		X	X	X		X	X	X	X	X	X
21WBh	Wabasha	Fitzgerald		X	X	X		X	X	X	X	X	X
			Total number of sites	7	7	7	5	8	8	8	6	11	8

Segment 3 - Archaeological Resources wthin One-Half Mile of Proposed Centerline (cont'd)

				Route Alternatives								
Site Number	County	Site Name	NRHP Status	2C3-001-3a	2C3-001-3b	2C3-002-3	2C3-003-3	2C3-004-3	2C3-005-3	2C3-006-3	2C3-007-3	2C3-008-3
21GD0248	Goodhue	Goodhue Good View				X			X	X	X	X
21GD0249	Goodhue	O'Brien		X	X							
21GDt	Goodhue	Howard and Haggard Mill		X	X							
21WB0015	Wabasha	Kellogg I										
21WB0043	Wabasha	McDonough										
21WB0047	Wabasha	Kachelmyer										
21WB0059	Wabasha	Petersen Farm II		X	X	X	X	X	X	X	X	X
21WB0083	Wabasha			X	X	X	X	X	X	X	X	X
21WB0084	Wabasha			X	X	X	X	X	X	X	X	X
21WB0096	Wabasha						X					
21WB0120	Wabasha			X	X	X	X	X	X	X	X	X
21WB0124	Wabasha						X					
21WBh	Wabasha	Fitzgerald		X	X	X	X	X	X	X	X	X
21WBh	Wabasha	Fitzgerald		X	X	X	X	X	X	X	X	X
			Total number of sites	8	8	7	8	6	7	7	7	7

Segment 3 - Historical Resources wthin One-Half Mile of Proposed Centerline

				Route Alternatives											
Inventory Number	County	Property Name	NRHP Status	3P	3P-Kellogg	3P-Zumbro-N	3P-Zumbro-S	3P-001	3P-002	3P-003	3P-004	3P-005	3P-006	3P-007	3P-008
GD-PIC-002	Goodhue	Newhouse Building													
GD-PIC-003	Goodhue	L.F. Irish Building													
GD-PIC-004	Goodhue	IOOF Building													
GD-PIC-005	Goodhue	Farmers Co-op Creamery & Cheese Factory													
GD-PIC-006	Goodhue	Gibson Lumber Company													
GD-PIC-007	Goodhue	Pine Island Farmers Elevator													
GD-PIC-008	Goodhue	elevator													
GD-PIC-009	Goodhue	fertilizer warehouse													
GD-PIC-010	Goodhue	Koening Electric and Locker Plant													
GD-PIC-016	Goodhue	commercial buildings													
GD-PIC-027	Goodhue	United Methodist Church													
GD-PIC-028	Goodhue	Grace Episcopal Church													
GD-PIC-029	Goodhue	house													
GD-PIC-030	Goodhue	house													
GD-PIC-031	Goodhue	house													
GD-PIC-032	Goodhue	house													
GD-PIC-033	Goodhue	house													
GD-PIC-035	Goodhue	house													
GD-PIC-036	Goodhue	A.B. Collins House													
GD-PIC-038	Goodhue	house													
GD-PIC-039	Goodhue	grain elevators													
GD-PIC-040	Goodhue	house													
GD-PIC-041	Goodhue	foot bridge													
GD-PIC-042	Goodhue	Pine Island Water Pump House													
GD-PIC-043	Goodhue	Pine Island School													
GD-PIC-044	Goodhue	Pine Island Library													
GD-PIC-048	Goodhue	house													
GD-PIC-055	Goodhue	Bridge No. 757													
GD-PIC-069	Goodhue	W. W. Jewell Drug Store													
GD-PIT-007	Goodhue	St. Peter's Evangelical Lutheran Church													
GD-PIT-009	Goodhue	farmhouse													
GD-PIT-010	Goodhue	Pine Island Township Hall													
GD-PIT-011	Goodhue	George Baslington Farmhouse	Registered												
GD-PIT-012	Goodhue	barn													
GD-PIT-013	Goodhue	District School No. 18													
GD-PIT-015	Goodhue	farmhouse													
GD-PIT-016	Goodhue	farmstead		X	X	X	X	X	X	X	X	X	X	X	X
GD-PIT-018	Goodhue	farmhouse						X		X					
GD-PIT-019	Goodhue	farmhouse						X							
GD-PIT-022	Goodhue	R.J. Robinson Farmstead													
GD-PIT-024	Goodhue	District School No. 76		X	X	X	X		X	X	X	X	X	X	X
GD-PIT-025	Goodhue	farmhouse													X
GD-PIT-026	Goodhue	farmstead													
GD-PIT-027	Goodhue	Swarthoat Farmstead													
GD-PIT-028	Goodhue	Edison Barn		X	X	X	X		X		X	X	X	X	X
GD-PIT-029	Goodhue	Manthei Farmstead		X	X	X	X	X	X	X	X	X	X	X	X
GD-PIT-030	Goodhue	farmstead		X	X	X	X	X	X	X	X	X	X	X	X
GD-PIT-031	Goodhue	Dickinson Farmstead		X	X	X	X	X	X	X	X	X	X	X	X
GD-PIT-032	Goodhue	Walter Farmstead		X	X	X	X		X		X	X	X	X	X

Segment 3 - Historical Resources wthin One-Half Mile of Proposed Centerline (cont'd)

				Route Alternatives										
Inventory Number	County	Property Name	NRHP Status	3P-008	3P-009	3P-010	3P-011	3B-003	3A-001	3A-003	3A-004	3A-Cross	3A-Kellogg	3A
GD-PIC-002	Goodhue	Newhouse Building												
GD-PIC-003	Goodhue	L.F. Irish Building												
GD-PIC-004	Goodhue	IOOF Building												
GD-PIC-005	Goodhue	Farmers Co-op Creamery & Cheese Factory												
GD-PIC-006	Goodhue	Gibson Lumber Company												
GD-PIC-007	Goodhue	Pine Island Farmers Elevator												
GD-PIC-008	Goodhue	elevator												
GD-PIC-009	Goodhue	fertilizer warehouse												
GD-PIC-010	Goodhue	Koening Electric and Locker Plant												
GD-PIC-016	Goodhue	commercial buildings												
GD-PIC-027	Goodhue	United Methodist Church												
GD-PIC-028	Goodhue	Grace Episcopal Church												
GD-PIC-029	Goodhue	house												
GD-PIC-030	Goodhue	house												
GD-PIC-031	Goodhue	house												
GD-PIC-032	Goodhue	house												
GD-PIC-033	Goodhue	house												
GD-PIC-035	Goodhue	house												
GD-PIC-036	Goodhue	A.B. Collins House												
GD-PIC-038	Goodhue	house												
GD-PIC-039	Goodhue	grain elevators												
GD-PIC-040	Goodhue	house												
GD-PIC-041	Goodhue	foot bridge												
GD-PIC-042	Goodhue	Pine Island Water Pump House												
GD-PIC-043	Goodhue	Pine Island School												
GD-PIC-044	Goodhue	Pine Island Library												
GD-PIC-048	Goodhue	house												
GD-PIC-055	Goodhue	Bridge No. 757												
GD-PIC-069	Goodhue	W. W. Jewell Drug Store												
GD-PIT-007	Goodhue	St. Peter's Evangelical Lutheran Church							X	X	X	X	X	X
GD-PIT-009	Goodhue	farmhouse							X	X	X	X	X	X
GD-PIT-010	Goodhue	Pine Island Township Hall							X	X	X	X	X	X
GD-PIT-011	Goodhue	George Baslington Farmhouse	Registered						X	X	X	X	X	X
GD-PIT-012	Goodhue	barn							X	X	X	X	X	X
GD-PIT-013	Goodhue	District School No. 18												
GD-PIT-015	Goodhue	farmhouse												
GD-PIT-016	Goodhue	farmstead		X	X	X	X	X						
GD-PIT-018	Goodhue	farmhouse												
GD-PIT-019	Goodhue	farmhouse												
GD-PIT-022	Goodhue	R.J. Robinson Farmstead												
GD-PIT-024	Goodhue	District School No. 76		X	X	X	X	X						
GD-PIT-025	Goodhue	farmhouse		X										
GD-PIT-026	Goodhue	farmstead												
GD-PIT-027	Goodhue	Swarthoat Farmstead												
GD-PIT-028	Goodhue	Edison Barn		X	X	X	X	X						
GD-PIT-029	Goodhue	Manthei Farmstead		X	X	X	X	X						
GD-PIT-030	Goodhue	farmstead		X	X	X	X	X						
GD-PIT-031	Goodhue	Dickinson Farmstead		X	X	X	X	X						
GD-PIT-032	Goodhue	Walter Farmstead		X	X	X	X	X						
GD-PIT-033	Goodhue	house												

Segment 3 - Historical Resources wthin One-Half Mile of Proposed Centerline (cont'd)

				Route Alternatives								
Inventory Number	County	Property Name	NRHP Status	2C3-001-3a	2C3-001-3b	2C3-002-3	2C3-003-3	2C3-004-3	2C3-005-3	2C3-006-3	2C3-007-3	2C3-008-3
GD-PIC-002	Goodhue	Newhouse Building		X	X							
GD-PIC-003	Goodhue	L.F. Irish Building		X	X							
GD-PIC-004	Goodhue	IOOF Building		X	X							
GD-PIC-005	Goodhue	Farmers Co-op Creamery & Cheese Factory		X	X							
GD-PIC-006	Goodhue	Gibson Lumber Company		X	X							
GD-PIC-007	Goodhue	Pine Island Farmers Elevator		X	X							
GD-PIC-008	Goodhue	elevator		X	X							
GD-PIC-009	Goodhue	fertilizer warehouse		X	X							
GD-PIC-010	Goodhue	Koening Electric and Locker Plant		X	X							
GD-PIC-016	Goodhue	commercial buildings		X	X							
GD-PIC-027	Goodhue	United Methodist Church		X	X							
GD-PIC-028	Goodhue	Grace Episcopal Church		X	X							
GD-PIC-029	Goodhue	house		X	X							
GD-PIC-030	Goodhue	house		X	X							
GD-PIC-031	Goodhue	house		X	X							
GD-PIC-032	Goodhue	house		X	X							
GD-PIC-033	Goodhue	house		X	X							
GD-PIC-035	Goodhue	house		X	X							
GD-PIC-036	Goodhue	A.B. Collins House		X	X							
GD-PIC-038	Goodhue	house		X	X							
GD-PIC-039	Goodhue	grain elevators		X	X							
GD-PIC-040	Goodhue	house		X	X							
GD-PIC-041	Goodhue	foot bridge		X	X							
GD-PIC-042	Goodhue	Pine Island Water Pump House		X	X							
GD-PIC-043	Goodhue	Pine Island School		X	X							
GD-PIC-044	Goodhue	Pine Island Library		X	X							
GD-PIC-048	Goodhue	house		X	X							
GD-PIC-055	Goodhue	Bridge No. 757		X	X							
GD-PIC-069	Goodhue	W. W. Jewell Drug Store		X	X							
GD-PIT-007	Goodhue	St. Peter's Evangelical Lutheran Church					X	X				
GD-PIT-009	Goodhue	farmhouse					X	X				
GD-PIT-010	Goodhue	Pine Island Township Hall					X	X				
GD-PIT-011	Goodhue	George Baslington Farmhouse	Registered				X	X				
GD-PIT-012	Goodhue	barn					X	X		X		
GD-PIT-013	Goodhue	District School No. 18								X		
GD-PIT-015	Goodhue	farmhouse								X		
GD-PIT-016	Goodhue	farmstead		X	X	X			X		X	X
GD-PIT-018	Goodhue	farmhouse							X	X	X	
GD-PIT-019	Goodhue	farmhouse							X		X	
GD-PIT-022	Goodhue	R.J. Robinson Farmstead		X	X							
GD-PIT-024	Goodhue	District School No. 76				X				X		X
GD-PIT-025	Goodhue	farmhouse										
GD-PIT-026	Goodhue	farmstead		X	X							
GD-PIT-027	Goodhue	Swarthoat Farmstead		X	X							
GD-PIT-028	Goodhue	Edison Barn		X	X							X
GD-PIT-029	Goodhue	Manthei Farmstead		X	X	X			X	X	X	X
GD-PIT-030	Goodhue	farmstead		X	X	X			X	X	X	X
GD-PIT-031	Goodhue	Dickinson Farmstead		X	X	X			X	X	X	X
GD-PIT-032	Goodhue	Walter Farmstead		X	X							X
GD-PIT-033	Goodhue	house		X	X							

Segment 1 – Houses and ROW Type

				Houses				ROW Type (percent)									
Route	Start	End	ROW (ft)	75 ft	150 ft	300 ft	500 ft	County or Township Road	County or Township Road and Trans-mission Line	Field Line	Field Line and Trans-mission Line	Local Rd	Major Hwy	Major Hwy and Trans-mission Line	Trail	Trans-mission Line	X-Country
1P	Hampton	North Rochester (S)	150	1	14	46	149	4.7%	0.0%	63.0%	0.5%	0.2%	0.5%	1.3%	4.1%	1.0%	24.7%
1P-001	Hampton	North Rochester (S)	150	2	14	44	124	4.9%	0.0%	13.3%	0.0%	0.0%	30.4%	34.2%	0.0%	7.5%	9.7%
1P-002	Hampton	North Rochester (S)	150	2	25	58	142	4.9%	0.0%	12.0%	0.0%	0.0%	34.9%	34.3%	0.0%	7.6%	6.3%
1P-003	Hampton	North Rochester (S)	150	2	15	42	112	1.7%	4.8%	13.5%	0.0%	0.0%	26.8%	33.9%	0.0%	7.4%	11.8%
1P-004	Hampton	North Rochester (S)	150	1	14	47	149	0.0%	0.0%	13.5%	0.0%	0.2%	39.4%	31.6%	0.0%	6.9%	8.4%
1P-005	Hampton	North Rochester (S)	150	1	14	47	150	2.2%	0.0%	12.8%	0.0%	0.0%	39.2%	30.0%	0.0%	6.8%	9.0%
1P-006	Hampton	North Rochester (S)	150	1	14	47	150	0.0%	0.0%	11.7%	0.0%	0.0%	39.3%	35.8%	0.0%	6.8%	6.3%
1P-007	Hampton	North Rochester (S)	150	2	16	49	153	1.9%	0.0%	11.5%	0.0%	0.0%	38.6%	37.3%	0.0%	6.7%	3.9%
1P-008	Hampton	North Rochester (S)	150	1	14	43	133	0.0%	0.0%	12.7%	0.0%	0.0%	37.7%	34.6%	0.0%	6.9%	8.0%
1P-009	Hampton	North Rochester (S)	150	7	27	65	113	4.4%	0.0%	60.6%	0.5%	0.2%	5.2%	1.2%	3.8%	0.0%	24.1%
1B-001	Hampton	North Rochester (S)	150	1	9	22	37	4.7%	0.0%	62.2%	0.5%	0.2%	0.6%	1.3%	4.1%	1.0%	25.4%
1B-003	Hampton	North Rochester (N)	150	1	4	14	22	1.9%	0.0%	23.5%	0.6%	0.3%	55.0%	1.4%	0.0%	1.1%	16.2%
1B-005	Hampton	North Rochester (N)	150	4	11	42	79	16.5%	0.0%	10.7%	0.0%	0.0%	43.7%	17.2%	0.0%	6.1%	5.8%
1A-001	Hampton	North Rochester (N)	150	2	10	21	31	12.8%	0.0%	59.2%	0.0%	0.0%	0.5%	6.9%	4.0%	1.0%	15.6%
1A-003	Hampton	North Rochester (N)	150	1	4	17	25	8.5%	0.0%	58.8%	0.5%	0.2%	0.5%	1.3%	4.1%	1.0%	25.0%
1A-004	Hampton	North Rochester (N)	150	2	7	17	26	15.6%	0.0%	56.9%	0.0%	0.0%	0.6%	0.0%	4.1%	1.8%	20.9%
1A	Hampton	North Rochester (N)	150	1	4	13	21	0.0%	0.0%	12.2%	0.0%	0.0%	40.0%	34.7%	0.0%	6.9%	6.1%

Segment 1 – Human

				Schools	Churches	Cemeteries	Towers	Airports		Hospitals			Nursing Homes	MES Sites	LUST Sites
Route	Start	End	ROW (ft)	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In 1 mile	Number In Route Width	Number In 1/2 miles	Number In 1 mile	Number In Route Width	Number in Route Width	Number in Route Width
1P	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	3
1P-001	Hampton	North Rochester (S)	150	0	0	0	7	0	0	0	0	1	0	1	2
1P-002	Hampton	North Rochester (S)	150	0	0	0	6	0	0	0	1	1	0	1	3
1P-003	Hampton	North Rochester (S)	150	0	0	0	6	0	0	0	0	0	0	1	2
1P-004	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	3
1P-005	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	3
1P-006	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	3
1P-007	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	3
1P-008	Hampton	North Rochester (S)	150	1	0	0	6	0	0	0	1	1	0	1	2
1P-009	Hampton	North Rochester (S)	150	0	2	1	3	1	1	0	0	0	0	1	7
1B-001	Hampton	North Rochester (S)	150	0	1	0	1	0	1	0	0	0	0	1	3
1B-003	Hampton	North Rochester (N)	150	0	1	0	1	0	1	0	0	0	0	1	1
1B-005	Hampton	North Rochester (N)	150	0	1	0	2	1	1	0	0	0	0	0	5
1A-001	Hampton	North Rochester (N)	150	0	1	0	2	0	1	0	0	0	0	1	1
1A-003	Hampton	North Rochester (N)	150	0	1	0	1	0	1	0	0	0	0	2	1
1A-004	Hampton	North Rochester (N)	150	0	1	0	2	0	1	0	0	0	0	1	0
1A	Hampton	North Rochester (N)	150	0	1	0	1	0	1	0	0	0	0	1	1

Segment 1 – Water Resources

				PWI Streams			PWI Basins			Trout Streams			Impaired Streams			Impaired Lakes		
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width
1P	Hampton	North Rochester (S)	150	16	34	22589	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-001	Hampton	North Rochester (S)	150	14	32	21153	0	1	7.05	4	6	5602	1	1	2009	0	1	7.57
1P-002	Hampton	North Rochester (S)	150	16	33	21288	0	1	7.05	4	6	5602	1	2	1484	0	1	7.57
1P-003	Hampton	North Rochester (S)	150	12	26	17490	0	1	7.05	4	6	5602	1	1	1389	0	1	7.57
1P-004	Hampton	North Rochester (S)	150	18	38	26740	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-005	Hampton	North Rochester (S)	150	18	38	26740	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-006	Hampton	North Rochester (S)	150	18	42	25740	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-007	Hampton	North Rochester (S)	150	17	37	23671	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-008	Hampton	North Rochester (S)	150	16	34	22589	0	0	0	4	6	5602	1	2	1484	0	0	0
1P-009	Hampton	North Rochester (S)	150	8	24	20006	0	1	1.99	1	1	1147	4	6	5969	0	0	0
1B-001	Hampton	North Rochester (S)	150	10	24	16186	0	0	0	0	0	0	3	4	3861	0	0	0
1B-003	Hampton	North Rochester (N)	150	10	22	16843	0	0	0	0	0	0	3	4	3861	0	0	0
1B-005	Hampton	North Rochester (N)	150	9	28	24851	0	1	1.99	3	7	5067	4	6	5833	0	0	0
1A-001	Hampton	North Rochester (N)	150	9	29	15792	0	0	0	0	0	0	3	4	3861	0	0	0
1A-003	Hampton	North Rochester (N)	150	9	21	15602	0	0	0	0	0	0	3	4	4606	0	0	0
1A-004	Hampton	North Rochester (N)	150	9	24	15605	0	0	0	0	0	0	3	4	3861	0	0	0
1A	Hampton	North Rochester (N)	150	9	20	14926	0	0	0	0	0	0	3	4	3861	0	0	0

Segment 1 – Water Resources (cont'd)

				Wetlands											FEMA Floodplain			Wildlife Lakes	Shallow Lakes		
				Number Crossed					Number in Route Width	Number > 1000 ft Span	Area (acres) in Route Width	Area (acres) in ROW			Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE IN ROUTE WIDTH	Number Crossed	Number in Route Width	Length (ft) in Route Width
Route	Start	End	ROW (ft)	Emergent	Shrub	Forested	Open	Total			Total	Forested	Non-Forested	Total							
1P	Hampton	North Rochester (S)	150	8	4	0	2	14	43	0	51.3	0.0	9.0	9.0	11	22	225	0	0	5	3.42
1P-001	Hampton	North Rochester (S)	150	8	4	1	1	14	40	0	51.5	0.6	8.0	8.6	5	7	186	0	0	4	3.08
1P-002	Hampton	North Rochester (S)	150	8	4	1	2	15	42	0	54.5	0.6	8.4	9.0	8	14	213	0	0	4	3.08
1P-003	Hampton	North Rochester (S)	150	8	4	2	1	15	43	0	57.0	1.9	8.0	9.9	7	8	182	0	0	4	3.08
1P-004	Hampton	North Rochester (S)	150	8	4	0	2	14	47	0	54.3	0.0	9.1	9.1	12	22	280	0	0	6	3.74
1P-005	Hampton	North Rochester (S)	150	8	4	0	2	14	51	0	55.6	0.0	9.1	9.1	12	22	280	0	0	6	3.74
1P-006	Hampton	North Rochester (S)	150	8	4	0	2	14	42	0	51.6	0.0	9.0	9.0	11	23	254	0	0	5	3.42
1P-007	Hampton	North Rochester (S)	150	8	4	0	2	14	41	0	49.3	0.0	9.0	9.0	12	25	255	0	0	5	2.04
1P-008	Hampton	North Rochester (S)	150	8	4	0	2	14	44	0	51.0	0.0	9.0	9.0	11	23	225	0	0	5	3.42
1P-009	Hampton	North Rochester (S)	150	12	4	1	1	18	65	1	148.5	0.4	16.8	17.2	14	24	220	0	0	3	2.48
1B-001	Hampton	North Rochester (S)	150	12	3	5	1	21	65	0	109.6	4.7	11.8	16.5	6	8	140	0	0	2	2.05
1B-003	Hampton	North Rochester (N)	150	12	3	3	1	19	66	0	106.0	2.6	12.1	14.7	6	8	140	0	0	3	2.22
1B-005	Hampton	North Rochester (N)	150	12	2	4	1	19	83	1	198.7	4.0	15.3	19.4	11	22	200	0	0	1	1.00
1A-001	Hampton	North Rochester (N)	150	11	1	5	1	18	63	0	99.3	4.4	9.4	13.7	6	8	140	0	0	2	2.05
1A-003	Hampton	North Rochester (N)	150	12	2	5	1	20	66	0	110.1	4.7	11.3	16.0	5	8	143	0	0	2	2.05
1A-004	Hampton	North Rochester (N)	150	11	2	6	1	20	65	0	121.0	4.5	14.1	18.7	6	8	140	0	0	1	1.05
1A	Hampton	North Rochester (N)	150	12	2	5	1	20	64	0	109.3	4.7	11.3	16.0	6	8	140	0	0	2	2.05

Segment 1 – GAP Data

				GAP - Land Cover in Route (acres)															
Route	Start	End	ROW (ft)	Aquatic	Cropland	Developed	Grassland	Lowland Deciduous	Lowland Shrub	Maple/ Basswood	Marsh	Oak	Pine	Pine-Deciduous mix	Redcedar-Deciduous mix	Silver Maple	Upland Cedar	Upland Deciduous	Upland Shrub
1P	Hampton	North Rochester (S)	150	3.8	2764.8	449.2	889.2	26.0	19.9	24.1	32.2	156.6	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-001	Hampton	North Rochester (S)	150	11.8	2851.5	372.1	918.0	29.5	17.9	26.7	33.3	196.7	4.5	16.9	0.0	0.0	0.0	4.7	6.2
1P-002	Hampton	North Rochester (S)	150	11.8	2874.9	408.1	886.8	26.2	17.9	22.7	33.3	161.2	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-003	Hampton	North Rochester (S)	150	11.8	3011.2	292.1	941.1	37.7	17.9	24.5	33.3	139.4	1.3	0.0	0.0	2.0	0.0	2.4	7.5
1P-004	Hampton	North Rochester (S)	150	3.8	2830.5	436.1	873.5	34.5	20.9	25.2	32.2	156.1	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-005	Hampton	North Rochester (S)	150	3.8	2822.0	432.5	908.6	34.5	21.0	25.2	32.2	156.1	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-006	Hampton	North Rochester (S)	150	3.8	2781.3	455.4	925.9	25.3	20.8	24.1	32.2	156.1	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-007	Hampton	North Rochester (S)	150	3.8	2809.2	464.8	965.8	23.6	18.8	24.1	32.2	155.0	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-008	Hampton	North Rochester (S)	150	3.8	2810.1	413.7	898.4	26.2	10.5	24.1	31.7	156.6	1.3	9.5	0.0	0.0	0.0	5.2	6.2
1P-009	Hampton	North Rochester (S)	150	4.6	3545.7	224.5	990.0	45.0	38.0	26.9	44.1	81.9	0.0	0.0	0.0	0.0	0.0	2.7	6.0
1B-001	Hampton	North Rochester (S)	150	2.0	5266.5	43.4	801.5	41.8	21.5	5.8	8.0	42.6	0.0	0.0	0.0	0.0	0.0	2.1	0.0
1B-003	Hampton	North Rochester (N)	150	2.0	5057.9	13.9	700.6	32.2	22.6	5.8	8.0	26.1	0.0	0.0	0.0	0.0	0.0	2.1	0.0
1B-005	Hampton	North Rochester (N)	150	4.6	3981.1	158.2	882.7	48.5	47.5	13.0	45.8	36.3	0.0	0.0	0.0	0.0	0.0	3.1	0.9
1A-001	Hampton	North Rochester (N)	150	2.0	5224.5	29.2	662.1	22.3	21.2	4.3	8.0	27.7	0.0	0.0	0.0	0.0	0.0	2.1	0.0
1A-003	Hampton	North Rochester (N)	150	2.0	5067.4	11.7	690.6	31.6	20.8	5.8	8.0	34.2	0.0	0.0	0.0	0.0	0.0	2.1	0.0
1A-004	Hampton	North Rochester (N)	150	2.0	5117.6	25.4	641.8	31.4	18.6	4.4	9.1	36.3	0.0	0.0	0.0	0.0	0.0	2.1	0.0
1A	Hampton	North Rochester (N)	150	2.0	5093.7	11.7	680.2	31.6	20.1	5.8	8.0	34.2	0.0	0.0	0.0	0.0	0.0	2.1	0.0

Segment 1 – MCBS Easements and Karst

				MCBS ROW Prairie			Conservation Easements												Karst Features			
				Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width				Number in Route Width			
Route	Start	End	ROW (ft)				CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	Spring	Sink/Sieve	Sinkhole	Total
1P	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	5	0	3	8
1P-001	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	4	0	3	7
1P-002	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	5	0	3	8
1P-003	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	4	0	3	7
1P-004	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	5	0	3	8
1P-005	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	4	0	3	7
1P-006	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	5	0	3	8
1P-007	Hampton	North Rochester (S)	150	0	0	0	0	0	0	0	1	1	4	6	3.28	6.43	8.01	17.72	5	0	3	8
1P-008	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	1	1	5	7	3.28	6.43	22.53	32.24	5	0	3	8
1P-009	Hampton	North Rochester (S)	150	0	1	593	0	0	1	1	0	1	3	4	0	6.43	15.52	21.95	3	0	0	3
1B-001	Hampton	North Rochester (S)	150	0	0	0	0	0	1	1	0	0	7	7	0	0	17.45	17.45	0	0	0	0
1B-003	Hampton	North Rochester (N)	150	0	0	0	0	0	0	0	0	0	6	6	0	0	10.18	10.18	0	0	0	0
1B-005	Hampton	North Rochester (N)	150	0	1	593	0	0	1	1	0	0	4	4	0	0	12.23	12.23	2	1	0	3
1A-001	Hampton	North Rochester (N)	150	0	0	0	0	0	1	1	0	0	5	5	0	0	14.23	14.23	0	0	0	0
1A-003	Hampton	North Rochester (N)	150	0	0	0	0	0	1	1	0	0	7	7	0	0	17.45	17.45	0	0	0	0
1A-004	Hampton	North Rochester (N)	150	0	0	0	0	0	1	1	0	0	7	7	0	0	17.45	17.45	0	0	0	0
1A	Hampton	North Rochester (N)	150	0	0	0	0	0	1	1	0	0	7	7	0	0	17.45	17.45	0	0	0	0

Segment 1 – MCBS

				MCBS Native Plant Communities			MCBS Significant Biodiversity											
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width			
							Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total
1P	Hampton	North Rochester (S)	150	2	3	61.1	0	2	0	2	0	3	0	3	0.0	64.4	0.0	64.4
1P-001	Hampton	North Rochester (S)	150	2	4	62.0	0	2	0	2	1	3	0	4	0.9	64.4	0.0	65.3
1P-002	Hampton	North Rochester (S)	150	2	4	62.0	0	2	0	2	1	3	0	4	0.9	64.4	0.0	65.3
1P-003	Hampton	North Rochester (S)	150	5	9	78.5	1	3	0	4	2	5	0	7	15.6	71.1	0.0	86.7
1P-004	Hampton	North Rochester (S)	150	2	5	61.6	0	2	0	2	0	5	0	5	0.0	64.9	0.0	64.9
1P-005	Hampton	North Rochester (S)	150	2	5	61.6	0	2	0	2	0	5	0	5	0.0	64.9	0.0	64.9
1P-006	Hampton	North Rochester (S)	150	2	3	61.1	0	2	0	2	0	3	0	3	0.0	64.4	0.0	64.4
1P-007	Hampton	North Rochester (S)	150	2	3	61.1	0	2	0	2	0	3	0	3	0.0	64.4	0.0	64.4
1P-008	Hampton	North Rochester (S)	150	2	3	61.1	0	2	0	2	0	3	0	3	0.0	64.4	0.0	64.4
1P-009	Hampton	North Rochester (S)	150	1	5	68.5	1	0	1	2	3	3	2	8	46.6	13.6	39.4	99.6
1B-001	Hampton	North Rochester (S)	150	4	7	49.2	1	1	2	4	1	1	2	4	9.0	10.5	31.3	50.8
1B-003	Hampton	North Rochester (N)	150	4	7	49.2	1	1	2	4	3	1	2	6	8.0	10.5	31.3	49.8
1B-005	Hampton	North Rochester (N)	150	0	4	14.3	0	0	0	0	1	3	1	5	0.3	13.6	1.6	15.6
1A-001	Hampton	North Rochester (N)	150	5	6	51.2	1	1	3	5	2	1	2	5	7.7	10.5	33.6	51.8
1A-003	Hampton	North Rochester (N)	150	4	7	49.2	2	1	2	5	4	1	2	7	25.4	10.5	31.3	67.2
1A-004	Hampton	North Rochester (N)	150	5	7	65.6	1	1	3	5	2	1	3	6	7.7	10.5	47.9	66.1
1A	Hampton	North Rochester (N)	150	4	7	49.2	1	1	2	4	3	1	2	6	8.0	10.5	31.3	49.8

Segment 1 – Prime Farmland

				Prime Farmland in 1000 ft Route Width (acres)						
Route	Start	End	ROW (ft)	All areas are prime farmland	Farmland of local importance	Farmland of statewide importance	Not prime farmland	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Prime farmland if protected from flooding or not frequently flooded during the growing season
1P	Hampton	North Rochester (S)	150	2369.9	16.9	702.3	925.9	229.4	1.6	142.1
1P-001	Hampton	North Rochester (S)	150	2394.9	0.0	658.3	1063.6	229.4	1.6	142.1
1P-002	Hampton	North Rochester (S)	150	2345.1	0.0	769.7	977.3	229.4	1.6	142.1
1P-003	Hampton	North Rochester (S)	150	2525.8	0.0	667.8	955.5	229.4	1.6	142.1
1P-004	Hampton	North Rochester (S)	150	2370.7	16.9	699.7	941.9	227.2	1.6	177.1
1P-005	Hampton	North Rochester (S)	150	2393.4	16.9	705.6	939.3	224.3	1.6	177.1
1P-006	Hampton	North Rochester (S)	150	2399.5	16.9	702.4	957.4	229.4	3.5	138.1
1P-007	Hampton	North Rochester (S)	150	2469.5	16.9	702.4	951.9	239.9	1.6	137.3
1P-008	Hampton	North Rochester (S)	150	2346.9	16.9	698.3	948.2	243.5	1.6	142.1
1P-009	Hampton	North Rochester (S)	150	2834.7	18.3	768.9	952.8	251.3	1.6	181.7
1B-001	Hampton	North Rochester (S)	150	3966.0	6.6	870.6	549.2	701.0	0.0	141.9
1B-003	Hampton	North Rochester (N)	150	3712.1	6.6	753.1	577.6	757.2	1.6	63.2
1B-005	Hampton	North Rochester (N)	150	2885.6	18.3	859.0	846.1	511.7	8.0	93.1
1A-001	Hampton	North Rochester (N)	150	3895.9	6.6	724.5	517.4	741.2	0.0	117.8
1A-003	Hampton	North Rochester (N)	150	3740.8	6.6	754.9	526.4	715.6	12.2	117.8
1A-004	Hampton	North Rochester (N)	150	3813.1	6.6	734.7	514.4	692.4	0.0	127.6
1A	Hampton	North Rochester (N)	150	3766.7	6.6	779.5	517.8	701.0	0.0	117.8

Segment 1 – Recreation Areas

				WMA (Wildlife Management Areas)			SNA	WPA	Wildlife Refuge			State Forest			State Parks	County Parks			Local Parks
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number in Route Width
1P	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-001	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	2	2	55.78	0
1P-002	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	2	2	55.74	0
1P-003	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	2	2	55.78	0
1P-004	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-005	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-006	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-007	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-008	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
1P-009	Hampton	North Rochester (S)	150	0	1	0.07	0	0	0	0	0	0	0	0	0	1	2	61.69	0
1B-001	Hampton	North Rochester (S)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0
1B-003	Hampton	North Rochester (N)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0
1B-005	Hampton	North Rochester (N)	150	0	1	0.07	0	0	0	0	0	0	0	0	0	1	2	61.69	0
1A-001	Hampton	North Rochester (N)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0
1A-003	Hampton	North Rochester (N)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0
1A-004	Hampton	North Rochester (N)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0
1A	Hampton	North Rochester (N)	150	0	0	0.00	0	0	0	0	0	0	0	0	0	1	1	8.92	0

Segment 1 – Recreation Areas (cont'd)

				Snowmobile Trails			Scenic Byways			MN DNR State Trails			MN State Park Trails	MN State Forest Campgrounds	Boat Access
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	NONE	NONE	NONE
1P	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-001	Hampton	North Rochester (S)	150	9	12	18347	0	0	0	0	0	0	0	0	0
1P-002	Hampton	North Rochester (S)	150	9	12	21094	0	0	0	0	0	0	0	0	0
1P-003	Hampton	North Rochester (S)	150	7	14	13641	0	0	0	0	0	0	0	0	0
1P-004	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-005	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-006	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-007	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-008	Hampton	North Rochester (S)	150	9	13	21972	0	0	0	0	0	0	0	0	0
1P-009	Hampton	North Rochester (S)	150	24	13	31519	0	0	0	0	0	0	0	0	0
1B-001	Hampton	North Rochester (S)	150	14	12	37341	0	0	0	0	0	0	0	0	0
1B-003	Hampton	North Rochester (N)	150	14	12	37341	0	0	0	0	0	0	0	0	0
1B-005	Hampton	North Rochester (N)	150	17	8	21336	0	0	0	0	0	0	0	0	0
1A-001	Hampton	North Rochester (N)	150	14	13	41108	0	0	0	0	0	0	0	0	0
1A-003	Hampton	North Rochester (N)	150	14	12	35312	0	0	0	0	0	0	0	0	0
1A-004	Hampton	North Rochester (N)	150	14	13	35376	0	0	0	0	0	0	0	0	0
1A	Hampton	North Rochester (N)	150	14	12	37341	0	0	0	0	0	0	0	0	0

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Segment 2 – Houses and ROW Type

				Within 80 ft ROW		Within 200 ft ROW		Within entire Route				ROW Type (percent)						
Route	Start	End	ROW (ft)	40 ft	100 ft	40 ft	100 ft	40 ft	100 ft	300 ft	500 ft	County or Township Road	Field Line	Trail	Trans-mission Line	Trans-mission Line and Cnty or Twp Rd	Trans-mission Line and Trail	X-Country
2P	North Rochester (S)	Northern Hills	80	0	7	NA	NA	0	7	59	108	68.3%	4.2%	2.3%	9.6%	3.8%	8.2%	3.6%
2B-001	North Rochester (S)	Northern Hills	80	1	5	NA	NA	1	5	45	99	68.6%	9.1%	9.2%	1.6%	3.7%	7.9%	0.0%
2A-001	North Rochester (N)	Northern Hills	80	0	1	NA	NA	0	1	33	86	19.9%	5.6%	25.5%	32.3%	2.0%	7.4%	7.3%
2A-002	North Rochester (N)	Northern Hills	80	0	3	NA	NA	0	3	35	84	35.0%	9.8%	3.7%	31.1%	1.9%	7.1%	11.3%
2A-003	North Rochester (N)	Northern Hills	80	0	3	NA	NA	0	3	38	93	41.5%	9.1%	3.8%	32.0%	2.0%	7.3%	4.3%
2A	North Rochester (N)	Northern Hills	80	0	1	NA	NA	0	1	28	77	33.2%	10.8%	9.4%	30.7%	1.9%	7.0%	7.0%
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	0	5	3	5	3	10	56	123	41.9%	4.3%	2.4%	30.3%	3.8%	8.3%	9.1%
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	3	7	0	0	3	7	47	97	37.5%	17.2%	1.6%	0.8%	3.6%	7.8%	31.6%
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	3	7	0	0	3	7	42	92	24.5%	29.0%	1.4%	0.4%	0.4%	7.0%	37.3%
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	3	7	0	0	3	7	42	92	24.5%	29.0%	1.4%	0.4%	0.4%	7.0%	37.3%
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	0	7	0	0	0	7	59	108	68.3%	4.2%	2.3%	9.6%	3.8%	8.2%	3.6%
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	0	7	0	3	0	10	68	122	60.5%	4.1%	2.1%	22.5%	0.5%	7.2%	3.2%
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	3	7	0	0	3	7	49	99	46.9%	12.7%	1.6%	0.8%	3.6%	7.8%	26.6%
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	0	7	0	0	0	7	59	107	68.3%	4.6%	2.3%	12.5%	0.5%	8.2%	3.6%

Segment 2 – Human

				Schools	Churches	Cemeteries	Towers	Airpots		Hospital			Nursing Homes	MES Sites	LUST Sites
Route	Start	End	ROW (ft)	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In 1 mile	Number In Route Width	Number In 1/2 mile	Number In 1 mile	Number In Route Width	Number in Route Width	Number in Route Width
2P	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2B-001	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2A-001	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2A-002	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2A-003	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2A	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0
				Schools	Churches	Cemeteries	Towers	Airpots		Hospital			Nursing Homes	MES Sites	LUST Sites
Route	Start	End	ROW (ft)	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In 1 mile	Number In Route Width	Number In 1/2 mile	Number In 1 mile	Number In Route Width	Number in Route Width	Number in Route Width
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	1
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	2
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0

Segment 2 – Water Resources

				PWI Streams			PWI Basins			Trout Streams			Impaired Streams			Impaired Lakes		
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width
2P	North Rochester (S)	Northern Hills	80	2	13	7013	0	0	0	0	0	0	1	2	2275.68994	0	0	0
2B-001	North Rochester (S)	Northern Hills	80	2	8	4882	0	0	0	0	0	0	1	1	1823.91003	0	0	0
2A-001	North Rochester (N)	Northern Hills	80	7	13	9456	0	0	0	0	0	0	2	4	3761.05005	0	0	0
2A-002	North Rochester (N)	Northern Hills	80	7	13	9456	0	0	0	0	0	0	2	4	3761.05005	0	0	0
2A-003	North Rochester (N)	Northern Hills	80	7	13	10087	0	0	0	0	0	0	2	4	4221.98999	0	0	0
2A	North Rochester (N)	Northern Hills	80	7	13	9456	0	0	0	0	0	0	2	4	3761.05005	0	0	0
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	2	19	10746	0	0	0	0	0	0	1	2	2275.68994	0	0	0
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	4	8	3949	1	1	13.71	0	0	0	3	1	2512.43994	0	0	0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	5	10	5233	1	1	13.71	0	0	0	3	1	2512.43994	0	0	0
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	5	10	5233	1	1	13.71	0	0	0	3	1	2512.43994	0	0	0
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	2	13	7013	0	0	0	0	0	0	1	2	2275.68994	0	0	0
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	3	17	8272	0	0	0	0	0	0	1	2	2275.68994	0	0	0
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	6	16	10148	1	1	13.71	0	0	0	3	1	2512.43994	0	0	0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	2	13	7013	0	0	0	0	0	0	1	2	2275.68994	0	0	0

				PWI Streams			PWI Basins			Trout Streams			Impaired Streams			Impaired Lakes		
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	0	6	3733	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	1	2	1284	0	0	0	0	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	1	4	1259	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	2	8	6199	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 2 – Water Resources (cont'd)

				Wetlands											FEMA Floodplain			Wildlife Lakes	Shallow Lakes		
Route	Start	End	ROW (ft)	Number Crossed					Number in Route Width	Number > 1000 ft Span	Area (acres) in Route Width	Area (acres) in ROW			Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE IN ROUTE WIDTH	Number Crossed	Number in Route Width	Length (ft) in Route Width
				Emergent	Shrub	Forested	Open	Total			Total	Forested	Non-Forested	Total							
2P	North Rochester (S)	Northern Hills	80	1	0	2	0	3	13	0	36.6	1.3	0.2	1.5	3	7	79	0	0	1	0.20
2B-001	North Rochester (S)	Northern Hills	80	3	0	2	0	5	21	0	40.0	1.3	0.6	1.9	6	3	129	0	0	4	3.63
2A-001	North Rochester (N)	Northern Hills	80	3	1	3	0	7	22	2	83.9	1.7	7.1	8.8	7	6	188	0	0	0	0
2A-002	North Rochester (N)	Northern Hills	80	4	0	3	0	7	22	0	48.9	1.7	1.0	2.7	7	6	188	0	0	0	0
2A-003	North Rochester (N)	Northern Hills	80	4	0	3	0	7	24	0	54.6	1.7	1.0	2.7	8	5	205	0	0	0	0
2A	North Rochester (N)	Northern Hills	80	4	0	3	0	7	21	0	48.9	1.7	1.0	2.7	7	6	188	0	0	0	0
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	4	0	4	16	1	74.7	7.1	0.1	7.3	6	12	96	0	0	0	0
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	4	0	3	4	11	23	0	58.8	2.3	3.1	5.4	10	11	71	0	1	4	4.49
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	2	0	3	4	9	25	0	54.7	2.3	2.4	4.6	10	11	71	0	1	6	5.29
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	2	0	3	4	9	25	0	54.7	2.3	2.8	5.0	10	11	71	0	1	6	5.29
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	1	0	2	0	3	13	0	36.6	1.3	0.2	1.5	3	7	79	0	0	1	0.20
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	1	0	2	0	3	15	0	38.4	1.3	0.2	1.5	3	7	79	0	0	1	0.20
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	2	0	3	4	9	23	0	53.5	2.3	2.3	4.6	10	11	71	0	1	6	5.28
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	1	0	2	0	3	14	0	38.1	1.3	0.2	1.5	3	7	79	0	0	1	0.20

				Wetlands											FEMA Floodplain			Wildlife Lakes	Shallow Lakes		
Route	Start	End	ROW (ft)	Number Crossed					Number in Route Width	Number > 1000 ft Span	Area (acres) in Route Width	Area (acres) in ROW			Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE IN ROUTE WIDTH	Number Crossed	Number in Route Width	Length (ft) in Route Width
				Emergent	Shrub	Forested	Open	Total			Total	Forested	Non-Forested	Total							
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	0	0	2	0	2	5	1	39.9	5.8	0.0	5.8	3	5	21.18	0	0	0	0.00
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	2	0	0	0	2	4	0	7.2	0.0	1.0	1.0	0	0	0	0	0	1	0.11
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	2	0	1.2	0.0	0.2	0.2	0	0	0	0	0	0	0.00
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	6	0	3.1	0.0	0.6	0.6	0	0	0	0	0	3	0.91
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0.00
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	2	0	1.7	0.0	0.0	0.0	0	0	0	0	0	0	0.00
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	4	0	1.9	0.0	0.2	0.2	0	0	0	0	0	0	0.91
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	0	1.5	0.0	0.0	0.0	0	0	0	0	0	0	0.00

Segment 2 – GAP Data

				GAP - Land Cover in Route (acres)															
Route	Start	End	ROW (ft)	Aquatic	Cropland	Developed	Grassland	Lowland Deciduous	Lowland Shrub	Maple/ Basswood	Marsh	Oak	Pine	Pine-Deciduous mix	Redcedar-Deciduous mix	Silver Maple	Upland Cedar	Upland Deciduous	Upland Shrub
2P	North Rochester (S)	Northern Hills	80	1.3	1306.6	36.2	417.0	40.9	6.2	4.7	4.0	46.1	0.1	0.0	0.0	0.0	4.0	7.2	0.0
2B-001	North Rochester (S)	Northern Hills	80	5.7	1346.1	41.9	427.7	41.0	7.4	14.7	4.9	49.4	0.0	0.0	0.0	0.0	4.0	2.8	0.0
2A-001	North Rochester (N)	Northern Hills	80	0.0	1541.4	9.8	420.9	53.9	5.8	18.2	2.3	32.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0
2A-002	North Rochester (N)	Northern Hills	80	0.0	1482.1	14.5	496.6	58.0	7.1	20.9	4.9	75.2	0.0	0.0	0.0	0.3	0.0	1.3	0.0
2A-003	North Rochester (N)	Northern Hills	80	0.0	1506.9	15.6	439.6	56.0	7.1	16.3	4.9	54.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
2A	North Rochester (N)	Northern Hills	80	0.0	1608.7	14.5	447.9	50.7	7.1	15.9	4.9	41.2	0.0	0.0	0.0	0.0	0.0	1.3	0.0
2C3-001 - 2	End of parallel alignment	Northern Hills	80	1.8	1098.3	137.7	459.9	71.3	6.4	7.4	6.6	52.5	0.1	0.0	0.0	0.0	4.0	8.1	0.0
2C3-002 - 2	End of parallel alignment	Northern Hills	80	11.3	1347.1	21.9	459.6	26.3	11.6	9.3	2.2	65.4	2.2	0.0	0.0	0.0	0.0	7.2	0.0
2C3-003 - 2	End of parallel alignment	Northern Hills	80	11.3	1425.5	17.3	556.7	44.8	9.9	11.6	2.9	91.0	2.2	0.0	0.0	0.0	0.0	15.4	0.0
2C3-004 - 2	End of parallel alignment	Northern Hills	80	11.3	1425.5	17.3	556.7	44.8	9.9	11.6	2.9	91.0	2.2	0.0	0.0	0.0	0.0	15.4	0.0
2C3-005 - 2	End of parallel alignment	Northern Hills	80	1.3	1306.6	36.2	417.0	40.9	6.2	4.7	4.0	46.1	0.1	0.0	0.0	0.0	4.0	7.2	0.0
2C3-006 - 2	End of parallel alignment	Northern Hills	80	1.3	1450.4	68.9	469.9	40.6	7.5	4.7	4.0	54.7	0.1	0.0	0.0	0.0	4.0	7.2	0.0
2C3-007 - 2	End of parallel alignment	Northern Hills	80	11.3	1340.0	24.4	457.7	30.8	11.6	9.3	2.9	72.2	2.2	0.0	0.0	0.0	0.0	8.1	0.0
2C3-008 - 2	End of parallel alignment	Northern Hills	80	43.3	3380.8	36.6	1200.2	94.2	66.8	4.1	54.3	455.0	9.4	0.0	0.0	37.5	0.0	20.8	17.8

				GAP - Land Cover in Route (acres)															
Route	Start	End	ROW (ft)	Aquatic	Cropland	Developed	Grassland	Lowland Deciduous	Lowland Shrub	Maple/ Basswood	Marsh	Oak	Pine	Pine-Deciduous mix	Redcedar-Deciduous mix	Silver Maple	Upland Cedar	Upland Deciduous	Upland Shrub
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	1.8	356.6	123.7	129.1	33.8	0.0	2.8	2.7	6.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0.0	756.4	9.2	170.3	3.0	1.6	1.6	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0.0	594.2	4.1	121.0	9.7	0.0	2.4	0.0	10.4	0.0	0.0	0.0	0.0	0.0	3.6	0.0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	0.0	834.7	4.6	267.3	21.4	0.0	4.0	0.7	30.9	0.0	0.0	0.0	0.0	0.0	8.2	0.0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0.0	310.2	9.1	51.9	3.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0.0	454.0	41.8	104.8	2.7	3.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0.0	749.2	11.7	168.4	7.5	1.6	1.6	0.7	12.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0.0	86.8	8.0	47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Segment 2 – MCBS Easements and Karst

				MCBS ROW Prairie			Conservation Easements												Karst Features			
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width				Number in Route Width			
							CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	Spring	Stream Sink/Sieve	Sinkhole	Total
2P	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2B-001	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	1	0	0	1
2A-001	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2A-002	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2A-003	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2A	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	1	1	0	0	7	7	0	0	32.63	32.63	0	0	0	0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	1	1	0	0	4	4	0	0	31.87	31.87	0	0	0	0
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	1	1	0	0	4	4	0	0	31.87	31.87	0	0	0	0
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	1	1	0	0	6	6	0	0	39.84	39.84	0	0	0	0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0

				MCBS ROW Prairie			Conservation Easements												Karst Features			
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width				Number in Route Width			
							CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	Spring	Stream Sink/Sieve	Sinkhole	Total
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	7	7	0	0	32.63	32.63	0	0	0	0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	4	4	0	0	31.87	31.87	0	0	0	0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	6	6	0	0	39.84	39.84	0	0	0	0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 2 – MCBS

				MCBS Native Plant Communities			MCBS Significant Biodiversity											
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width			
							Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total
2P	North Rochester (S)	Northern Hills	80	1	3	3.3	0	0	0	0	0	1	0	1	0.0	0.1	0.0	0.1
2B-001	North Rochester (S)	Northern Hills	80	0	3	15.2	0	0	0	0	1	1	0	2	15.1	0.1	0.0	15.2
2A-001	North Rochester (N)	Northern Hills	80	1	4	23.6	0	2	0	2	1	2	0	3	11.2	18.6	0.0	29.8
2A-002	North Rochester (N)	Northern Hills	80	6	8	69.3	4	3	0	-7	2	3	0	5	50.4	25.1	0.0	75.5
2A-003	North Rochester (N)	Northern Hills	80	2	10	47.0	1	2	0	3	5	2	0	7	34.6	18.6	0.0	53.2
2A	North Rochester (N)	Northern Hills	80	1	4	23.6	0	2	0	2	1	2	0	3	11.2	18.6	0.0	29.8
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	3	5	44.0	0	2	0	2	0	2	0	2	0.0	40.8	0.0	40.8
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	1	3	3.3	0	0	0	0	0	1	0	1	0.0	0.1	0.0	0.1
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	1	3	3.3	0	0	0	0	1	1	0	2	1.0	0.1	0.0	1.1
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	1	3	3.3	0	0	0	0	0	1	0	1	0.0	0.1	0.0	0.1

				MCBS Native Plant Communities			MCBS Significant Biodiversity											
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width			
							Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	2	3	40.8	0	2	0	2	0	2	0	2	0.0	40.8	0.0	40.8
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0.0	0	0	0	0	1	0	0	1	1.0	0.0	0.0	1.0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0

Segment 2 – Prime Farmland

				Prime Farmland in 1000 ft Route Width (acres)						
Route	Start	End	ROW (ft)	All areas are prime farmland	Farmland of local importance	Farmland of statewide importance	Not prime farmland	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Prime farmland if protected from flooding or not frequently flooded during the growing season
2P	North Rochester (S)	Northern Hills	80	1155.06	0	334.9	278.53	60.61	0	45.04
2B-001	North Rochester (S)	Northern Hills	80	1146.69	0	366.05	291.7	95.95	0	45.04
2A-001	North Rochester (N)	Northern Hills	80	1458.19	0	194.55	199.03	188.12	26.91	18.05
2A-002	North Rochester (N)	Northern Hills	80	1321.64	0	331.92	304.17	157.75	27.34	18.05
2A-003	North Rochester (N)	Northern Hills	80	1317.6	0	308.85	282.21	150.93	23.98	18.05
2A	North Rochester (N)	Northern Hills	80	1454.11	0	291.93	263.95	137.22	26.91	18.05
2C3-001 - 2 (Both)	North Rochester (S)	Northern Hills	80 and 200	1172.85	0	260.2	339.17	64	5.89	11.97
2C3-002 - 2 (Both)	North Rochester (S)	Northern Hills	80 and 200	1074.48	0	397.7	368.83	55.35	0	67.71
2C3-003 - 2 (Both)	North Rochester (N)	Northern Hills	80 and 200	1208.94	0	464	406.6	54.32	0	54.65
2C3-004 - 2 (Both)	North Rochester (N)	Northern Hills	80 and 200	1208.94	0	464	406.6	54.32	0	54.65
2C3-005 - 2 (Both)	North Rochester (S)	Northern Hills	80 and 200	1155.06	0	334.9	278.53	60.61	0	45.04
2C3-006 - 2 (Both)	North Rochester (N)	Northern Hills	80 and 200	1362.08	0	359.65	272.86	60.61	0	57.96
2C3-007 - 2 (Both)	North Rochester (S)	Northern Hills	80 and 200	1020.74	0	387.89	428.84	55.35	0	77.45
2C3-008 - 2 (Both)	North Rochester (S)	Northern Hills	80 and 200	1123.41	0	362.49	274.75	60.61	0	52.23

				Prime Farmland in 1000 ft Route Width (acres) --Parallel Alignment Portion Only--						
Route	Start	End	ROW (ft)	All areas are prime farmland	Farmland of local importance	Farmland of statewide importance	Not prime farmland	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Prime farmland if protected from flooding or not frequently flooded during the growing season
2C3-001 - 2 (parallel alignment)	North Rochester (S)	End of parallel alignment	200	442.57	0	96.83	96.13	4.42	5.89	11.97
2C3-002 - 2 (parallel alignment)	North Rochester (S)	End of parallel alignment	200	471.31	0	281.51	125.78	1.03	0	67.71
2C3-003 - 2 (parallel alignment)	North Rochester (N)	End of parallel alignment	200	477.07	0	225.69	17.1	0	0	25.42
2C3-004 - 2 (parallel alignment)	North Rochester (N)	End of parallel alignment	200	605.77	0	347.81	163.55	0	0	54.65
2C3-005 - 2 (parallel alignment)	North Rochester (S)	End of parallel alignment	200	215.13	0	102.79	26.29	1.03	0	30.57
2C3-006 - 2 (parallel alignment)	North Rochester (N)	End of parallel alignment	200	422.16	0	127.53	20.62	1.04	0	43.49
2C3-007 - 2 (parallel alignment)	North Rochester (S)	End of parallel alignment	200	417.57	0	271.71	185.79	1.03	0	77.45
2C3-008 - 2 (parallel alignment)	North Rochester (S)	End of parallel alignment	200	45.21	0	66.18	11.18	0	0	19.16

Segment 2 – Recreation Areas

				WMA (Wildlife Management Areas)			SNA	WPA	Wildlife Refuge			State Forest			State Parks	County Parks			Local Parks
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number in Route Width
2P	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2B-001	North Rochester (S)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2A-001	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2A-002	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2A-003	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2A	North Rochester (N)	Northern Hills	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

				WMA (Wildlife Management Areas)			SNA	WPA	Wildlife Refuge			State Forest			State Parks	County Parks			Local Parks
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number in Route Width
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 2 – Recreation Areas (cont'd)

				Snowmobile Trails			Scenic Byways			MN DNR State Trails			MN State Park Trails	MN State Forest Campgrounds	Boat Access
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	NONE	NONE	NONE
2P	North Rochester (S)	Northern Hills	80	8	6	17682	0	0	0	4	1	7867	0	0	0
2B-001	North Rochester (S)	Northern Hills	80	8	7	26252	0	0	0	10	2	17759	0	0	0
2A-001	North Rochester (N)	Northern Hills	80	10	7	45307	0	0	0	29	2	42128	0	0	0
2A-002	North Rochester (N)	Northern Hills	80	8	4	26040	0	0	0	13	2	22731	0	0	0
2A-003	North Rochester (N)	Northern Hills	80	6	4	21327	0	0	0	13	2	17959	0	0	0
2A	North Rochester (N)	Northern Hills	80	10	5	32959	0	0	0	14	3	29720	0	0	0
2C3-001 - 2	North Rochester (S)	Northern Hills	80 and 200	9	8	27442	0	0	0	4	1	7867	0	0	0
2C3-002 - 2	North Rochester (S)	Northern Hills	80 and 200	6	6	16231	0	0	0	4	1	7867	0	0	0
2C3-003 - 2	North Rochester (N)	Northern Hills	80 and 200	4	4	12984	0	0	0	4	1	7867	0	0	0
2C3-004 - 2	North Rochester (N)	Northern Hills	80 and 200	4	4	12984	0	0	0	4	1	7867	0	0	0
2C3-005 - 2	North Rochester (S)	Northern Hills	80 and 200	8	6	17682	0	0	0	4	1	7867	0	0	0
2C3-006 - 2	North Rochester (N)	Northern Hills	80 and 200	6	4	14586	0	0	0	4	1	7867	0	0	0
2C3-007 - 2	North Rochester (S)	Northern Hills	80 and 200	6	6	16231	0	0	0	4	1	7867	0	0	0
2C3-008 - 2	North Rochester (S)	Northern Hills	80 and 200	6	4	14586	0	0	0	4	1	7867	0	0	0

				Snowmobile Trails			Scenic Byways			MN DNR State Trails			MN State Park Trails	MN State Forest Campgrounds	Boat Access
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	NONE	NONE	NONE
2C3-001 - 2	North Rochester (S)	End of parallel alignment	200	7	6	16748	0	0	0	0	0	0	0	0	0
2C3-002 - 2	North Rochester (S)	End of parallel alignment	200	4	4	5537	0	0	0	0	0	0	0	0	0
2C3-003 - 2	North Rochester (N)	End of parallel alignment	200	1	1	1143	0	0	0	0	0	0	0	0	0
2C3-004 - 2	North Rochester (N)	End of parallel alignment	200	2	2	2289	0	0	0	0	0	0	0	0	0
2C3-005 - 2	North Rochester (S)	End of parallel alignment	200	3	3	4390	0	0	0	0	0	0	0	0	0
2C3-006 - 2	North Rochester (N)	End of parallel alignment	200	1	1	1294	0	0	0	0	0	0	0	0	0
2C3-007 - 2	North Rochester (S)	End of parallel alignment	200	4	4	5537	0	0	0	0	0	0	0	0	0
2C3-008 - 2	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0

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Segment 3 – Houses and ROW Type

				Within 150 ft ROW		Within 200 ft ROW		Within entire Route					ROW Type (percent)						
Route	Start	End	ROW (ft)	75 ft	100 ft	75 ft	100 ft	75 ft	100 ft	150 ft	300 ft	500 ft	County or Township Road	County or Township Road and Trans-mission Line	Field Line	Major Hwy	Railroad	Trans-mission Line	X-Country
3P	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	5	25	3.4%	0.0%	41.9%	2.2%	0.0%	24.6%	28.0%
3P-Kellogg	North Rochester (S)	Mississippi River	150	1	1	NA	NA	1	1	2	9	33	8.4%	0.0%	39.9%	2.1%	4.7%	18.0%	27.0%
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	2	8	23	1.9%	0.0%	15.9%	2.5%	0.0%	24.8%	54.9%
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	2	9	24	0.9%	0.0%	40.7%	2.3%	0.0%	27.5%	28.6%
3P-001	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	0	11	29	12.2%	0.0%	37.9%	1.1%	0.0%	24.5%	24.3%
3P-002	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	5	24	3.8%	0.0%	42.0%	2.2%	0.0%	24.6%	27.5%
3P-003	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	0	11	28	11.6%	0.0%	37.9%	1.1%	0.0%	24.5%	24.9%
3P-004	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	5	25	3.8%	0.0%	42.5%	2.2%	0.0%	24.6%	26.8%
3P-005	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	7	27	4.0%	0.0%	40.8%	2.2%	0.0%	24.6%	28.3%
3P-006	North Rochester (S)	Mississippi River	150	2	2	NA	NA	2	2	3	11	33	7.3%	0.0%	42.5%	2.2%	0.0%	24.2%	23.8%
3P-007	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	4	23	4.4%	0.0%	43.2%	2.2%	0.0%	24.0%	26.2%
3P-008	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	5	24	3.4%	0.0%	42.1%	2.2%	0.0%	24.6%	27.7%
3P-009	North Rochester (S)	Mississippi River	150	6	7	NA	NA	6	7	10	20	38	0.1%	4.6%	39.6%	2.2%	0.0%	26.8%	26.6%
3P-010	North Rochester (S)	Mississippi River	150	1	2	NA	NA	1	2	7	18	39	8.5%	0.0%	40.4%	2.2%	0.0%	24.7%	24.0%
3P-011	North Rochester (S)	Mississippi River	150	0	0	NA	NA	0	0	1	5	24	3.3%	0.0%	42.3%	2.2%	0.0%	24.5%	27.6%
3B-003	North Rochester (S)	Mississippi River	150	2	2	NA	NA	2	2	6	20	43	9.6%	0.0%	36.2%	26.5%	0.0%	2.6%	25.0%
3A-001	North Rochester (N)	Mississippi River	150	0	0	NA	NA	0	0	0	3	18	4.5%	0.0%	21.5%	0.0%	0.0%	22.6%	51.4%
3A-003	North Rochester (N)	Mississippi River	150	0	0	NA	NA	0	0	0	3	18	4.8%	0.0%	21.2%	0.0%	0.0%	22.0%	52.0%
3A-004	North Rochester (N)	Mississippi River	150	0	0	NA	NA	0	0	0	3	18	4.8%	0.0%	19.9%	0.0%	0.0%	22.0%	53.3%
3A-Crossover	North Rochester (N)	Mississippi River	150	0	0	NA	NA	0	0	0	4	19	2.7%	0.0%	44.3%	0.0%	0.0%	24.7%	28.3%
3A-Kellogg	North Rochester (N)	Mississippi River	150	1	1	NA	NA	1	1	1	7	26	9.2%	0.0%	19.6%	0.0%	5.0%	15.1%	51.1%
3A	North Rochester (N)	Mississippi River	150	0	0	NA	NA	0	0	0	3	18	3.9%	0.0%	20.7%	0.0%	0.0%	22.0%	53.4%
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	2	2	4	5	6	7	7	14	50	1.6%	0.0%	36.0%	10.8%	0.0%	26.4%	25.2%
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	3	3	4	5	7	8	8	17	55	3.2%	0.0%	36.1%	10.8%	0.0%	26.4%	23.4%
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	1	9	28	8.7%	0.0%	39.3%	0.2%	0.0%	25.7%	26.1%
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	0	0	0	0	3	18	3.8%	0.0%	20.8%	0.0%	0.0%	22.0%	53.5%
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	0	0	0	0	4	23	4.9%	0.0%	42.9%	0.0%	0.0%	23.6%	28.5%
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	0	11	30	12.2%	0.0%	37.6%	0.2%	0.0%	25.6%	24.3%
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	3	0	3	6	20	43	11.1%	0.0%	36.1%	5.3%	0.0%	23.5%	23.9%
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	0	11	30	12.2%	0.0%	37.6%	0.2%	0.0%	25.6%	24.3%
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	1	5	25	3.4%	0.0%	41.8%	2.2%	0.0%	24.6%	28.0%

Segment 3 – Human

				Schools	Churches	Cemeteries	Towers	Airports		Hospitals			Nursing Homes	MES Sites	LUST Sites
Route	Start	End	ROW (ft)	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In 1 mile	Number In Route Width	Number In 1/2 mile	Number In 1 mile	Number In Route Width	Number in Route Width	Number in Route Width
3P	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-Kellogg	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	0	0	0	2	0	1	0	0	0	0	0	0
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	0	0	0	2	0	1	0	0	0	0	0	0
3P-001	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-002	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-003	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-004	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-005	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-006	North Rochester (S)	Mississippi River	150	0	0	0	4	0	0	0	0	0	0	0	0
3P-007	North Rochester (S)	Mississippi River	150	0	0	0	4	0	0	0	0	0	0	0	0
3P-008	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-009	North Rochester (S)	Mississippi River	150	0	0	0	1	0	1	0	0	0	0	0	0
3P-010	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3P-011	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3B-003	North Rochester (S)	Mississippi River	150	0	0	0	2	0	0	0	0	0	0	0	0
3A-001	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
3A-003	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
3A-004	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
3A-Crossover	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
3A-Kellogg	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
3A	North Rochester (N)	Mississippi River	150	0	0	0	3	0	0	0	0	0	0	0	0
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	2	0	0	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	3	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	3	0	0	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	2	0	0	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	2	0	0	0	0	0	0	0	0
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	2	0	0	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	2	0	0	0	0	0	0	0	0

				Schools	Churches	Cemeteries	Towers	Airpots		Hospitals			Nursing Homes	MES Sites	LUST Sites
Route	Start	End	ROW (ft)	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In Route Width	Number In 1 mile	Number In Route Width	Number In 1/2 mile	Number In 1 mile	Number In Route Width	Number in Route Width	Number in Route Width
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	1
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	1
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	0	0	0	1	0	0	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	2
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0

Segment 3 – Water Resources

				PWI Streams			PWI Basins			Trout Streams			Impaired Streams			Impaired Lakes		
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width
3P	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-Kellogg	North Rochester (S)	Mississippi River	150	15	27	19531	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	24	51	34828	1	2	31.21	14	30	19774	4	8	6914	1	1	21.26
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	16	30	20844	1	2	31.21	10	14	11489	3	4	4109	1	1	21.26
3P-001	North Rochester (S)	Mississippi River	150	17	36	24378	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-002	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-003	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-004	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-005	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-006	North Rochester (S)	Mississippi River	150	15	27	17429	2	2	34.20	10	14	11489	2	2	2388	1	1	19.01
3P-007	North Rochester (S)	Mississippi River	150	15	27	17429	2	2	34.20	10	14	11489	2	2	2388	1	1	19.01
3P-008	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
3P-009	North Rochester (S)	Mississippi River	150	17	33	20867	2	2	57.91	10	14	11489	2	2	2388	2	3	38.9
3P-010	North Rochester (S)	Mississippi River	150	15	28	18179	2	2	33.86	10	14	11489	2	2	2388	1	2	18.61
3P-011	North Rochester (S)	Mississippi River	150	15	27	17429	2	2	34.20	10	14	11489	2	2	2388	1	1	19.01
3B-003	North Rochester (S)	Mississippi River	150	5	12	6640	2	2	34.22	0	0	0	2	2	2388	1	2	19.03
3A-001	North Rochester (N)	Mississippi River	150	23	51	32785	1	1	17.22	14	36	21331	4	7	6382	0	0	0
3A-003	North Rochester (N)	Mississippi River	150	23	45	31227	1	1	17.22	14	30	19774	4	7	6382	0	0	0
3A-004	North Rochester (N)	Mississippi River	150	23	45	31227	1	1	17.22	14	30	19774	4	7	6382	0	0	0
3A-Crossover	North Rochester (N)	Mississippi River	150	15	24	17243	1	1	17.22	10	14	11489	3	3	3578	0	0	0
3A-Kellogg	North Rochester (N)	Mississippi River	150	23	44	32579	1	1	17.22	14	30	19774	4	7	6382	0	0	0
3A	North Rochester (N)	Mississippi River	150	23	45	31227	1	1	17.22	14	30	19774	4	7	6382	0	0	0
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	15	34	21912	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	15	34	21912	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	23	45	31227	1	1	17.22	14	30	19774	4	7	6382	0	0	0
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	16	30	19463	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	17	36	24378	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	16	32	19438	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	17	36	24378	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	15	28	18179	2	2	34.22	10	14	11489	2	2	2388	1	2	19.03
				PWI Streams			PWI Basins			Trout Streams			Impaired Streams			Impaired Lakes		
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	0	6	3733	0	0	0	0	0	0	0	0	0	0	0	0
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	0	6	3733	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	1	2	1284	0	0	0	0	0	0	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	1	4	1259	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	2	8	6199	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 3 – Water Resources (cont'd)

				Wetlands											FEMA Floodplain			Wildlife Lakes	Shallow Lakes		
Route	Start	End	ROW (ft)	Number Crossed					Number in Route Width	Number > 1000 ft Span	Area (acres) in Route Width	Area (acres) in ROW			Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE IN ROUTE WIDTH	Number Crossed	Number in Route Width	Length (ft) in Route Width
				Emergent	Shrub	Forested	Open	Total			Total	Forested	Non-Forested	Total							
3P	North Rochester (S)	Mississippi River	150	10	3	9	4	26	54	3	255.3	13.1	26.1	39.2	3	3	476.31	0	1	8	4.50
3P-Kellogg	North Rochester (S)	Mississippi River	150	4	0	7	4	15	43	1	169.2	7.7	15.2	22.8	7	7	447.87	0	1	8	4.50
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	11	4	11	6	32	71	3	277.0	14.5	25.2	39.7	4	6	510.55	0	2	15	5.45
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	13	3	9	8	33	61	3	272.0	14.3	25.7	40.0	4	6	510.55	0	4	13	7.05
3P-001	North Rochester (S)	Mississippi River	150	9	3	9	4	25	53	3	251.4	13.1	25.6	38.8	3	3	476.31	0	1	10	5.30
3P-002	North Rochester (S)	Mississippi River	150	9	3	9	4	25	53	3	250.9	13.1	25.6	38.7	3	3	476.31	0	1	8	4.50
3P-003	North Rochester (S)	Mississippi River	150	9	3	9	4	25	51	3	250.6	13.1	25.6	38.7	3	3	476.31	0	1	8	4.50
3P-004	North Rochester (S)	Mississippi River	150	10	3	9	4	26	54	3	255.3	13.1	26.1	39.2	3	3	476.31	0	1	8	4.50
3P-005	North Rochester (S)	Mississippi River	150	10	3	9	4	26	54	3	255.3	13.1	26.1	39.2	3	3	476.31	0	1	8	4.50
3P-006	North Rochester (S)	Mississippi River	150	10	3	9	4	26	51	3	254.8	13.1	26.1	39.2	3	3	476.27	0	1	8	4.50
3P-007	North Rochester (S)	Mississippi River	150	10	3	9	4	26	52	3	256.6	13.1	26.1	39.2	3	3	476.27	0	1	9	6.29
3P-008	North Rochester (S)	Mississippi River	150	10	3	9	4	26	53	3	255.2	13.1	26.1	39.2	3	3	476.31	0	1	7	4.39
3P-009	North Rochester (S)	Mississippi River	150	10	3	9	6	28	59	3	279.0	13.1	28.0	41.1	6	6	519.89	0	2	11	5.61
3P-010	North Rochester (S)	Mississippi River	150	10	3	9	4	26	51	3	254.3	13.1	26.1	39.2	3	3	475.76	0	1	7	4.36
3P-011	North Rochester (S)	Mississippi River	150	10	3	9	4	26	51	3	254.8	13.1	26.1	39.2	3	3	476.27	0	1	8	4.50
3B-003	North Rochester (S)	Mississippi River	150	1	0	6	4	11	41	0	107.1	7.0	6.9	13.9	4	5	373.86	0	1	9	2.93
3A-001	North Rochester (N)	Mississippi River	150	9	4	13	3	29	67	3	259.4	15.0	24.6	39.7	4	5	499.63	0	0	10	3.38
3A-003	North Rochester (N)	Mississippi River	150	9	4	13	3	29	69	3	260.4	15.2	24.2	39.4	4	5	499.63	0	0	11	4.37
3A-004	North Rochester (N)	Mississippi River	150	9	4	13	3	29	69	3	260.4	15.2	24.2	39.4	4	5	499.63	0	0	11	4.37
3A-Crossover	North Rochester (N)	Mississippi River	150	10	3	12	5	30	57	3	254.2	15.2	24.2	39.4	4	5	499.63	0	2	8	4.83
3A-Kellogg	North Rochester (N)	Mississippi River	150	3	1	11	3	18	56	1	173.1	9.7	13.3	23.1	8	9	471.19	0	0	10	3.23
3A	North Rochester (N)	Mississippi River	150	9	4	13	3	29	67	3	259.2	15.2	24.2	39.4	4	5	499.63	0	0	10	3.23
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	9	3	11	4	27	54	4	288.2	18.9	25.5	44.5	6	8	497.48	0	1	8	4.64
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	9	3	11	4	27	55	4	288.5	18.9	25.5	44.5	6	8	497.48	0	1	9	4.85
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	11	3	9	4	27	52	3	255.2	13.1	26.5	39.7	3	3	476.31	0	1	8	4.50
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	9	4	13	3	29	67	3	259.2	15.2	24.3	39.5	4	5	499.63	0	0	10	3.23
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	9	3	9	4	25	54	3	251.1	13.1	26.1	39.3	3	3	476.31	0	1	10	5.31
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	9	3	9	4	25	52	3	249.9	13.1	25.6	38.8	3	3	476.31	0	1	10	5.30
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	9	3	9	4	25	53	3	250.9	13.1	25.5	38.7	3	3	476.31	0	1	8	4.50
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	9	3	9	4	25	52	3	249.9	13.1	25.7	38.9	3	3	476.31	0	1	10	5.30
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	10	3	9	4	26	54	3	255.3	13.1	26.1	39.2	3	3	476.31	0	1	8	4.50

				Wetlands											FEMA Floodplain			Wildlife Lakes	Shallow Lakes		
Route	Start	End	ROW (ft)	Number Crossed					Number in Route Width	Number > 1000 ft Span	Area (acres) in Route Width	Area (acres) in ROW			Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE IN ROUTE WIDTH	Number Crossed	Number in Route Width	Area (acres) in Route Width
				Emergent	Shrub	Forested	Open	Total			Total	Forested	Non-Forested	Total							
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	0	0	2	0	2	5	1	39.9	5.8	0.0	5.8	3	5	21.18	0	0	0	0.00
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	0	0	2	0	2	5	1	39.9	5.8	0.0	5.8	3	5	21.18	0	0	0	0.00
2C3-002-3	North Rochester (S)	End of parallel alignment	200	2	0	0	0	2	4	0	7.2	0.0	1.0	1.0	0	0	0	0	0	1	0.11
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	2	0	1.2	0.0	0.2	0.2	0	0	0	0	0	0	0.00
2C3-004-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	6	0	3.1	0.0	0.6	0.6	0	0	0	0	0	3	0.91
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0.00
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	2	0	1.7	0.0	0.0	0.0	0	0	0	0	0	0	0.00
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	4	0	1.9	0.0	0.2	0.2	0	0	0	0	0	0	0.91
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	0	1.5	0.0	0.0	0.0	0	0	0	0	0	0	0.00

Segment 3 – GAP Data

				GAP - Land Cover in Route (acres)															
Route	Start	End	ROW (ft)	Aquatic	Cropland	Developed	Grassland	Lowland Deciduous	Lowland Shrub	Maple/ Basswood	Marsh	Oak	Pine	Pine-Deciduous mix	Redcedar-Deciduous mix	Silver Maple	Upland Cedar	Upland Deciduous	Upland Shrub
3P	North Rochester (S)	Mississippi River	150	43.3	3380.8	36.6	1200.2	94.2	66.8	4.1	54.3	455.0	9.4	0.0	0.0	37.5	0.0	20.8	17.8
3P-Kellogg	North Rochester (S)	Mississippi River	150	46.2	3558.7	95.1	1271.6	99.0	17.2	4.1	47.2	468.9	9.4	0.0	0.0	36.1	0.0	20.8	15.5
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	50.9	2830.6	37.7	1045.9	100.0	58.8	15.6	54.4	611.0	9.4	0.0	1.9	37.5	0.0	27.7	24.8
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	51.9	3225.9	30.5	1080.8	125.8	59.9	7.1	55.0	483.1	9.4	0.0	1.2	37.5	0.0	16.9	20.4
3P-001	North Rochester (S)	Mississippi River	150	43.3	3382.9	39.1	1190.7	101.4	68.4	4.1	55.0	461.7	9.4	0.0	0.0	37.5	0.0	21.7	17.8
3P-002	North Rochester (S)	Mississippi River	150	43.3	3380.2	36.5	1201.4	94.2	66.8	4.1	54.3	455.0	9.4	0.0	0.0	37.5	0.0	20.8	17.8
3P-003	North Rochester (S)	Mississippi River	150	43.3	3399.0	38.0	1187.3	97.0	68.4	4.1	54.3	455.0	9.4	0.0	0.0	37.5	0.0	20.8	17.8
3P-004	North Rochester (S)	Mississippi River	150	43.3	3396.1	37.3	1197.8	84.9	66.8	4.1	54.3	447.2	9.4	0.0	0.0	37.5	0.0	19.1	17.8
3P-005	North Rochester (S)	Mississippi River	150	43.3	3404.4	35.0	1175.1	97.7	66.8	4.1	54.3	455.5	9.4	0.0	0.0	37.5	0.0	20.8	17.8
3P-006	North Rochester (S)	Mississippi River	150	40.6	3477.6	51.1	1206.4	90.7	68.7	2.2	54.3	413.0	9.4	0.0	0.0	37.5	0.0	19.7	17.8
3P-007	North Rochester (S)	Mississippi River	150	40.6	3516.6	45.5	1233.0	89.4	67.1	2.2	54.3	406.4	9.4	0.0	0.0	37.5	0.0	19.2	17.8
3P-008	North Rochester (S)	Mississippi River	150	43.3	3383.5	36.6	1187.7	94.2	66.8	2.5	54.3	449.7	9.4	0.0	0.0	37.5	0.0	20.8	17.8
3P-009	North Rochester (S)	Mississippi River	150	65.0	3285.8	39.7	1208.4	109.1	66.3	8.4	54.3	526.5	9.4	0.0	0.0	37.5	0.0	31.1	20.8
3P-010	North Rochester (S)	Mississippi River	150	43.2	3397.5	52.0	1160.6	86.4	66.8	4.1	54.3	446.1	9.4	0.0	0.0	37.5	0.0	15.3	17.8
3P-011	North Rochester (S)	Mississippi River	150	40.6	3448.0	37.3	1226.4	89.4	68.7	2.8	54.3	395.5	9.4	0.0	0.0	37.5	0.0	19.2	17.8
3B-003	North Rochester (S)	Mississippi River	150	42.3	3835.6	90.3	1240.9	40.4	12.8	3.4	5.3	199.9	0.0	0.0	0.0	34.8	0.0	12.2	4.0
3A-001	North Rochester (N)	Mississippi River	150	31.4	2969.3	26.9	1074.9	117.4	58.8	26.3	58.5	665.6	9.4	0.0	0.7	43.1	0.0	27.7	25.9
3A-003	North Rochester (N)	Mississippi River	150	31.4	2952.0	26.1	1093.0	98.8	58.8	26.4	58.5	641.2	9.4	0.0	0.7	43.1	0.0	26.9	23.4
3A-004	North Rochester (N)	Mississippi River	150	31.4	2931.9	26.1	1117.8	93.3	58.8	25.2	58.5	635.6	9.4	0.0	0.7	43.1	0.0	26.9	23.4
3A-Crossover	North Rochester (N)	Mississippi River	150	32.4	3356.5	19.0	1100.6	139.8	59.9	18.1	59.1	524.1	9.4	0.0	0.0	43.1	0.0	16.1	18.9
3A-Kellogg	North Rochester (N)	Mississippi River	150	34.3	3137.1	84.6	1136.6	118.9	9.2	26.5	51.3	665.9	9.4	0.0	0.7	41.7	0.0	26.9	21.1
3A	North Rochester (N)	Mississippi River	150	31.4	2959.2	26.1	1065.3	114.1	58.8	26.5	58.5	652.0	9.4	0.0	0.7	43.1	0.0	26.9	23.4
2C3-001-3a	End of parallel alignment	Mississippi River	150	45.1	3069.6	149.4	1215.8	128.1	78.7	5.3	57.0	456.5	9.4	0.0	0.0	37.5	0.0	21.7	17.8
2C3-001-3b	End of parallel alignment	Mississippi River	150	45.1	3006.9	156.5	1234.2	130.6	78.7	8.6	57.0	461.4	9.4	0.0	0.0	37.5	0.0	26.5	17.8
2C3-002-3	End of parallel alignment	Mississippi River	150	43.3	3412.9	30.8	1175.8	97.3	68.4	4.1	54.3	455.0	9.4	0.0	0.0	37.5	0.0	20.8	17.8
2C3-003-3	End of parallel alignment	Mississippi River	150	31.4	2959.2	26.1	1065.3	114.1	58.8	26.5	58.5	652.0	9.4	0.0	0.7	43.1	0.0	26.9	23.4
2C3-004-3	End of parallel alignment	Mississippi River	150	43.3	3491.2	26.2	1272.8	115.7	66.8	6.5	55.0	480.6	9.4	0.0	0.0	37.5	0.0	29.0	17.8
2C3-005-3	End of parallel alignment	Mississippi River	150	43.3	3405.7	33.3	1173.9	101.7	68.4	4.1	55.0	461.7	9.4	0.0	0.0	37.5	0.0	21.7	17.8
2C3-006-3	End of parallel alignment	Mississippi River	150	43.3	3563.9	64.8	1224.0	96.9	69.8	4.1	54.3	463.6	9.4	0.0	0.0	37.5	0.0	20.8	17.8
2C3-007-3	End of parallel alignment	Mississippi River	150	43.3	3405.7	33.3	1173.9	101.7	68.4	4.1	55.0	461.7	9.4	0.0	0.0	37.5	0.0	21.7	17.8
2C3-008-3	End of parallel alignment	Mississippi River	150	1.3	1283.8	42.0	433.7	40.6	6.2	4.7	4.0	46.1	0.1	0.0	0.0	0.0	4.0	7.2	0.0

				GAP - Land Cover in Route (200 ft ROW only) (acres)															
Route	Start	End	ROW (ft)	Aquatic	Cropland	Developed	Grassland	Lowland Deciduous	Lowland Shrub	Maple/ Basswood	Marsh	Oak	Pine	Pine-Deciduous mix	Redcedar-Deciduous mix	Silver Maple	Upland Cedar	Upland Deciduous	Upland Shrub
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	1.8	356.6	123.7	129.1	33.8	0.0	2.8	2.7	6.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	1.8	356.6	123.7	129.1	33.8	0.0	2.8	2.7	6.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0.0	756.4	9.2	170.3	3.0	1.6	1.6	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0.0	594.2	4.1	121.0	9.7	0.0	2.4	0.0	10.4	0.0	0.0	0.0	0.0	0.0	3.6	0.0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	0.0	834.7	4.6	267.3	21.4	0.0	4.0	0.7	30.9	0.0	0.0	0.0	0.0	0.0	8.2	0.0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0.0	310.2	9.1	51.9	3.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0.0	454.0	41.8	104.8	2.7	3.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0.0	749.2	11.7	168.4	7.5	1.6	1.6	0.7	12.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0.0	86.8	8.0	47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Segment 3 – MCBS Easements and Karst

				MCBS ROW Prairie			Conservation Easements												Karst Features			
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width				Number in Route Width			
							CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	Spring	Stream Sink/Sieve	Sinkhole	Total
3P	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	10	11
3P-Kellogg	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	8	8	0	0	25.76	25.76	1	0	10	11
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	5	5	0	0	14.01	14.01	0	0	3	3
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	15.05	15.05	0	0	2	2
3P-001	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	8	8	0	0	40.88	40.88	1	0	10	11
3P-002	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	10	11
3P-003	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	9	9	0	0	33.67	33.67	1	0	10	11
3P-004	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	10	11
3P-005	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	10	11
3P-006	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	12	13
3P-007	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	12	13
3P-008	North Rochester (S)	Mississippi River	150	0	0	0	0	0	0	0	0	0	3	3	0	0	1.26	1.26	1	0	10	11
3P-009	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	15.05	15.05	2	0	9	11
3P-010	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	9	10
3P-011	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	12	13
3B-003	North Rochester (S)	Mississippi River	150	0	0	0	0	0	1	1	0	0	5	5	0	0	24.66	24.66	1	0	11	12
3A-001	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	1	1	0	0	0.69	0.69	0	0	4	4
3A-003	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
3A-004	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
3A-Crossover	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	2	2	0	0	1.04	1.04	0	0	3	3
3A-Kellogg	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	1	1	0	0	0.06	0.06	0	0	4	4
3A	North Rochester (N)	Mississippi River	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	0	0	0	2	2	0	0	1.04	1.04	1	0	9	10
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	0	0	0	0	2	2	0	0	1.04	1.04	1	0	9	10
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	9	9	0	0	33.67	33.67	1	0	10	11
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	6	6	0	0	32.91	32.91	1	0	10	11
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	8	8	0	0	40.88	40.88	1	0	10	11
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	9	9	0	0	33.66	33.66	1	0	10	11
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	8	8	0	0	40.88	40.88	1	0	10	11
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	0	0	0	0	0	1	1	0	0	7	7	0	0	25.7	25.7	1	0	10	11

				MCBS ROW Prairie			Conservation Easements												Karst Features			
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width				Number in Route Width			
							CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	CREP II	PWP	RIM	Total	Spring	Stream	Sinkhole	Total
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	7	7	0	0	32.63	32.63	0	0	0	0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	4	4	0	0	31.87	31.87	0	0	0	0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	2	2	0	0	7.97	7.97	0	0	0	0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	1	1	0	0	6	6	0	0	39.84	39.84	0	0	0	0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 3 – MCBS

				MCBS Native Plant Communities			MCBS Significant Biodiversity											
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width			
							Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total
3P	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-Kellogg	North Rochester (S)	Mississippi River	150	8	11	128.6	10	1	1	12	10	2	1	13	175.7	53.6	60.9	290.2
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	9	20	149.5	6	6	2	14	12	6	3	21	136.5	175.4	93.3	405.2
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	9	16	148.5	4	6	1	11	10	6	1	17	98.4	175.4	60.9	334.8
3P-001	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	-15	9	4	1	14	175.5	112.1	60.9	348.5
3P-002	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-003	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-004	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-005	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-006	North Rochester (S)	Mississippi River	150	7	12	127.1	5	4	1	10	10	4	1	15	106.4	112.1	60.9	279.5
3P-007	North Rochester (S)	Mississippi River	150	7	12	127.4	5	4	1	10	10	4	1	15	106.7	112.1	60.9	279.7
3P-008	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-009	North Rochester (S)	Mississippi River	150	10	15	178.8	10	4	1	15	11	4	1	16	208.1	112.1	60.9	381.1
3P-010	North Rochester (S)	Mississippi River	150	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
3P-011	North Rochester (S)	Mississippi River	150	7	12	127.4	5	4	1	10	10	4	1	15	107.0	112.1	60.9	280.0
3B-003	North Rochester (S)	Mississippi River	150	6	7	70.7	6	0	1	7	3	1	1	5	82.0	6.4	60.9	149.3
3A-001	North Rochester (N)	Mississippi River	150	7	17	122.5	10	4	2	16	17	4	3	24	192.0	112.1	93.3	397.4
3A-003	North Rochester (N)	Mississippi River	150	7	17	122.5	10	4	2	16	17	4	3	24	192.0	112.1	93.3	397.4
3A-004	North Rochester (N)	Mississippi River	150	7	17	122.5	10	4	2	16	17	4	3	24	192.0	112.1	93.3	397.4
3A-Crossover	North Rochester (N)	Mississippi River	150	7	13	121.5	8	4	1	13	15	4	1	20	153.9	112.1	60.9	326.9
3A-Kellogg	North Rochester (N)	Mississippi River	150	5	16	104.9	10	1	2	13	18	2	3	23	192.2	53.6	93.3	339.1
3A	North Rochester (N)	Mississippi River	150	7	17	122.5	10	4	2	16	17	4	3	24	192.0	112.1	93.3	397.4
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	12	15	186.9	10	6	1	17	9	6	1	16	175.5	152.8	60.9	389.3
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	12	15	186.9	10	6	1	17	9	6	1	16	175.5	152.8	60.9	389.3
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	7	17	122.5	10	4	2	16	17	4	3	24	192.0	112.1	93.3	397.4
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	11	13	151.0	11	4	1	16	11	4	1	16	183.8	112.1	60.9	356.8
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	10	12	146.2	10	4	1	15	10	4	1	15	176.5	112.1	60.9	349.5
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	10	12	146.2	10	4	1	15	9	4	1	14	175.5	112.1	60.9	348.5

				MCBS Native Plant Communities			MCBS Significant Biodiversity											
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed				Number in Route Width				Area (acres) in Route Width			
							Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total	Moderate	High	Outstanding	Total
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	2	3	40.8	0	2	0	2	0	2	0	2	0.0	40.8	0.0	40.8
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	2	3	40.8	0	2	0	2	0	2	0	2	0.0	40.8	0.0	40.8
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-004-3	North Rochester (N)	End of parallel alignment	200	1	1	4.9	1	0	0	1	2	0	0	2	8.3	0.0	0.0	8.3
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0	0	0.0	0	0	0	0	1	0	0	1	1.0	0.0	0.0	1.0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0

Segment 3 – Prime Farmland

				Prime Farmland in 1000 ft Route Width (acres)						
Route	Start	End	ROW (ft)	All areas are prime farmland	Farmland of local importance	Farmland of statewide importance	Not prime farmland	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Prime farmland if protected from flooding or not frequently flooded during the growing season
3P	North Rochester (S)	Mississippi River	150	2122.12	0	1495.99	1692.37	43.56	0	65.22
3P-Kellogg	North Rochester (S)	Mississippi River	150	2242.54	0	1590.27	1746.52	43.56	0	65.22
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	1520.29	0	1469.8	1850.87	5.71	0	57.8
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	1870.98	0	1589.73	1668.6	11.71	0	62.7
3P-001	North Rochester (S)	Mississippi River	150	2031.63	0	1507.66	1757.95	44.6	0	89.54
3P-002	North Rochester (S)	Mississippi River	150	2126.98	0	1489.84	1705.04	43.56	0	54.41
3P-003	North Rochester (S)	Mississippi River	150	2094.29	0	1526.15	1690.4	44.6	0	74.89
3P-004	North Rochester (S)	Mississippi River	150	2096.18	0	1515.83	1693.28	43.56	0	65.22
3P-005	North Rochester (S)	Mississippi River	150	2116.28	0	1500.09	1675.15	63.44	0	65.22
3P-006	North Rochester (S)	Mississippi River	150	2219.26	0	1537.07	1620.41	45.5	0	65.22
3P-007	North Rochester (S)	Mississippi River	150	2229.17	0	1542.54	1652.14	48.32	0	65.22
3P-008	North Rochester (S)	Mississippi River	150	2133.94	0	1493.6	1666.28	43.56	0	65.22
3P-009	North Rochester (S)	Mississippi River	150	1964.11	0	1589.46	1823.82	20.8	0	62.54
3P-010	North Rochester (S)	Mississippi River	150	2110.87	0	1473.28	1667.17	72.93	0	65.22
3P-011	North Rochester (S)	Mississippi River	150	2196.71	0	1528.09	1611.69	43.56	0	65.22
3B-003	North Rochester (S)	Mississippi River	150	2606.78	0	1603.31	1210.24	39.72	0	60.32
3A-001	North Rochester (N)	Mississippi River	150	1750.75	0	1519.25	1838.95	0	0	25.42
3A-003	North Rochester (N)	Mississippi River	150	1694.74	0	1564.85	1802.9	0	0	25.42
3A-004	North Rochester (N)	Mississippi River	150	1694.8	0	1565.2	1794.94	0	0	25.42
3A-Crossover	North Rochester (N)	Mississippi River	150	2077.12	0	1657.84	1624.04	5.99	0	30.32
3A-Kellogg	North Rochester (N)	Mississippi River	150	1846.23	0	1630.37	1860.46	0	0	25.42
3A	North Rochester (N)	Mississippi River	150	1725.81	0	1536.09	1806.31	0	0	25.42
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	2150.56	0	1343.39	1725.54	47.88	5.89	16.87
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	2091.28	0	1359.28	1762.08	33.08	5.89	16.87
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	2117.02	0	1489.87	1701.72	44.6	0	72.61
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	1725.81	0	1536.09	1806.31	0	0	25.42
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	2251.48	0	1556.17	1739.48	43.56	0	59.55
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	2063.28	0	1480.06	1761.73	44.6	0	82.35
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	2329.61	0	1522.31	1690.14	44.6	0	81.92
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	2063.28	0	1480.06	1761.73	44.6	0	82.35
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	2122.12	0	1495.99	1692.37	43.56	0	65.22

				Prime Farmland in 1000 ft Route Width (acres)						
Route	Start	End	ROW (ft)	All areas are prime farmland	Farmland of local importance	Farmland of statewide importance	Not prime farmland	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Prime farmland if protected from flooding or not frequently flooded during the growing season
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	442.57	0	96.83	96.13	4.42	5.89	11.97
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	442.57	0	96.83	96.13	4.42	5.89	11.97
2C3-002-3	North Rochester (S)	End of parallel alignment	200	471.31	0	281.51	125.78	1.03	0	67.71
2C3-003-3	North Rochester (N)	End of parallel alignment	200	477.07	0	225.69	17.1	0	0	25.42
2C3-004-3	North Rochester (N)	End of parallel alignment	200	605.77	0	347.81	163.55	0	0	54.65
2C3-005-3	North Rochester (S)	End of parallel alignment	200	215.13	0	102.79	26.29	1.03	0	30.57
2C3-006-3	North Rochester (N)	End of parallel alignment	200	422.16	0	127.53	20.62	1.04	0	43.49
2C3-007-3	North Rochester (S)	End of parallel alignment	200	417.57	0	271.71	185.79	1.03	0	77.45
2C3-008-3	North Rochester (S)	End of parallel alignment	200	45.21	0	66.18	11.18	0	0	19.16

Segment 3 – Recreation Areas

				WMA (Wildlife Management Areas)			SNA	WPA	Wildlife Refuge			State Forest			State Parks	County Parks			Local Parks
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number in Route Width
3P	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-Kellogg	North Rochester (S)	Mississippi River	150	1	1	62.23	0	0	1	1	65.34	1	1	971.42	0	0	0	0	0
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	3404.19	0	0	0	0	0
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	2	2	1721.54	0	0	0	0	0
3P-001	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-002	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-003	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-004	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-005	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-006	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-007	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-008	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-009	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	2	2	1190.87	0	0	0	0	0
3P-010	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3P-011	North Rochester (S)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
3B-003	North Rochester (S)	Mississippi River	150	0	2	127.97	0	0	1	1	65.34	1	1	1240.60	0	0	0	0	0
3A-001	North Rochester (N)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	3662.90	0	0	0	0	0
3A-003	North Rochester (N)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	3616.44	0	0	0	0	0
3A-004	North Rochester (N)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	3608.90	0	0	0	0	0
3A-Crossover	North Rochester (N)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	2	2	1941.95	0	0	0	0	0
3A-Kellogg	North Rochester (N)	Mississippi River	150	1	1	62.23	0	0	1	1	65.34	1	1	3644.00	0	0	0	0	0
3A	North Rochester (N)	Mississippi River	150	3	2	127.97	0	0	1	1	65.34	1	1	3622.17	0	0	0	0	0
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	1
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	1
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	3622.17	0	0	0	0	0
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	3	2	127.97	0	0	1	1	65.34	1	1	949.59	0	0	0	0	0

				WMA (Wildlife Management Areas)			SNA	WPA	Wildlife Refuge			State Forest			State Parks	County Parks			Local Parks
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number Crossed	Number in Route Width	Area (acres) in Route Width	NONE	Number Crossed	Number in Route Width	Area (acres) in Route Width	Number in Route Width
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2C3-002-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Segment 3 – Recreation Areas (cont'd)

				Snowmobile Trails			Scenic Byways			MN DNR State Trails			MN State Park Trails	MN State Forest Campgrounds	Boat Access
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	NONE	NONE	NONE
3P	North Rochester (S)	Mississippi River	150	21	19	36932	1	1	1053	0	0	0	0	0	0
3P-Kellogg	North Rochester (S)	Mississippi River	150	21	19	40357	1	1	8230	0	0	0	0	0	0
3P-Zumbro-N	North Rochester (S)	Mississippi River	150	11	15	19724	1	1	1053	0	0	0	0	0	0
3P-Zumbro-S	North Rochester (S)	Mississippi River	150	17	19	31376	1	1	1053	0	0	0	0	0	0
3P-001	North Rochester (S)	Mississippi River	150	21	19	37225	1	1	1053	0	0	0	0	0	0
3P-002	North Rochester (S)	Mississippi River	150	21	19	36932	1	1	1053	0	0	0	0	0	0
3P-003	North Rochester (S)	Mississippi River	150	21	19	37225	1	1	1053	0	0	0	0	0	0
3P-004	North Rochester (S)	Mississippi River	150	21	19	39199	1	1	1053	0	0	0	0	0	0
3P-005	North Rochester (S)	Mississippi River	150	22	21	42159	1	1	1053	0	0	0	0	0	0
3P-006	North Rochester (S)	Mississippi River	150	26	22	45462	1	1	1053	0	0	0	0	0	0
3P-007	North Rochester (S)	Mississippi River	150	24	20	40334	1	1	1053	0	0	0	0	0	0
3P-008	North Rochester (S)	Mississippi River	150	21	19	36932	1	1	1053	0	0	0	0	0	0
3P-009	North Rochester (S)	Mississippi River	150	21	18	35622	1	1	1053	0	0	0	0	0	0
3P-010	North Rochester (S)	Mississippi River	150	21	21	40779	1	1	1053	0	0	0	0	0	0
3P-011	North Rochester (S)	Mississippi River	150	23	20	41923	1	1	1053	0	0	0	0	0	0
3B-003	North Rochester (S)	Mississippi River	150	14	13	20347	1	1	1001	0	0	0	0	0	0
3A-001	North Rochester (N)	Mississippi River	150	10	12	16950	1	1	1053	0	0	0	0	0	0
3A-003	North Rochester (N)	Mississippi River	150	10	11	16414	1	1	1053	0	0	0	0	0	0
3A-004	North Rochester (N)	Mississippi River	150	11	12	17360	1	1	1053	0	0	0	0	0	0
3A-Crossover	North Rochester (N)	Mississippi River	150	16	16	28512	1	1	1053	0	0	0	0	0	0
3A-Kellogg	North Rochester (N)	Mississippi River	150	10	12	20286	1	1	8230	0	0	0	0	0	0
3A	North Rochester (N)	Mississippi River	150	10	12	16861	1	1	1053	0	0	0	0	0	0
2C3-001-3a	North Rochester (S)	Mississippi River	150 and 200	26	23	51532	1	1	1053	0	0	0	0	0	0
2C3-001-3b	North Rochester (S)	Mississippi River	150 and 200	24	22	46722	1	1	1053	0	0	0	0	0	0
2C3-002-3	North Rochester (S)	Mississippi River	150 and 200	23	21	40321	1	1	1053	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	Mississippi River	150 and 200	10	12	16861	1	1	1053	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	Mississippi River	150 and 200	21	19	37074	1	1	1053	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	Mississippi River	150 and 200	23	21	40321	1	1	1053	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	Mississippi River	150 and 200	21	19	37225	1	1	1053	0	0	0	0	0	0
2C3-007-3	North Rochester (S)	Mississippi River	150 and 200	23	21	40321	1	1	1053	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	Mississippi River	150 and 200	21	19	36932	1	1	1053	0	0	0	0	0	0

				Snowmobile Trails			Scenic Byways			MN DNR State Trails			MN State Park Trails	MN State Forest Campgrounds	Boat Access
Route	Start	End	ROW (ft)	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	Number Crossed	Number in Route Width	Length (ft) in Route Width	NONE	NONE	NONE
2C3-001-3a	North Rochester (S)	End of parallel alignment	200	7	6	16748	0	0	0	0	0	0	0	0	0
2C3-001-3b	North Rochester (S)	End of parallel alignment	200	7	6	16748	0	0	0	0	0	0	0	0	0
2C3-002-3	North Rochester (S)	End of parallel alignment	200	4	4	5537	0	0	0	0	0	0	0	0	0
2C3-003-3	North Rochester (N)	End of parallel alignment	200	1	1	1143	0	0	0	0	0	0	0	0	0
2C3-004-3	North Rochester (N)	End of parallel alignment	200	2	2	2289	0	0	0	0	0	0	0	0	0
2C3-005-3	North Rochester (S)	End of parallel alignment	200	3	3	4390	0	0	0	0	0	0	0	0	0
2C3-006-3	North Rochester (N)	End of parallel alignment	200	1	1	1294	0	0	0	0	0	0	0	0	0
2C3-007-3	North Rochester (S)	End of parallel alignment	200	4	4	5537	0	0	0	0	0	0	0	0	0
2C3-008-3	North Rochester (S)	End of parallel alignment	200	0	0	0	0	0	0	0	0	0	0	0	0

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