EL 06-002

PO Box 496
215 South Cascade Street
Fergus Falls MN 56537

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JAN 17 2006
SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

January 12, 2006

BIG STONE
PARTNERS IN TRANSMISSION

Ms. Patricia Van Gerpen
Executive Director
Public Utilities Commission of the
State of South Dakota
Capitol Building, First Floor
500 East Capitol Avenue
Pierre, SD 57501

Re: In the Matter of the Application for a Route Permit for High Voltage Transmission Lines in Eastern South Dakota

Dear Ms. Van Gerpen:

Enclosed please find one original and 10 copies of an Application for a Route Permit for High Voltage Transmission Lines in Eastern South Dakota.

This Application is being submitted jointly by the transmission functions of seven regional utilities – Otter Tail Power Company, Central Minnesota Municipal Power Agency, Great River Energy, Heartland Consumers Power District, Montana-Dakota Utilities Co., Southern Minnesota Municipal Power Agency, and Western Minnesota Municipal Power Agency (as represented by Missouri River Energy Services).

The Applicants seek a Route Permit designating a route and authorizing construction of two new transmission lines in South Dakota from the existing Big Stone 230 kV Substation in South Dakota to termination points in Minnesota. One line would be constructed to 230 kV standards and would run from the Big Stone 230 kV Substation to the Morris Substation near Morris, Minnesota, a distance of approximately 48 miles, 4 miles of which are in South Dakota. The second line would be constructed for future 345 kV operation but initially operated at 230 kV and would run from the Big Stone 345 kV Substation to the Granite Falls Substation in Granite Falls, Minnesota, a distance of approximately 90 miles, 33 miles of which are in South Dakota. In addition, modification of the Big Stone 230 kV Substation and existing transmission facilities and construction of the Big Stone 345 kV Substation will also be required as part of the Project.

Consideration of the Route Permit Application will proceed in accordance with the requirements of Chapter 49-41B of South Dakota Codified Law, and Chapter 20:10:22 of the South Dakota Administrative Rules. We have included a Completion Checklist at the beginning of the Application citing sections in the document where information required for a route permit application can be found. We are confident that the Application contains all the information required in a route permit application.

Enclosed are 11 hard copies and a CD-ROM of the Application. We will also post the Application on a webpage being maintained by the Applicants for this project.

Finally, I have enclosed a check for $8,000 as the initial payment for costs associated with processing this Application. The check is made out the Department of Commerce.

Thank you for your consideration.

Sincerely,

Dean Pawlowski
Otter Tail Power Company
Big Stone Transmission Project Manager

Enclosures

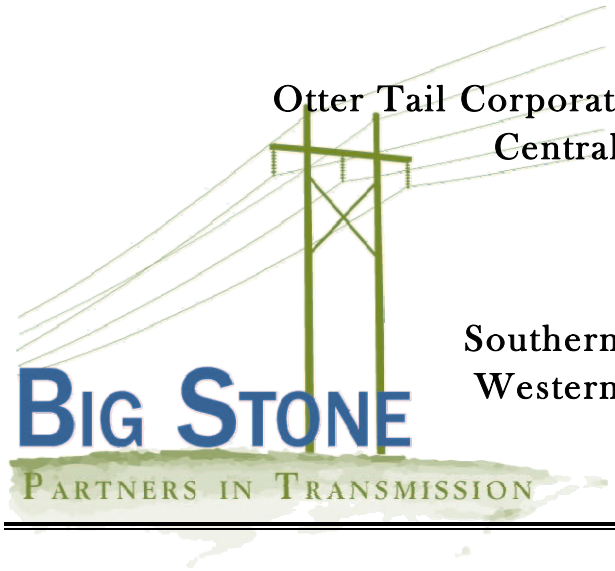
Otter Tail Corporation dba Otter Tail Power Company
Central Minnesota Municipal Power Agency
Great River Energy
Heartland Consumers Power District
Montana-Dakota Utilities Co.
Southern Minnesota Municipal Power Agency
Western Minnesota Municipal Power Agency
(as represented by Missouri River Energy Services)

January 12, 2006

Big Stone Transmission Project

Application to the Public Utilities Commission of the
State of South Dakota for a Transmission Facility Siting Permit

SDPUC Docket No. _____



Otter Tail Corporation (dba Otter Tail Power Company)
Central Minnesota Municipal Power Agency
Great River Energy
Heartland Consumers Power District
Montana-Dakota Utilities Co.
Southern Minnesota Municipal Power Agency
Western Minnesota Municipal Power Agency
(as represented by Missouri River Energy Services)

Application to the Public Utilities Commission of the State of South Dakota

for a Transmission Facility Siting Permit

Big Stone Transmission Project

January 12, 2006

SDPUC Docket No. __

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COMPLETENESS CHECKLIST

The contents required for an application with the Public Utilities Commission of the State of South Dakota (PUC) are described in SDCL 49-1-8 and further clarified in ARSD 20:10:13:01(1) et seq. The Commission submittal requirements are listed with cross-references indicating where the information can be found in this Application.

TABLE 1
COMPLETENESS CHECKLIST

SDCL	ARSD	Required Information	Location
49-41B-11(1)	20:10:22:06	Names of participants required. The application shall contain the name, address, and telephone number of all persons participating in the proposed facility at the time of filing, as well as the names of any individuals authorized to receive communications relating to the application on behalf of those persons.	2.0
49-41B-11(7)	20:10:22:07	Name of owner and manager. The application shall contain a complete description of the current and proposed rights of ownership of the proposed facility. It shall also contain the name of the project manager of the proposed facility.	3.0
49-41B-11(8)	20:10:22:08	Purpose of facility. The applicant shall describe the purpose of the proposed facility.	4.0
49-41B-11(12)	20:10:22:09	Estimated cost of facility. The applicant shall describe the estimated construction cost of the proposed facility.	5.0
49-41B-11(9)	20:10:22:10	Demand for facility. The applicant shall provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. The applicant shall also provide data, data sources, assumptions, forecast methods or models, or other reasoning upon which the description is based. This statement shall also include information on the relative contribution to any power or energy distribution network or pool that the proposed facility is projected to supply and a statement on the consequences of delay or termination of the construction of the facility.	4.0, 6.0
49-41 B-11	20:10:22:11	General site description. The application shall contain a general site description of the proposed facility including a description of the specific site and its location with respect to state, county, and other political subdivisions; a map showing prominent features such as cities, lakes and rivers; and maps showing cemeteries, places of historical significance, transportation facilities, or other public facilities adjacent to or abutting the plant or transmission site.	7.0

SDCL	ARSD	Required Information	Location
49-41B-11(6), 49-41B-21, 34A-9-7(4)	20:10:22:12	Alternative sites. The applicant shall present information related to its selection of the proposed site for the facility, including the following: (1) The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for selecting these criteria; (2) An evaluation of alternative sites considered by the applicant for the facility; (3) An evaluation of the proposed plant or transmission site and its advantages over the other alternative sites considered by the applicant, including a discussion of the extent to which reliance upon eminent domain powers could be reduced by use of an alternative site, alternative generation method, or alternative waste handling method.	8.0
49-41B-11(11); 49-41B-21; 49-41B-22	20:10:22:13	Environmental information. The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse affect of the environment as a result of their construction or operation in the transmission site or siting area.	9.0
49-41B-11; 49-41B-22	20:10:22:14	Effect on physical environment. The applicant shall provide information describing the effect of the proposed facility on the physical environment. The information shall include: (1) A written description of the regional land forms surrounding the proposed plant site or through which the transmission facility will pass; (2) A topographic map of the transmission site or siting area; (3) A written summary of the geological features of the siting area or transmission site using the topographic map as a base showing the bedrock geology and surficial geology with sufficient cross-sections to depict the major subsurface variations in the siting area; (4) A description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the plan or transmission site; (5) A description of the soil type at the plant site; (6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control; (7) Information on areas of seismic risks, subsidence potential and slope instability for the siting area or transmission site; and (8) An analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints.	10.0

SDCL	ARSD	Required Information	Location
49-41B-11; 49-41B-21; 49-41B-22	20:10:22:15	Hydrology. The applicant shall provide information concerning the hydrology in the area of the proposed plant or transmission site and the effect of the proposed site on surface and groundwater. The information shall include: (1) A map drawn to scale of the plant or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility; (2) Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects; (3) A map drawn to scale locating any known surface or groundwater supplies within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission; (4) If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definition of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of ground water; (5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; (6) If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.	11.0
49-41B-11; 49-41B-21; 49-41B-22	20:10:22:16	Effect on terrestrial ecosystems. The applicant shall provide information on the effect of the proposed facility on the terrestrial ecosystems, including existing information resulting from biological surveys conducted to identify and quantify the terrestrial fauna and flora potentially affected within the transmission site or siting area; an analysis of the impact of construction and operation of the proposed facility on the terrestrial biotic environment, including breeding times and places and pathways of migration; important species; and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	12.0
49-41B-11; 49-41B-21; 49-41B-22	20:10:22:17	Effect of aquatic ecosystems. The applicant shall provide information of the effect of the proposed facility on aquatic ecosystems, and including existing information resulting from biological surveys conducted to identify and quantify the aquatic fauna and flora, potentially affected within the transmission site or siting area, an analysis of the impact of the construction and operation of the proposed facility on the total aquatic biotic environment and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	13.0

SDCL	ARSD	Required Information	Location
49-41B-11 49-41B-22	20:10:22:18	Land use. The applicant shall provide the following information concerning present and anticipated use or condition of the land: (1) A map or maps drawn to scale of the siting area and transmission site identifying existing land use according to the following classification system: (a) Land used primarily for row and nonrow crops in rotation; (b) Irrigated lands; (c) Pasturelands and rangelands; (d) Haylands; (e) Undisturbed native grasslands; (f) Existing and potential extractive nonrenewable resources; (g) Other major industries; (h) Rural residences and farmsteads, family farms, and ranches; (i) Residential; (j) Public, commercial, and institutional use; (k) Municipal water supply and water sources for organized rural water districts; and (l) Noise sensitive land uses; (2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility; (3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and (4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.	14.0
49-41B-11	20:10:22:19	Local land use controls. The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the commission with a detailed explanation of the reasons why the proposed facility should preempt the local controls. The explanation shall include a detailed description of the restrictiveness of the local controls in view of existing technology, factors of cost, economics, needs of parties, or any additional information to aid the commission in determining whether a permit may supersede or preempt a local control pursuant to SDCL 49-41B-28.	15.0
49-41B-11	20:10:22:20	Water quality. The applicant shall provide evidence that the proposed facility will comply with all water quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	16.0
49-41B-11; 49-41B-21; 49-41B-22	20:10:22:21	Air quality. The applicant shall provide evidence that the proposed facility will comply with all air quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	17.0
49-41B-11(3)	20:10:22:22	Time schedule. The applicant shall provide estimated time schedules for accomplishment of major events in the commencement and duration of construction of the proposed facility.	18.0

SDCL	ARSD	Required Information	Location
49-41B-11(3); 49-41B-22	20:10:22:23	Community impact. The applicant shall include an identification and analysis of the effects the construction, operation, and maintenance of the proposed facility will have on the anticipated affected area including the following: (1) A forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services; (2) A forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions; (3) A forecast of the impact on agricultural production and uses; (4) A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities; (5) A forecast of the impact on transportation facilities; (6) A forecast of the impact on landmarks and cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance. The information shall include the applicants' plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the proposed facility; and (7) An indication of means of ameliorating negative social impact of the facility development.	19.0
49-41B-11	20:10:22:24	Employment estimates. The application shall contain the estimated number of jobs and a description of job classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals. The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the county and the township in which the facility is located after construction is completed.	20.0
49-41B-11(5)	20:10:22:25	Future additions and modifications. The applicant shall describe any plans for future modification or expansion of the proposed facility or construction of additional facilities which the applicant may wish to be approved in the permit.	21.0
49-41B-11	20:10:22:34	Transmission facility layout and construction. If a transmission facility is proposed, the applicant shall submit a policy statement concerning the route clearing, construction and landscaping operations, and a description of plans for continued right-of-way maintenance, including stabilization and weed control.	22.0

SDCL	ARSD	Required Information	Location
49-41B-11	20:10:22:35.	Information concerning transmission facilities. If a transmission facility is proposed, the applicant shall provide the following information as it becomes available to the applicant: (1) Configuration of the towers and poles, including material, overall height and width; (2) Conductor configuration and size, length of span between structures, and number of circuits per pole or tower; (3) The proposed transmission site and major alternatives as depicted on overhead photographs and land use culture maps; (4) Reliability and safety; (5) Right-of-way or condemnation requirements; (6) Necessary clearing activities; and (7) If the transmission facility is placed underground, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.	23.0
49-41B-7; 49-41B-22	20:10:22:36.	Additional information in application. The applicant shall also submit as part of the application any additional information necessary for the local review committees to assess the effects of the proposed facility pursuant to SDCL 49-41B-7. The applicant shall also submit as part of its application any additional information necessary to meet the burden of proof specified in SDCL 49-41B-22.	24.0
49-41B-11; 49-41B-22	20:10:22:37.	Statement required describing gas or liquid transmission line standards of construction. The applicant shall submit a statement describing existing pipeline standards and regulations that will be followed during construction and operation of the proposed transmission facility.	N/A
49-41B-11; 49-41B-22	20:10:22:38.	Gas or liquid transmission line description. The applicant shall provide the following information describing the proposed gas or liquid transmission line: (1) A flow diagram showing daily design capacity of the proposed transmission facility; (2) Changes in flow in the transmission facilities connected to the proposed facility; (3) Technical specifications of the pipe proposed to be installed, including the certified maximum operating pressure, expressed in terms of pounds per square inch gauge (psig); (4) A description of each new compressor station and the specific operating characteristics of each station; and (5) A description of all storage facilities associated with the proposed facility.	N/A
49-41B-11	20:10:22:39.	Testimony and exhibits. Upon the filing of an application pursuant to SDCL 49-41B-11, an applicant shall also file all data, exhibits, and related testimony which the applicant intends to submit in support of its application. The application shall specifically show the witnesses supporting the information contained in the application. Such filing will be made consistent with the prehearing conference order.	25.0

1.0 EXECUTIVE SUMMARY

Seven utilities – Otter Tail Power Company, Central Minnesota Municipal Power Agency, Great River Energy, Heartland Consumers Power District, Montana-Dakota Utilities Co., Southern Minnesota Municipal Power Agency and Western Minnesota Municipal Power Agency (as represented by Missouri River Energy Services) – have proposed to construct a new 600 megawatt (MW) power plant (BSP II) next to the existing unit (BSP I) at the Big Stone Plant in South Dakota. The BSP II will provide additional generating capacity and baseload energy for the benefit of the utilities' customers.

In July 2005, the utilities filed an application with the PUC for an Energy Conversion Facility Siting Permit for the BSP II. That application is available online at:

www.state.sd.us/puc/commission/dockets/electric/2005/EL05-022/application.pdf

Studies conducted by Otter Tail Power Company for the Midwest Independent Transmission System Operator (MISO) have shown that the existing transmission system is not capable of handling the output from BSP II. The existing transmission lines would seriously overload if an additional 600 MW of power were added to the present system. Therefore, additional transmission facilities are required to provide additional outlet capacity for the electricity that will be generated by the new unit.

The utilities are submitting this Application for a Transmission Facility Siting Permit for the South Dakota portion of two new high voltage transmission lines from the Big Stone 230 kV Substation to termination points at substations in Minnesota. One new transmission line would run from the Big Stone 230 kV Substation in South Dakota to the Morris Substation near Morris, Minnesota, a total of approximately 48 miles, only four miles of which are in South Dakota. The other transmission line would run from the Big Stone 230 kV Substation to Granite Falls Substation near Granite Falls, Minnesota, a distance of approximately 90 miles, 33 miles of which would be in the state of South Dakota. The Big Stone to Morris transmission line would be constructed at 230 kV. The Granite Falls transmission line would be constructed at 345 kV but operated initially at 230 kV.

These transmission lines will actually serve two purposes: (1) provide an outlet for the power from the proposed BSP II and (2) increase the transmission capacity and improve reliability of the electric transmission system in the Buffalo Ridge area in South Dakota and Minnesota. The Granite Falls transmission line is proposed to be constructed at 345 kilovolts (kV) to provide this additional capacity to transport other energy from the Buffalo Ridge area in South Dakota and southwestern Minnesota to the Twin Cities and other markets when such power becomes available.

Because the Granite Falls 230 kV Substation and the Morris 230 kV Substation are owned by the Western Area Power Administration (Western) and the Applicants have requested interconnection at those facilities, a federal environmental impact statement (EIS) is required. The EIS is being prepared by Western and will evaluate the corridors in which the routes are being considered.

The Big Stone Transmission Project map is shown in Figure 1.

In October 2005, the utilities filed an application with the Minnesota Public Utilities Commission (MPUC) for a Certificate of Need (CON) for the Minnesota portion of these two new transmission lines. That application is available online at:

http://www.bigstoneii.com

The utilities evaluated several transmission system alternatives before deciding on the Morris transmission line and the Granite Falls transmission line. As explained in the Minnesota CON application, these two lines were determined to be the best alternatives from an environmental, electrical and cost standpoint. One system alternative that has been examined in detail as part of the Minnesota application is a 230 kV transmission line from Big Stone to the Willmar, Minnesota area, which would replace the conversion of Big Stone to Morris transmission line.

The utilities are submitting this application to the PUC of the State of South Dakota for the South Dakota portion of the two transmission lines. The South Dakota routes are more specifically described as follows.

The Morris Transmission Line:

Approximately four miles of the new transmission line from Big Stone to Morris will be in South Dakota. The preferred route for this transmission line is south (approximately 1.25 miles) from the existing 230 kV Big Stone Substation (Big Stone 230 kV Substation) to the site for a new 345 kV Big Stone Substation (Big Stone 345 kV Substation), then southeast approximately one mile to U.S. Highway 12, then east into Minnesota along the existing ROW of a 115 kV transmission line.

The Granite Falls Transmission Line:

The route for the Big Stone to Granite Falls transmission line has a 230 kV segment that parallels the 230 kV Morris transmission line 1.25 miles from the Big Stone 230 kV Substation to the Big Stone 345 kV Substation. The transmission line built for 345 kV will travel from the Big Stone 345 kV Substation approximately 33 miles to near the city of Gary, South Dakota before turning east to the Minnesota border and on to the substation at Canby, Minnesota and then to the Granite Falls

Substation, a total of approximately 90 miles. The route in South Dakota is described in the following segments.

SEGMENT A (5.3 MILES):
This segment of transmission line will consist of new single circuit 345 kV transmission line constructed from the Big Stone 345 kV Substation east and then south towards U.S. Highway 12, to 150th Street near Section 18 of Alban Township 120N, Range 47W in Grant County, South Dakota.

SEGMENT B (22.6 MILES):
This segment will consist of a new single circuit 345 kV transmission line constructed south of Segment A traveling south to Section 6 of Glenwood Township, 116N, Range 47W in Deuel County.

SEGMENT C (4.8 MILES):
This segment will consist of a new single circuit 345 kV transmission line constructed south of Segment B. The segment will travel southeast to the southwest corner of 176th Street and County Road 310 or 488th Avenue to the South Dakota endpoint in Section 27 of Township 116N, Range 47W, north of Gary, South Dakota. This segment will travel in a valley to the east of the Blair Substation crossing under the existing Western Area Power Administration 230 kV transmission line and will then cross over the Big Stone to Blair 230 kV transmission line to the South Dakota border crossing.

A map showing the preferred route segments is shown in Figure 2 and Appendix A.1 through A.5.

In addition to the two new transmission lines, the utilities must also upgrade the Big Stone 230 kV Substation and construct a new substation to handle the 345 kV transmission. The Big Stone 230 kV Substation, located south of the Plant, will require upgrading to handle the additional 230 kV transmission lines and the 230 kV connection to the new generator. The utilities will require a slight expansion of the present substation area by approximately 50 feet by 375 feet or 0.43 acres located on plant property. The Big Stone 345 kV Substation will be constructed approximately 1.25 miles southeast of the Plant. Approximately 600 x 600 feet or 8.3 acres of area will be required for the new substation. Finally, a small portion of the existing Hankinson 230 kV transmission line will have to be relocated on BSP property to accommodate the BSP II construction.

The utilities estimate that the facilities to be constructed in South Dakota will cost between $29 and $41 million. The entire transmission project is estimated to cost between $93 and $135 million. The transmission lines are scheduled to be in service by 2010 in order to satisfy the increasing demand for electricity by the utilities' customers.

In selecting the preferred routes for the new transmission line, the utilities examined several different possibilities. One system alternative that has been considered is the construction of a new 230 kV transmission line to the Willmar, Minnesota area. The MPUC will ultimately determine which system alternative to select, the Applicants' preferred line to Morris or the Willmar line. The Minnesota route selection will not affect the South Dakota portion of the 230 kV transmission line.

There is no system alternative to the Granite Falls transmission line, but there are several different route options under consideration in Minnesota. Minnesota law requires a utility proposing a new 345 kV transmission line to recommend a preferred route and suggest an alternative route. While the Minnesota preferred and alternative route will match up with the proposed South Dakota route at the border, additional routes are under consideration that would change the South Dakota route. One alternative route being considered in the Minnesota route application would be located on the Minnesota side of the border rather than in South Dakota, thus eliminating nearly 30 miles of transmission line in South Dakota. If this alternative route is selected, the border crossing would be located at 150th Street along the southern edge of Section 10 of Alban Township 120N, Range 47W in Grant County. This alternative route is shown in Appendix A.6.

Several other corridors were considered by the utilities in preparation of the Minnesota CON Application, and the Western Area Power Administration also considered other possible corridors as part of the EIS it is preparing. The utilities believe that the other possible routes within these corridors offer no environmental or electrical benefits over the preferred routes and should be rejected. An application for a Route Permit for the two transmission lines will be submitted to the MPUC on December 9, 2005 and it will be necessary for the two agencies to coordinate approval of a border crossing.

In this Application the utilities have addressed all those matters set forth in SDCL Chapter 49-41B and in ARSD chapter 20:10:22 (entitled Energy Facility Siting Rules) Included with this Application is a Completion Checklist (Table 1) that sets forth where in the Application each requirement of the rules is addressed.

Pursuant to SDCL 49-41B-22, the information presented here establishes that:

1. The proposed transmission line facilities comply with all applicable laws and rules;
2. The facilities will not pose a threat of serious injury to the environment or to the social and economic condition of inhabitants in the siting area;

3. The facilities will not substantially impair the health, safety, or welfare of the inhabitants; and
4. The facilities will not unduly interfere with the orderly development of the region, giving consideration to the views of the governing bodies of the local affected units of government.

2.0 NAMES OF PARTICIPANTS (ARSD 20:10:22:06)

The Applicants for the proposed Project are listed below along with a contact person and contact information for each of the utilities. Otter Tail Power Company is the project lead and it is preferred that the Project Contact be contacted for information requests.

Project Lead:	Otter Tail Power Company
	215 South Cascade Street
	Fergus Falls, Minnesota 56538
Project Manager:	Dean Pawlowski
Contact:	Beverly Rund
	Otter Tail Power Company
	215 South Cascade Street, PO Box 496
	Fergus Falls, MN 56538-0496
Phone:	(218) 739-8249
Fax:	(218) 739-8629
Email:	brund@otpco.com
Project Counsel:	Boyce, Greenfield, Pashby & Welk, LLP
	101 N. Phillips Ave., Suite 600
	Sioux Falls, SD 57104
Applicant:	Central Minnesota Municipal Power Agency (CMMPA)
	459 South Grove Street
	Blue Earth, Minnesota 56013
Contact:	Steve Thompson
Phone:	(507) 526-2193
Applicant:	Great River Energy (GRE)
	17845 East Highway 10
	P.O. Box 800
	Elk River, Minnesota 55330
Contact:	Gordon Pietsch
Phone:	(763) 441-3121

Applicant:	Heartland Consumers Power District (Heartland)
	P.O. Box 248
	Madison, South Dakota 57042-0248
Contact:	John Knofczynski
Phone:	(605) 256-6536

Applicant:	Missouri River Energy Services (MRES)
	3724 West Avera Drive
	Sioux Falls, South Dakota 57109-8920
Contact:	Brian Zavesky
Phone:	(605) 330-6986

Applicant:	Montana-Dakota Utilities Co. (Montana-Dakota)
	400 North 4th Street
	Bismarck, North Dakota 58501
Contact:	Lynn Paulsen
Phone:	(701) 222-7649

Applicant:	Southern Minnesota Municipal Power Agency (SMMPA)
	500 First Avenue SW
	Rochester, Minnesota 55902-3303
Contact:	Richard Hetwer
Phone:	(507) 285-0478

3.0 NAME OF OWNER AND MANAGER (ARSD 20:10:22:07)

The Applicants include two investor-owned utilities (Otter Tail Power Company and Montana-Dakota Utilities Co.), one generation and transmission cooperative (Great River Energy), three municipal power agencies (Central Minnesota Municipal Power Agency, Southern Minnesota Municipal Power Agency and Missouri River Energy Services) and a consumers power district (Heartland Consumers Power District). Collectively these utilities provide electrical energy and related services to wholesale and retail residential, commercial and industrial customers in Iowa, Minnesota, Montana, North Dakota, South Dakota, Wisconsin and Wyoming. They collectively own and operate thousands of miles of transmission lines throughout the Midwest.

The Applicants will own the project in the proportions shown in Table 2.

TABLE 2
APPLICANTS' OWNERSHIP INTEREST IN PROPOSED TRANSMISSION FACILITIES

Applicants	Percentage of Ownership
Western Municipal Power Agency	25.00%
Great River Energy	19.33%
Montana-Dakota Utilities Company	19.33%
Otter Tail Power Company	19.33%
Southern Minnesota Municipal Power Supply	7.80%
Central Minnesota Municipal Power Agency	5.00%
Heartland Consumer Power District	4.20%
Total	100.00%

The individual Applicants and their respective general service areas are described below.

Otter Tail Corporation is an investor-owned diversified corporation, organized under the laws of the State of Minnesota. Otter Tail Power Company (Otter Tail) is the utility business segment of Otter Tail Corporation. Otter Tail is headquartered in Fergus Falls, Minnesota. It provides electricity to approximately 127,000 residential, commercial and industrial customers throughout Minnesota, South Dakota and North Dakota. Otter Tail was originally incorporated in 1907 and first delivered electricity in 1909 from the Dayton Hollow Dam on the Otter Tail River.

Central Minnesota Municipal Power Agency (CMMPA) is a not-for-profit municipal corporation and political subdivision of the State of Minnesota, headquartered in Blue Earth, Minnesota. CMMPA was formed in 1987 and has 15 members. CMMPA is responsible for supplying wholesale power to its members, who in turn provide low cost, reliable electric energy and related services directly to customers across south and central Minnesota.

Great River Energy (GRE) is a generation and transmission electric cooperative headquartered in Elk River Minnesota, which provides electrical and related services to 28 member distribution cooperatives in Minnesota and Wisconsin. These member cooperatives distribute electricity to more than 600,000 homes, businesses and farms. The service territories of GRE's 28 members stretch from the southwest corner of Minnesota, with one member serving a small part of northwestern Wisconsin.

Heartland Consumers Power District (Heartland) is a not-for-profit public corporation and political subdivision of the state of South Dakota, headquartered in Madison, South Dakota. Created in 1969, Heartland supplies wholesale electric power and energy from a diverse mix of resources to eighteen municipalities across eastern South Dakota, southwestern Minnesota and northwestern Iowa, as well as several state institutions and one electric power cooperative.

Missouri River Energy Services (MRES) is comprised of 59 municipally owned electric utilities in the states of Iowa, Minnesota, North Dakota and South Dakota, of which 57 are MRES S-1 Power Supply Agreement customers. MRES has no retail loads and all of its firm sales are made to municipal or wholesale utilities. MRES acts as an agent for the Western Minnesota Municipal Power Agency (WMMPA), which itself was incorporated as a municipal corporation and political subdivision of the State of Minnesota. WMMPA consists of 24 municipalities.

Montana-Dakota Utilities Co. (Montana-Dakota) is an investor owned utility that operates an integrated electric system in parts of Montana, North Dakota and South Dakota, and a separate electric system in Wyoming. Montana-Dakota is a division of MDU Resources Group, Inc., a diverse energy company located in Bismarck, North Dakota, which includes natural gas and oil production, construction materials and mining, domestic and international independent power production, electric and natural gas utilities, natural gas pipelines and energy services, and utility services. Montana-Dakota provides electric and natural gas services to approximately 250 communities in the above states.

Southern Minnesota Municipal Power Agency (SMMPA) is a not-for-profit municipal corporation and political subdivision of the State of Minnesota, headquartered in Rochester, Minnesota. SMMPA was created in 1977 and has eighteen municipally owned utilities as members, located predominantly in south-central and southeastern Minnesota.

The Project Manager for the proposed facility is:

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4.0 PURPOSE OF THE TRANSMISSION FACILITY (ARSD 10:22:08)

The purpose of the Big Stone Transmission Project is to provide outlet capability for the proposed 600 MW baseload unit at the Big Stone site, to improve the transmission system reliability and to increase the regional transmission system transfer capability.

The Mid-Continent Area Power Pool (MAPP), an association of electric utilities and other electric industry participants organized in 1972 for the purpose of pooling generation and transmission facilities, predicts that the region's electricity demand will grow by more than 15 percent over the next decade and that present excess capacity within the service areas will be depleted in five years. No new baseload facilities have been built in the region since the 1980s. The Applicants determined that the best way to begin to meet this increasing demand is to build a new 600 MW baseload unit at the Big Stone Plant. Also, no major transmission facilities have been constructed since the 1980s and the existing transmission system is nearly at its capacity.

The new transmission lines the Applicants seek through this application are needed for two primary reasons:

- To provide interconnection service to accommodate the proposed 600 MW BSP II facility; and
- To increase capacity and improve reliability of the electric transmission system in western/southwestern Minnesota and eastern South Dakota and to support future independent transmission projects in the region, in particular a 345 kV transmission line planned to connect the Buffalo Ridge area with the Twin Cities metro area.

In sum, these new transmission lines will provide the best available outlet capability to accommodate additional baseload power from the proposed BSP II and facilitate expansion of the regional transmission grid in order to relieve congestion, provide transmission capacity and maintain transmission system reliability.

5.0 ESTIMATED COST OF FACILITY (ARSD 10:22:09)

The costs for the South Dakota portion of the transmission lines are estimated to range from approximately $29 to $41 million. Table 3 provides a breakdown of the transmission and substation costs of the Project.

TABLE 3
FACILITY COSTS

Facility	Distance (miles)	Construction Costs per mile (Average)	Right-of-Way Costs per mile	Total Cost
Granite Falls Route (345 kV)	33	$600,000	$28,000 to $50,000	$16 to $26 Million
Morris Route (230 kV)	4.2	$450,000	$28,000 to $50,000	$1.2 to $2.7 Million
230 kV connection from Big Stone 230 kV Substation to Big Stone 345 kV Substation – Two Transmission Lines	1.25	$450,000	$28,000 to $50,000	$600,000 to $1.3 Million
Big Stone 230 kV Substation Upgrade	NA	NA	NA	$3.5 Million
Big Stone 345 kV Substation	NA	NA	NA	$7.5 Million
230 kV transmission line to Hankinson, MN reroute on Big Stone property	0.9	$450,000	NA	$250,000 to $600,000
Total Facility Costs				$29 to $41 Million

Transmission line costs include items related to engineering, surveying, materials, labor and equipment. Annual operation and maintenance costs are estimated to be approximately $30,000 per year for the transmission lines and $10,000 to $15,000 per year for the substations and are dependent on setting, amount of vegetation management necessary, storm damage occurrences, structure types, age of the transmission line, etc. It is anticipated that very little maintenance will be required for the first several years since the transmission line will be new. These costs do not include any costs related to restoration or mitigation.

6.0 DEMAND FOR TRANSMISSION FACILITY (ARSD 10:22:10)

The Applicants serve retail and wholesale customers, including rural electric cooperatives and municipal utilities where peak load demands range from a low of approximately 90 MW for the smallest utility to 2,500 MW for the largest utility. Generation deficits are predicted to occur by the year 2011. The MAPP region's energy requirements are expected to grow by more than 15 percent over the next nine years and current excess capacity is expected to be gone within the next five years. The facility will provide outlet capacity for the proposed 600 MW BSP II baseload generation project and will maintain the reliability of transmission in the region.

Otter Tail completed a BSP II Generator Interconnection Study for the Midwest Independent Transmission System Operator (MISO) in November 2004 (Interconnection Study). The purpose of the study was to identify the impacts the proposed BSP II would have on the existing transmission system including prior interconnection requests in the MISO and Western queues. The Interconnection Study found that without additional transmission infrastructure, a second unit at Big Stone would overload the current system, resulting in severe violations of the regional reliability criteria.

The MISO interconnection study identified two alternatives that would provide the transmission capacity required for the BSP II project and future regional power demands. Both alternatives include the construction of a transmission line between Big Stone and Granite Falls, Minnesota. The preferred alternative includes a 230 kV transmission line between Big Stone and the City of Morris in addition to the Granite Falls transmission line. The other alternative includes the construction of a 230 kV transmission line between Big Stone and Willmar, Minnesota in addition to the Granite Falls transmission line.

The decision to construct the Granite Falls transmission line at 345 kV was in response to regional planning efforts. There are several regional planning studies, such as the Capital Expenditures by the Year 2020 (CapX 2020), Northwest Exploratory Study, Buffalo Ridge Incremental Generation Outlet Study (BRIGO) and Southwest Minnesota → Twin Cities Electric High Voltage (SW MN → TC EHV) being conducted by regional utilities and MISO. Given the preliminary results of these studies, the addition of a 345 kV transmission line in the region helps meet the growing need for transmission capacity in Minnesota, South Dakota and neighboring states.

Together these regional studies confirm that constructing the Big Stone to Granite Falls transmission line at 345 kV is the most feasible and prudent manner in which to accomplish the objective to expand transmission capability in the region. Additionally, sizing the transmission line at 345 kV fits into the regional transmission plan to support independent transmission projects, in particular a 345 kV transmission line planned to connect the Buffalo Ridge area with the Twin Cities.

7.0 GENERAL SITE DESCRIPTION (ARSD 10:22:11)

The transmission lines for which this Application is submitted include the Granite Falls 345 kV transmission line from the Big Stone 345 kV Substation to the Granite Falls Substation near Granite Falls, Minnesota; the 230 kV transmission line which connects the 345 kV transmission line to the Big Stone 230 kV Substation; and the Morris 230 kV transmission line from the Big Stone 230 kV Substation to the Morris Substation near Morris, Minnesota. The two 230 kV transmission lines will be located in Grant County and the 345 kV transmission line will be located in Grant and Deuel counties. The routes are shown on an aerial photo backdrop in Appendix A.1 through A.5. The Granite Falls 345 kV transmission line is a 33-mile South Dakota portion of a 90-mile 345 kV transmission project. The 230 kV transmission line connector will span approximately 1.25 miles; and the Morris 230 kV transmission line is a 4-mile portion of a 48 mile 230 kV transmission project.

The northern portion of the facility is located in Grant County and the southern portion in Deuel County. The location by Township, Range and Section is listed in Table 4.

TABLE 4
PROPOSED FACILITY LOCATIONS BY COUNTY, TOWNSHIP, RANGE AND SECTION

Facility	County	Township	Range	Section
Granite Falls Route (345 kV)	Grant	121N	47W	24,25,36
	Grant	120N	47W	6,7,18,19,30,31
	Grant	118N	47W	6,7,18,19,30,31
	Grant	119N	47W	6,7,18.19.30,31
	Deuel	117N	47W	6,7,18,19,30,31
	Deuel	116N	47W	5,6,8,16,17,21,22,27
Morris Route (230 kV)	Grant	121N	46W	17,19,20
	Grant	121N	47W	12,13,24
230 kV connection between Big Stone 230 kV Substation and Big Stone 345 kV Substation	Grant	121N	47W	12,13, 24
230 kV transmission line reroute between Big Stone and Hankinson, MN	Grant	121N	47W	12
Big Stone 230 kV Substation	Grant	121N	47W	12
Big Stone 345 kV Substation	Grant	121N	47W	24

The ROW for the Granite Falls 345 kV transmission line will be 150 feet wide for any sections of the transmission line that do not follow existing corridors, and approximately 98.5 feet wide for the portions that parallel roadway ROW. The ROW for the 230 kV transmission lines will be 125 feet wide for any sections of the transmission line that do not follow existing corridors, and approximately 82.5 feet wide for the portions that parallel roadway ROW. The Applicants' preferred structure at this time is single circuit, H-frame with an average height of approximately 100 feet for most of the route. However, the final structure type and material will be determined based on an engineering analysis. On average, the transmission line will span 700-800 feet between structures, depending on the structure type selected.

7.1 GRANITE FALLS 345 KV TRANSMISSION LINE

The Granite Falls 345 kV transmission line can be broken into three segments (shown as Segments A-C in Figure 2). The facility will require new construction for the entire 33 miles of the South Dakota route and will include the construction of the Big Stone 345 kV Substation when other regional facilities are constructed and the transmission system can support this transmission line being energized at 345 kV.

The three facility segments are described from north to south as follows:

Segment A (5.3 miles):
This segment of transmission line will consist of new single circuit 345 kV transmission line constructed from the Big Stone 345 kV Substation south towards U.S. Highway 12, to 150th Street near Section 18 of Alban Township 120N, Range 47W in Grant County, South Dakota.

Segment B (22.6 miles):
This segment will consist of a new single circuit 345 kV transmission line constructed south of Segment A traveling south to Section 6 of Glenwood Township, 116N, Range 47W in Deuel County.

Segment C (4.8 miles):
This segment will consist of a new single circuit 345 kV transmission line constructed south of Segment B. The segment will travel southeast to the southwest corner of 176th Street and County Road 310 or 488th Avenue to the South Dakota endpoint in Section 27 of Township 116N, Range 47W, north of Gary, South Dakota. This segment will travel in a valley to the east of the Blair Substation crossing under the existing Western Area Power Administration 230 kV transmission line

and will then cross over the Big Stone to Blair 230 kV transmission line to the South Dakota border crossing.

A map showing the preferred route segments is shown in Figure 2 and Appendix A.1 through A.5.

7.2 MORRIS 230 KV TRANSMISSION LINE

Approximately four miles of the new Morris 230 kV transmission line will be in South Dakota. The preferred route for this transmission line is south (approximately 1.25 miles) from the Big Stone 230 kV Substation to the site for the Big Stone 345 kV Substation, then southeast approximately one mile to U.S. Highway 12, then east into Minnesota along the existing ROW of a 115 kV transmission line. The transmission line will double circuit with and utilize the same route as the existing 115 kV transmission line near the Minnesota River tributaries to the Minnesota/South Dakota border.

7.3 230 KV TRANSMISSION LINES FROM BIG STONE 230 KV SUBSTATION TO BIG STONE 345 KV SUBSTATION

A second 230 kV transmission line will be constructed between the Big Stone 230 kV Substation and the Big Stone 345 kV Substation location. The Big Stone 345 kV Substation will be located approximately 1.25 miles south of the Big Stone 230 kV Substation and about one mile north of U.S. Highway 12. The final site layout will be selected when other regional facilities are constructed and the transmission system can support a transmission line being energized at 345 kV from this site to Granite Falls. This second 230 kV transmission line will initially be connected only as an extension of the Granite Falls 345 kV line described in Section 7.1.

7.4 BIG STONE 230 KV SUBSTATION UPGRADE

The Big Stone 230 kV Substation is located on the south side of BSP I, which is west of Big Stone City, in the SW ¼ of the SE ¼ of Section 12, Township 121N, Range 47W of Grant County, South Dakota. The substation is owned by Otter Tail, Montana-Dakota Utilities Co., and Northwestern Public Service and operated by Otter Tail. Modifications to the substation will include upgrading the existing 4-position ring-bus configuration into a 9-position ring-bus configuration to provide terminations for two new 230 kV transmission lines and a new 230 kV connection to the new generator. This includes installing new transmission line-termination towers, breakers and associated switches and transmission line relaying. The estimated substation expansion area is 50 feet by 375 feet (0.43 acres) and will require grading and fencing of 60 additional feet to the southern end of the existing station. The control house will likely be expanded as well. A schematic of the proposed substation improvements is attached as Appendix B.1.

7.5 BIG STONE 345 KV SUBSTATION CONSTRUCTION

The Big Stone 345 kV Substation will be located approximately 1.25 miles south of the Big Stone 230 kV Substation and one mile north of U.S. Highway 12 in the NE ¼ of the NW ¼ of section 24, Township 121N, range 47W of Grant County, South Dakota. The substation will be owned by the Applicants and operated by Otter Tail. The substation will consist of a 230 kV, three position bus configuration with two 230/345 kV transformers, and a 345 kV two breaker bus configuration. A new control house and a fenced area of approximately 600 x 600 feet or 8.3 acres will be required. A schematic of the proposed substation improvements is attached as Appendix B.2.

7.6 HANKINSON 230 KV TRANSMISSION LINE RELOCATION

The project will also require the relocation of approximately 0.9 miles of the Hankinson 230 kV transmission line to the south and west on Big Stone property to allow room for the BSP II plant construction.

8.0 ALTERNATIVE SITES (ARSD 10:22:12)

8.1 ALTERNATIVES CONSIDERED

The Applicants have undertaken extensive studies and modeling exercises over a nearly two year period to identify those transmission options that could best provide transmission outlet from BSP II and increase transmission capability and improve transmission reliability in the region. The Applicants and several other regional planning utilities in need of baseload generation, conducted an initial screening study beginning in late 2003, to address the development of increased transmission capacity necessary to accommodate the proposed second unit at Big Stone. During early 2004, the planners completed a Preliminary Transmission Screening Study for the BSP II Feasibility Study (Screening Study) that determined the transmission costs and performance associated with different output levels of a potential new second unit. To compare each alternative's effectiveness in delivering power from the second unit without detrimental impacts on the existing transmission system, 11 transmission alternatives were studied. The alternatives were compared and ranked based on capital cost, reliability, system power losses, and impacts to known constrained interfaces in the region.

Following completion of the Screening Study, those in the Applicant Group responsible for generation resource planning/acquisition submitted to MISO a generation interconnection request for a 600 MW second unit at Big Stone (assigned project number G392, queue number 38020-01). In April 2004, MISO initiated a meeting with the Applicants and other interested stakeholders to discuss the interconnection request. Based on the past study work for the Project, including the screening Study, the stakeholders selected five transmission interconnection alternatives from the initial 11 alternatives for further analysis.

The five alternatives under consideration all involved construction of a new 230 kV transmission line from Big Stone to Canby and an upgrade of the existing 115 kV to 230 kV transmission line between Canby and Granite Falls. After discussing the five alternatives at the April 2004 MISO scoping meeting, the participants selected two of the five alternatives for further analysis. One alternative included the upgrade of the 115 kV transmission line to a 230 kV transmission line from Big Stone to the Morris Substation near Morris, Minnesota. The other included a new 230 kV transmission line to Willmar. Both alternatives also included a Big Stone to Granite Falls 230 kV transmission line. After review of additional regional studies, the 230 kV transmission line from Big Stone to Granite Falls was upgraded to a 345 kV transmission line to meet future capacity needs. See section 6.0.

Because Minnesota law requires a utility proposing to construct a 345 kV transmission line to identify both a preferred route and at least one alternative route, two alternatives have been considered for the Granite Falls 345 kV transmission line route in South Dakota. The preferred route travels due south for approximately 33 miles from the Big Stone 345 kV Substation to the north side of Gary, South Dakota where it crosses the Minnesota/South Dakota border and travels east to Granite Falls, Minnesota. The alternative route travels due south of the Big Stone 345 kV Substation approximately five miles where it turns due east to follow 150th Street for approximately two miles to the Minnesota/South Dakota border. The transmission line then travels south in western Minnesota to Canby, Minnesota (Appendix A.6).

8.2 ROUTE IDENTIFICATION

The route selection process required a multi-faceted process in which the Applicants considered state and federal requirements and input received at pre-filing public meetings to develop criteria to route the transmission line. Since there are several permitting constraints (state and federal) associated with this Project, it was necessary to consider routes only within the corridors proposed in the federal EIS process for the purposes of this application. The corridors are identified in Figure 1. The preferred routes within the corridors were developed by considering the following:

- Minimize impacts to reliability, develop redundancy
- Follow existing rights-of-way, when feasible
- Follow existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries, when feasible
- Minimize length
- Minimize cost
- Avoid populated areas, when feasible
- Avoid large agricultural facilities
- Avoid airports and other land use conflicts, and
- Avoid major environmental features where feasible.

The routes were refined to avoid more specific items identified by the public at the pre-filing public meetings. These items include:

- Construct the transmission lines near existing roadway ROW or close to the half section to minimize impacts to agricultural fields
- Avoid placing the transmission lines any closer to residences than existing transmission lines in the area.
- Place structures near roadway ROW or near the section line to allow room for movement of farm equipment.
- Consider placing poles for H-frame structures on each side of the 1/2-section line to share the burden between landowners.
- Avoid diagonal traverses across agricultural fields wherever possible.
- Consider placing poles on landowners preferred side of tree lines wherever practicable.

Based on these criteria, analysis of the proposed corridors and constructability considerations, the preliminary routes were selected as described in the following sections.

8.2.1 MORRIS 230KV TRANSMISSION LINE ROUTE

The Morris 230 kV transmission line route was selected in part to minimize the congestion near the Big Stone 230 kV Substation and to increase transmission reliability by separating it from two existing 115 kV transmission lines and an existing 230 kV transmission line that run from the substation southeast towards U.S. Highway 12. The Morris route travels south from the Big Stone 230 kV Substation approximately 1.25 miles. It then travels southeast towards Highway 12 where it begins to follow an existing 115 kV corridor to the east to the Minnesota border. To minimize environmental impacts and maximize the distance from the transmission line to nearby homes, the 230 kV transmission line will be double circuited for approximately 0.9 miles near the Minnesota River crossing and the Minnesota/South Dakota border.

8.2.2 230 KV TRANSMISSION LINES FROM THE BIG STONE 230 KV SUBSTATION TO THE BIG STONE 345 KV SUBSTATION

The two transmission lines proposed from the Big Stone 230 kV Substation to the Big Stone 345 kV Substation location travel southwest to maximize the distance from the existing transmission lines that travel to the southeast from the Big Stone 230 kV Substation and to minimize the number of river crossings between the two substations. This alignment also increased the distance between the transmission line and a nearby residence and gravel pit.

8.2.3 GRANITE FALLS 345 KV TRANSMISSION LINE ROUTE

The first consideration for the route was to increase the transmission capacity in South Dakota to meet future energy demands. The Applicants believe that the facility will promote economic development in the area by enhancing the electric reliability and providing outlets for other generation in eastern South Dakota. During the Energy Conversion Facility Site Permit Application public hearing held on September 13, 2005, local legislators supported siting the transmission route in South Dakota, highlighting the tremendous potential for wind energy development in Grant and Deuel Counties. Therefore, the preferred route was selected to span the South Dakota Corridor from Big Stone to Gary, South Dakota.

The route was identified based on the criteria listed above for each segment as follows:

Segment A (5.3 miles):
Segment A, which extends from the Big Stone 345 kV Substation to 150th Street, travels near the western edge of the corridor established for the Federal EIS process, to maximize the distance between the route and an existing transmission line that travels north-south between the Big Stone 230 kV Substation and the Blair Substation located in Section 16 of Glenwood Township (116N), Range 47W in Deuel County.

In an attempt to follow natural division lines and agricultural field boundaries and maximize distances to homes, Segment A was placed on the half section. This placement is located west of 485th Avenue, a possible alternate location, which is populated with several homes. At 148th Street, the route shifts to the west to avoid impacts to the wetlands in Section 6 of Alban Township 120N, Range 47W of Grant County.

At 150th Street the route options were restricted by the location of the Cold Spring Granite Quarry. The route was shifted back to 485th Street to avoid spanning the Quarry and creating impacts for Quarry operations.

Segment B (22.6 miles):
Segment B parallels the 485th Street ROW south until 155th Street where it is shifted west to the half section. This segment alignment was chosen to minimize impacts to nearby residences, United States Fish and Wildlife Service (FWS) Waterfowl Production areas and agricultural fields. There is one approximately 90-acre WPA adjacent to Segment B, and an additional approximately 185-acre WPA within one mile of Segment B.

Segment C (4.8 miles):

Segment C travels southeast to the Minnesota Border crossing north of Gary, South Dakota. Alternative locations for this segment were limited by homes on County Road 310, USGWS grasslands, the Blair Substation location and existing transmission lines. The cross-country alignment for this segment minimized impacts to nearby homes, maximized the distance from existing transmission facilities, utilized terrain features to bypass existing transmission lines and factored in the shortest distance to the preferred Minnesota border crossing area.

8.2.4 GRANITE FALLS 345 KV ALTERNATE ROUTE

The alternative route considered travels due south of the Big Stone 345 kV Substation approximately five miles where it turns due east to follow 150th Street for approximately two miles to the Minnesota/South Dakota border. The transmission line then travels south in western Minnesota to Canby, Minnesota. Options for this route location were limited by the density of housing along 148th and 149th Streets and wetlands between the north-south route alignment and the Minnesota/South Dakota border.

9.0 ENVIRONMENTAL INFORMATION (ARSD 10:22:13)

Sections 10 through 17 provide a description of the existing environment at the time of the application submission, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed transmission system, and irreversible changes that are anticipated to remain beyond the operating lifetime of the facility.

10.0 EFFECT ON PHYSICAL ENVIRONMENT (ARSD 10:22:14)

10.1 EXISTING PHYSICAL ENVIRONMENT

10.1.1 GEOLOGY

The regional geology along the route consists of Des Moines lobe and Superior lobe deposits that overlie Precambrian and Cretaceous bedrock.

The project route generally lies northeast of the Coteau des Prairies Plateau, which dominates the regional topography of southwestern Minnesota and eastern South Dakota. The Glacial River Warren floodplain (now occupied by the Minnesota River) defines much of the surficial geology in the region. Unconsolidated deposits in the area include glacial tills with intermittent boulder pavement sequences and abandoned river channel deposits. Patchy glacial lake sediments overlying the local till are present in the area surrounding the river valley. Localized areas of gravel and sand are observed in former meltwater channels and glacial lake outlets (Cotter and Bidwell 1966, 1968; Cotter et. al. 1966, 1968; Novitzki et al. 1969; Van Voast et al. 1972). Currently, during flood events, the Minnesota River deposits silt and fine sand on the floodplain.

Unconsolidated sediments overlie bedrock within the vicinity of the route. Bedrock outcrops occur in certain areas along the Minnesota River Valley and parts of the Coteau des Prairies Plateau. Three bedrock units underlay the glacial drift: (1) igneous and high grade metamorphic rock of Early to Middle Precambrian age; (2) Sioux Quartzite of Late Precambrian age; and (3) poorly consolidated marine and continental shales and sandstone of Cretaceous age. The major constituent of the metamorphic rocks is a coarse-grained pink or white granite gneiss. Minor rock bodies in this unit are of mafic and/or granitic composition. The Sioux Quartzite is extremely resistant to erosion and therefore forms the underlying core of the high topography of the Coteau des Prairies Plateau and other prominent ridges in the area. The Cretaceous rocks generally consist of poorly consolidated quartz sands, lignitic clay and soft dark gray shale (Ojakangas and Matsch 1982).

The southern half of the South Dakota route lies within the Coteau des Prairies Plateau. The glacial cover in this area consists of approximately 100 to 200 feet of till overlying a thick unit of Cretaceous sediments (approximately 150 feet). The glacial till is inundated with many surficial and buried sand and gravel lenses. The Cretaceous sediments are mainly composed of shale with a lower mantle of sandstone or sand (Cotter and Bidwell 1968; Novitzki et. al. 1969).

10.1.2 ECONOMIC DEPOSITS

Aggregate sites along the South Dakota route were identified by site reconnaissance and aerial photographs. Governmental database listings of sites are not available at this time. Based on these sources, granite quarries and gravel pits were mainly identified in the northern portion of the corridor. These include:

- A gravel pit located in section 13 of Township 121N, Range 47W
- A granite quarry is located in parts of sections 7, 8, 17, and 18 of Township 120N, Range 47W
- Rock and/or aggregate mining operations located in section 33 of Township 120N, Range 47W
- Rock and/or aggregate mining operations located in sections 3, 4, and 10 of Township 119N, Range 47W,

The continued expansion of the mined areas is unknown. No other aggregate sites were identified within one mile of the route.

10.1.3 SOIL TYPE

Soils within the transmission line routes can be grouped by soil associations. An association is a group of individual soil series that occur together in a characteristic geographic pattern with a distinctive pattern of soils, relief and drainage. Each soil association is typically composed of one or more major soils and one or more minor soil components. Soil associations are defined by each county's Natural Resources Conservation Service (NRCS) office. Within the facility area, eight soil associations occur: Barnes-Flom-Buse (244), Brandt-Estelline-Fordville (127), Fordville-Renshaw-Southam (128), Forman-Aastad-Buse (135), Heimdal-Sisseton-Svea (138), Lamoure-La Prairie-Rauville (248), Ludden-Lamoure-Ladelle (139) and Peever-Forman-Tonka (136). These associations are described in greater detail below.

Barnes-Flom-Buse Association (244): This association generally consists of nearly level to hill and steep, poorly drained to well-drained soils that are loam or clay loam on glacial till. Approximately 1.0 percent of the facility area is in this association

Brandt-Estelline-Fordville Association (127): This association generally consists of well-drained soils formed in silty and loamy materials overlying sand and gravel on outwash plains. Approximately 6.2 percent of the facility area is in this association.

Fordville-Renshaw-Southam Association (128): This association generally consists of somewhat excessively drained, well-drained and poorly drained, loamy soils over gravelly material on outwash plains and moraines. Approximately 7.7 percent of the facility area is in this association.

Forman-Aastad-Buse Association (135): This association generally consists of nearly level to hilly, well-drained and moderately well-drained soils that are clay loam throughout on glacial till. Approximately 30.6 percent of the facility area is in this association.

Heimdal-Sisseton-Svea Association (138): This association generally consists of well-drained and moderately well-drained soils that formed in loamy glacial drift. Approximately 26.8 percent of the facility area is in this association.

Lamoure-La Prairie-Rauville Association (248): This association generally consists of nearly level, moderately well-drained and poorly drained soils on floodplains. Approximately 3.9 percent of the facility area is in this association.

Ludden-Lamoure-Ladelle Association (139): This association generally consists of poorly or very poorly drained and moderately drained slowly or moderately slowly permeable soils that formed in clayey and silty alluvium on floodplains. Approximately 1.2 percent of the facility area is in this association.

Peever-Forman-Tonka Association (136): This association generally consists of well-drained and poorly drained, nearly level to gently sloping, loamy soils formed on till plains. Approximately 22.5 percent of the facility area is in this association.

The facility site crosses 47 soil series and is dominated by Forman-Aastad and Heimdal-Sisseton loams and the Peever clay loam. A description of each soil unit is attached as Appendix C.

Approximately 60 percent of the land within the transmission line ROW contains soil that is listed as prime farmland; approximately 12 percent of the soil is listed as prime farmland when drained. Prime farmlands are determined by the South Dakota NRCS to have adequate potential of hydrogen (pH), water supply, growing season length and temperature for growing crops and are not excessively erodible or wet throughout the growing season.

10.1.4 SEISMIC RISKS

The seismic activity in South Dakota, especially in the eastern portions of the state, is fairly low. No earthquakes were recorded in Grant or Deuel Counties between 1872 and the present. Two small earthquakes registering near 3 on the Richter Scale were recorded in 1934 for Marshall County, located northwest of Grant County, and in 1959 for Spink County, located west of Deuel County.

10.2 FACILITY IMPACTS

10.2.1 POTENTIAL FOR EROSION OR SEDIMENTATION

The Grant and Deuel County digital Soil Survey data does not contain information regarding the potential for erosion or sedimentation associated with specific soil series. In general, areas with steep slopes, dry soils and/or minimal vegetative cover are at the greatest risk of erosion. Within the facility area, the potential for erosion is highest along steep stream banks along the Whetstone River and Yellow Bank River and their tributaries. Soil units within the facility area that have moderately steep to steep slopes (nine to 40 percent slopes) include the Buse Loam, the Buse-Barnes loams, the Buse-Forman loams, Forman-Buse loams, the Sioux-Renshaw complex, and the Sisseton Loam.

The potential for erosion near the Whetstone and Yellow Bank Rivers during construction will be minimized because construction equipment will not cross the Rivers. In addition, the construction plans will be developed to keep equipment away from these areas. Best management practices (BMP), such as sediment fences and revegetation within steep areas, are proposed to minimize erosion and sedimentation resulting from the facility. Specific plans to address these issues will be developed prior to construction, based on the locations of the structures and access roads.

11.0 GEOLOGICAL CONSTRAINTS ON DESIGN, CONSTRUCTION OR HYDROLOGY (ARSD 20:10:22:15)

11.1 EXISTING HYDROLOGY

The facility area is in the Minnesota River Basin. A map showing the hydrology of the facility area is attached as Appendix A.7. Within the facility area, the 230 kV transmission lines from the Big Stone 230 kV Substation to the Big Stone 345 kV Substation cross the Whetstone River. Segment B crosses both the North and South Forks of the Yellow Bank River, Lost Creek and Crow Creek, as well as several smaller tributaries.

The Minnesota River Basin drains approximately 15,000 square miles in Minnesota, South Dakota and Iowa. The average annual flow of the Minnesota River, measured at the Ortonville, Minnesota United States Geological Survey (USGS) gauging station, is approximately 142 cubic feet per second (cfs). Peak flows historically occur in the spring and early summer with a maximum flow of 5,070 cfs recorded in April 1997. Low flows occur in December and January.

Within the facility area, surface water generally flows into the Whetstone River, the North and South Forks of the Yellow Bank River or their tributaries, or tributaries to the Lac Qui Parle River where it then flows east to the Minnesota River. Existing surface water drainage patterns are shown in Appendix A.7 and is described below.

230 kV Transmission Line to the Big Stone 345 kV Substation

The Whetstone River flows east under these segments; the proposed transmission line crosses the river once. Surface water flows directly into the river in this portion of the facility.

Granite Falls 345 kV Transmission Line

Segment A: Within this segment, surface water generally flows east toward tributaries to the North Fork of the Yellow Bank River. The facility crosses two such tributaries approximately 1,100 feet north of the section line between Sections 17 and 20 in Township 120N, Range 47W. There is a high point approximately at the section line between Sections 8 and 17, Township 120N, Range 47W. From this point, water flows either to the north and east into a channel that runs southeast into the North Fork of the Yellow Bank River, or south and east into another tributary to the Yellow Bank River.

Segment B: Within this segment, surface water generally flows east into the North and South Forks of the Yellow Bank River and their tributaries. The Granite Falls 345 kV transmission line crosses the North Fork of the Yellow Bank River approximately half a mile south of the section line between Sections 29 and 32 in Township 120N, Range 47W.

The facility crosses one tributary to the South Fork of the Yellow Bank River approximately 250 feet south of the section line between Sections 29 and 32 in Township 119N, Range 47W. The proposed facility crosses the South Fork of the Yellow Bank River approximately half a mile south of the section line between Sections 6 and 7 in Township 118N, Range 47W. The facility crosses Mud Creek, a tributary to the South Fork of the Yellow Bank River, approximately 1,200 feet south of the section line between Sections 7 and 18 in Township 118N, Range 47W. The facility crosses Lost Creek, a tributary to the Lac Qui Parle River, approximately half a mile north of U.S. Highway 212.

Starting at approximately the U.S. Highway 212 going south, the terrain becomes hillier, and many ephemeral tributaries flow under the Granite Falls 345 kV transmission line. Water generally flows east and north through these drainages until it reaches the Lac Qui Parle River. The facility crosses Crow Timber Creek, a tributary to Lost Creek, approximately 1,000 feet south of the section line between Sections 19 and 30 in Township 117N, Range 47W.

Segment C: The terrain is very rolling along this segment, with ephemeral tributaries to Crow Creek and the Lac Qui Parle River crossing the landscape from the southwest to northeast. The facility crosses four tributaries to Crow Creek and four tributaries to the West Fork of the Lac Qui Parle River. Surface water flows from the high points along the route directly into these tributaries along this segment, where it then flows northeast, ultimately joining the Minnesota River.

Morris 230 kV Transmission Line

The Whetstone River flows east under these segments; the proposed transmission line crosses the river once. Surface water flows directly into the river in this portion of the facility.

11.2 FACILITY IMPACTS

11.2.1 EFFECT ON CURRENT OR PLANNED WATER USE

The facility will not require any groundwater for consumption or dewatering. The facility will have no impact on either municipal or private water uses in the facility area. No water storage, reprocessing or cooling is required for either the construction or operation of the facility. The facility will not require deep well injection.

11.2.2 SURFACE AND GROUNDWATER IMPACTS

The facility runs across several major rivers/streams in the area and many small tributaries. Erosion of sediment in these surface water bodies from construction may occur if BMPs to prevent sediment runoff are not taken; however the Applicants do employ BMPs during facility construction to prevent erosion. The Applicants' standard construction practices are summarized in Sections 22.3 and 22.4 and water quality impacts are discussed in Section 16.2. No impacts to existing drainage patterns are expected as a result of the proposed transmission facility.

Isolated groundwater impacts may occur if dewatering is necessary for the construction of the footings.

12.0 EFFECT ON TERRESTRIAL ECOSYSTEMS (ARSD 20:10:22:16)

12.1 EXISTING TERRESTRIAL ECOSYSTEM

The facility lies within the Northern Glaciated Plains Ecoregion. The native vegetation in this ecoregion is transitional between tall and shortgrass prairie. The prairie ecosystem that once dominated the landscape now exists in small isolated sites, such as steep slopes, ditches along road or railroad corridors, and on lands that have not been plowed. The tallgrass prairie has been converted primarily to agricultural related land uses. A few areas dominated by remnant prairie vegetation remain along the route. These areas are detailed in the next section (Section 12.1.1) Potential native vegetation in prairie remnants includes western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Stipa viridula*), big and little bluestem (*Andropogon gerandii* and *Andropogon scopdrius*), blue grama grass (*Bouteloua gracilis*) and forbs, such as purple cornflower (*Centaurea cyanus*), lead plant (*Amorpha canescens*) and pasque flower (*Anemone pulsatilla*).

A majority of the vegetation surrounding the facility are cultivated fields, pastureland and field margins populated primarily by invasive or pioneering species such as smooth brome (*Bromus inermis*) and ragweeds (*Ambrosia artemissiifolia*, *A. trifida*). The route follows existing highway and transmission line corridors for a portion of the route, follows agricultural field lines and crosses several natural and altered vegetation community types. A preliminary survey conducted by Graham Environmental Services (GES) in June 2005 shows that the principal natural community types encountered along the route include remnant mesic prairie and dry prairie. These classifications are based on the dominant plant community assemblages present at a particular location. The GES Remnant Prairies and Grassland Report is included as Appendix D.

Many of the small lakes, streams, and wetlands in the region have been drained, altered, or utilized for agricultural purposes. Three game production areas are located within one mile of the route. There are no state recreation areas, lake-side use areas or state game refuges located near the route.

12.1.1 NATURAL COMMUNITIES

12.1.1.1 Mesic Prairie

Mesic prairies are dry to wet-mesic plant communities dominated by grasses and sedges that are located on level to rolling glacial till. Mesic prairie communities are fire-dependent and where fire is absent, woody species invade. Big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and prairie dropseed (*Sporobolus heterolepis*) are typically the dominant species with numerous other species of grasses occurring at different levels of dominance based upon moisture availability or

disturbance. Invasive species such as Kentucky bluegrass (*Poa pratensis*) and Canada bluegrass (*P. compressa*) occur in varying abundance on these sites depending upon the level of disturbance at a particular site. Forbs on remnant mesic prairie sites are abundant and have a high level of diversity. Forb communities also vary in diversity and makeup with available soil moisture levels and levels of disturbance. Soils are generally classified as Mollisols. One mesic prairie remnant is adjacent to each segment of the Granite Falls 345 kV transmission line.

12.1.1.2 Dry Prairie

Dry prairies are dry to dry-mesic plant communities that are dominated by grasses and sedges. Dry prairies are maintained by fire, but require less frequent fires than mesic prairies due to the droughty conditions where they occur. These dry and poor soil conditions slow the advance of woody species. Generally, dry prairies have a greater component of Great Plains species than remnant mesic prairies. Midheight and short grasses and sedges are usually dominant in remnant dry prairie communities. Porcupine grass (*Stipa spartea*), prairie junegrass (*Koeleria macrantha*) and sun-loving sedge (*Carex heliophila*) were the most readily identified species observed on remnant dry prairie during a review of the corridor. Invasive species such as musk thistle (*Carduu nutans*) and yellow sweet clover (*Melilotus officinalis*) vary based upon frequency and duration of grazing on these sites. Low shrubs such as leadplant (*Amorpha canescens*), prairie rose (*Rosa arkansana*), and wolfberry (*Symphoricarpos occidentalis*) were also present in varying amounts. Two dry prairie remnants are adjacent to Segments B and C.

12.1.2 SENSITIVE SPECIES

The Applicants contacted the South Dakota Game, Fish and Park (GFP) Department's Natural Heritage Program to request locations of sensitive species near the project area. The South Dakota Natural Heritage Database did not list any occurrences of state threatened, endangered, rare or special concern terrestrial species within one mile of the proposed route (special status aquatic species are discussed in Section 13).

The South Dakota GFP and the FWS were contacted to identify concerns related to the route (Appendix E). The GFP stated that some of the project area has not been surveyed by GFP for rare species. The FWS also noted the possibility of bald eagle nesting sites. A survey conducted around the Big Stone 230 kV Substation in September 2004 by Barr Engineering identified a Bald Eagle (*Haliaeetus leucocephalus*) nest approximately one and a half miles northeast of the Big Stone 230 kV Substation, near Big Stone Lake. Nesting season for the bald eagle is between January and August. The Applicants have surveyed the route and have not found any sites that would be impacted.

Additionally, the FWS noted the possibility for western prairie fringed orchid (*Platanthera praeclara*) to occur in the area. The western prairie fringed orchid is typically found in native tallgrass prairie with sedge/wet meadow habitats. There are no recent records of the western prairie fringed orchid in South Dakota; however, extant populations exist in neighboring states, particularly the southwestern corner of Minnesota, which is near the facility. The FWS also stated that Dakota skippers (*Hesperia dacotae*), a federal candidate species of butterfly, have been located near the project area, and could occur in any high quality prairie remnants.

The Applicants will minimize impacts to the terrestrial ecosystems. The majority of the proposed facility follows existing roadways or agricultural field lines, which are habitats that have been previously disturbed. Although the facility is within 1,000 feet of surveyed native prairie remnants, all the remnants are less than 1,000 feet wide and no structures will be placed in this habitat, as practicable.

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the facility. Wildlife that inhabits natural areas, such as those near water bodies or the prairie remnants could be impacted in the short-term within the immediate area of construction. The distance that animals will be displaced will depend on the species. Animals in the area will be typical of those found in agricultural and urban settings and should not incur population level effects due to construction. No special status species were observed in any of the natural community types within one mile of the route during the GES June 2005 survey which included a preliminary sensitive species survey. A special status species survey, which will concentrate on the preferred route alignment, is planned to be conducted in 2006. (Appendix D).

The Applicants will maintain sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent water resources and minimize soil erosion and sedimentation.

Raptors, waterfowl and other bird species may also be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more susceptible to transmission line collision, especially if the transmission line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas.

Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. The Applicants' transmission line design standards provide

adequate spacing to eliminate the risk of raptor electrocution. As such, electrocution is not a concern related to the facility.

The primary methods the Applicants use to address avian issues for transmission projects include:

- Working with the GFP to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce collisions;
- Attempting to avoid areas known as major flyways or migratory resting spots.

The Applicants will continue to work with the FWS and GFP to determine if there are areas that should be marked when the transmission line is constructed. The area of the project most likely to be in a major flyway is at the northern end near the Minnesota River.

13.0 EFFECT ON AQUATIC ECOSYSTEMS (ARSD 20:10:22:17)

13.1 EXISTING AQUATIC ECOSYSTEMS

The primary aquatic ecosystems within the facility area are the Whetstone River, the North and South Forks of the Yellow Bank River, Mud Creek, Lost Creek, Crow Creek and the West Fork of the Lac Qui Parle River. The FWS National Wetland Inventory (NWI) maps indicate that there are 36 wetlands along the 345 kV Granite Falls route, 28 of which are crossed by the route. Along the 230 kV transmission line from the Big Stone 230 kV Substation to Minnesota, there are five wetlands depicted on NWI mapping, none of which are crossed. NWI wetland areas are shown on the area hydrology map attached as Appendix A.7. These wetlands are primarily palustrine wetlands, although several are associated with river systems. None of these wetlands is greater than 800 feet across; the average crossing width is approximately 200 feet.

The South Dakota Natural Heritage Database listed several occurrences of state threatened, endangered, rare or special concern aquatic species within one mile of the facility. All of the listed species are associated with surface waterbodies such as the Whetstone and Yellow Bank Rivers. Table 5 lists the special status species located within one mile of the facility.

The central mudminnow (*Umbra limi*) is a state-listed endangered species; the northern river otter (*Lontra canadensis*) and northern redbelly dace (*Phoxinus eos*) are state-listed threatened species. The central mudminnow prefers marshes, bogs, and slow moving streams, and breeds in April or May. Northern river otter prefer wooded areas along streams, rivers and lakes and prey on fish, frogs, crayfish and turtles. Otter cubs are born in March or April. Northern redbelly dace inhabit small streams and breed in May or June.

TABLE 5
SPECIAL STATUS SPECIES

COMMON NAME	NUMBER OF OCCURRENCES	SCIENTIFIC NAME	FEDERAL STATUS	SD STATUS*	STATE RANK**
Threeridge mussel	1	*Amblema plicata*	Not Listed	None	2
Cylindrical Papershell mussel	2	*Anodontoides ferussacianus*	Not Listed	None	4
Spiny Softshell mussel	1	*Apalone spinifera*	Not Listed	None	2
Wabash Pigtoe mussel	2	*Fusconaia flava*	Not Listed	None	1
Plain Pocketbook mussel	1	*Lampsilis cardium*	Not Listed	None	1
Fatmucket mussel	1	*Lampsilis siliquoidea*	Not Listed	None	4
Creek Heelsplitter mussel	2	*Lasmigona compressa*	Not Listed	None	1
Northern River Otter	1	*Lontra canadensis*	Not Listed	T	2
Golden Redhorse	3	*Moxostoma erythrurum*	Not Listed	None	H
Hornyhead Chub	1	*Nocomis biguttatus*	Not Listed	None	3
Rosyface Shiner	2	*Notropis rubellus*	Not Listed	None	2
Slenderhead Darter	1	*Percina phoxocephala*	Not Listed	None	X
Northern Redbelly Dace	1	*Phoxinus eos*	Not Listed	T	2
Creeper mussel	2	*Strophitus undulatus*	Not Listed	None	3
Lilliput mussel	2	*Toxolasma parvus*	Not Listed	None	3
Central Mudminnow	1	*Umbra limi*	Not Listed	E	1

** E – Endangered; T – Threatened; None – no legal status, data being gathered for possible future listing;*

*** State rank is assigned to species and terrestrial communities to reflect the extent and condition of that element. Ranks range from 1 – in greatest need of conservation, to 5 – secure under present conditions. X – extirpated, species believed to be extirpated from the state; H – historical, species occurred historically in state but has not been verified in the last 20 years.*

13.2 IMPACTS TO AQUATIC ECOSYSTEMS AND MITIGATION

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. Once the facility is completed, it will have no impact on surface water quality. Maintaining water quality during construction throughout the facility will minimize potential impacts to rare and common aquatic organisms and the aquatic environment.

The Applicants will avoid major disturbance of individual wetlands and drainage systems during construction. All wetlands along the facility corridor can be spanned by the transmission lines, which will have average spans of 700 to 800 feet, and a maximum span of 1,000 feet. No construction will occur within the Whetstone River, the North or South Forks of the Yellow Bank River, Mud Creek, Lost Creek, Crow Creek or the West Fork of the Lac Qui Parle River streambeds. These waterways will be spanned by the transmission lines; however construction may impact areas adjacent to these streambeds.

The Applicants will also implement appropriate BMPs to minimize the amount of erosion and sedimentation that could potentially impact wetlands and waterways. Temporary erosion and sediment control methods will be properly placed, monitored and maintained adjacent to water resources. These erosion control methods will remain in place until work areas become re-vegetated or are stable. BMPs may include silt fencing, mulching, seeding and hay bales. Where appropriate, the Applicants will re-vegetate disturbed areas.

14.0 LAND USE (ARSD 20:10:22:18)

14.1 EXISTING LAND USE

Land use in the facility area has traditionally been largely agricultural with a mixture of row crops and pastureland. A land cover map is attached as Appendix A.8. and a map from the Grant County Comprehensive Plan showing Grant County land use designations is attached as Appendix F.1. The Deuel County Comprehensive Plan does not contain any land use maps, although it is clear that aside from the city of Gary, the vast majority of the facility within Deuel County is agricultural (Appendix F.2).

In Grant County, the northern portion of the facility crosses areas of several different existing and planned land uses, according to the 2004 Grant County Comprehensive Plan (Appendix F.1). A portion of the corridor outside Big Stone City is zoned as an area of development transition, meaning the County anticipates a change from the existing land use. The majority of the corridor is zoned for agricultural uses.

In addition to the agricultural and rural residential land uses that dominate the facility area, there are pockets of commercial and industrial land use near Big Stone City. The existing Big Stone Plant site and Big Stone 230 kV Substation are zoned for industrial use. Currently, the proposed site for the Big Stone 345 kV Substation is zoned for agricultural use.

14.2 LAND USE IMPACTS

The facility will be located primarily on private land that is zoned as agricultural, and regulated by Grant and Deuel County land use plans and ordinances. The only publicly owned land directly affected by the facility is roadway ROW. The future site of the Big Stone 345 kV Substation will require rezoning. No other land use changes will occur beyond the immediate footprint of the facility.

The facility is compatible with the existing land uses in the area. The Granite Falls 345 kV transmission line route parallels roadways for five of the 33-mile length. Pole placement siting in areas where cross-country ROW is necessary has been planned to minimize impacts to farming operations. The 230 kV transmission line route follows an existing transmission line corridor from U.S. Highway 12 to the Minnesota border.

There will be some short-term impacts to agriculture from construction. Once the transmission line is in operation, only approximately 0.7 acres will be permanently removed from agricultural

production in order to accommodate the foundations for the preferred two pole H-frame structures. Agricultural impacts are discussed in Section 19.2.2.

14.2.1 DISPLACEMENT

No homes or businesses will be displaced by the facility. The Granite Falls 345 kV transmission line route comes within 1,000 feet of fifteen homes; the nearest of these homes is approximately 260 feet from the transmission line. The 230 kV transmission line route comes within 1000 feet of six residences; the nearest of these homes is approximately 270 feet. The 230 kV transmission line from the Big Stone 230 kV Substation to the 345 kV Substation comes within 1,000 feet of one home, as the home is approximately 850 feet away.

14.2.2 NOISE

Noise is defined as unwanted sound. It may be comprised of a variety of sounds of different intensities across the entire frequency spectrum.

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3 dBA is barely perceptible to average human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling or halving of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. Table 6 shows noise levels associated with common, everyday sources and places the magnitude of noise levels discussed here in context.

TABLE 6
COMMON NOISE SOURCES AND LEVELS

Sound Pressure Level (dBA)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. by Rau and Wooten, 1980

Noise concerns for this project may be associated with both the construction and operation of the energy transmission system. Transmission conductors and transformers at substations produce audible noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line. In addition, very few people are out near the transmission line during rainstorms. For these reasons, audible noise is not noticeable during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, the proposed transmission lines will produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is a faint, sporadic crackling sound.

The primary land use in the project area is rural agricultural land. Typical noise sensitive receptors near the facility may include residences, churches, schools and parks where either sleep or outdoor activities occur. Current average noise levels in these areas are typically in the 30 to 40 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, will be expected near roadways, urban areas, and commercial and industrial properties in the project area. It is not expected that noise from the facility will exceed the typical background noise levels in the project area.

14.2.3 AESTHETICS

The visual character and quality along the route are characterized by open agricultural fields to rolling hills broken by small lakes and wetland complexes. Dispersed residential areas and existing transmission lines are also part of the human-made elements in the vicinity of the facility. Within the project area, the dominant visual characteristic is agricultural land, encompassing over 90 percent of the land use.

The highest elevations in the project area occur around the Coteau des Prairies Plateau, located in Deuel County. Along the Minnesota and South Dakota border, there are several areas of federal and state managed lands. The northwest portion of the facility will be adjacent to Big Stone National Wildlife Refuge, located along the Minnesota River. The visual characteristics of these lands are rock outcroppings, rolling hills, grasslands and wetlands.

Other landscape features are the North Fork of the Whetstone River and South Fork of the Yellow Bank River in Grant County, listed in the National Park Service Nationwide Rivers. These rivers are narrow riparian areas in an agricultural setting.

The degree to which the transmission line will be visible will vary by location. The Applicants have not identified any unique aesthetic resources that would be impacted by this transmission line.

15.0 LOCAL LAND USE CONTROLS (ARSD 20:10:22:19)

The majority of the facility will be constructed on agricultural land regulated by Deuel and Grant Counties pursuant to their land use plans and ordinances (Appendix F). The Big Stone 345 kV Substation will require rezoning from agricultural to industrial land use. Construction of the transmission line and substation will require a building permit from Deuel County and Grant County, South Dakota.

16.0 WATER QUALITY (ARSD 20:10:22:20)

16.1 EXISTING WATER RESOURCES

The National Park Service (NPS) lists the North and South Forks of the Whetstone River on its Nationwide Rivers Inventory (NRI). The NRI lists over 3,400 river segments that the NPS has determined have "outstandingly remarkable" natural or cultural resources. Categories used to determine eligible river segments include: scenery, recreation, geology, fish, wildlife, prehistory, history, cultural values and others. The North Fork is listed for scenic, fishery, and wildlife values; the South Fork is listed for scenic, recreational, geologic, wildlife, historic and cultural values. Under a 1979 Presidential Directive, federal agencies need to seek to avoid and mitigate impacts to NRI riverways.

The Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list, is based on violations of water quality standards. Impaired waters require studies to determine the total amount of pollution, or total maximum daily load (TMDL), that a water body can receive before water quality standards are violated. The South Fork of the Whetstone River is listed on the 303(d) list within the Facility Project Area for ammonia, organic enrichment and low dissolved oxygen. The river is considered impaired for meeting the South Dakota Department of Environmental and Natural Resources' (DENR) warmwater marginal fish life use, due to low dissolved oxygen levels resulting from municipal discharge. All other rivers in the facility area are considered to fully support the DENR's designated uses, and are not impaired.

16.2 FACILITY IMPACTS AND MITIGATION

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. This could potentially affect water quality if the erosion is not controlled; however, the Applicants will employ BMPs to prevent sedimentation and introduction of sediment and pollutants to surface waterbodies during construction. The Applicants will maintain sound water and soil conservation practices during construction and operation of the facility to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. The facility is not expected to affect ammonia, organic matter or dissolved oxygen levels within the watersheds. Once the facility is completed, it will have no impact on surface water quality.

Temporary impacts to wetlands may occur if these areas need to be crossed during construction of the transmission line. The Applicants will avoid any wetland crossings where feasible; wherever

crossings are necessary the Applicants will attempt to minimize temporary impacts by constructing that portion of the facility during the winter and using mats when feasible. All wetlands along the facility corridor can be spanned by the transmission lines, which will have average spans of 700 to 800 feet, and a maximum span of 1,000 feet. No permanent impacts to wetlands are anticipated.

17.0 AIR QUALITY (ARSD 20:10:22:21)

17.1 EXISTING AIR QUALITY

Deuel and Grant Counties are in compliance with both National and South Dakota Ambient Air Quality Standards.

State and Federal Ambient Air Quality monitoring sites are sparse in the facility area. This is primarily due to the lack of significant emission sources in the area.

The primary emission sources that exist near the facility include agriculture and grain processing facilities and small to medium sized manufacturing facilities.

17.2 FACILITY IMPACTS

During construction of the facility, limited fugitive emissions from construction related equipment and ROW clearing are expected to occur. The impact from these emissions is expected to be minimal.

Construction emission impacts are highly dependent on weather conditions and the specific activity occurring. Primary emissions from these activities will include fugitive dust and diesel combustion emissions. These are expected to have minimal impacts on their surroundings due to the limited and intermittent nature of these activities.

Once the transmission line is operational, there will be minor amounts of ozone generated from the transmission line. The national standard for ozone is 0.08 parts per million on an eight-hour averaging period. Calculations, using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 for a standard single circuit 345 kV transmission line, predicted the maximum concentration of 0.008 ppm near the conductor and 0.0003 ppm at one meter above ground during foul weather or worst-case conditions (rain at four inches per hour). During a mist rain (rain at 0.01 inch per hour) the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one meter above ground level. For both cases, these conservative calculations of ozone levels are well below the federal standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there will be no measurable impacts relating to ozone for the facility.

18.0 TIME SCHEDULE (ARSD 20:10:22:22)

The Applicants propose an in-service date of March 2009 for the 345 kV and June 2010 for the 230 kV transmission line to Morris, Minnesota. A permitting and construction schedule for the project is provided below:

Submit PUC Route Permit Application	January 2006
PUC Route Permit	January 2007
Survey Permission and Survey	Feb 2006 – Aug 2006
Transmission Line and Substation Design	Feb 2006 – Mar 2010
ROW Acquisition	Nov 2006 – Mar 2007
Transmission Line Construction	Mar 2007 – June 2010
Substation Construction	Feb 2007 – June 2010
Final ROW Contacts, Settlements and Cleanup	Mar 2009 – July 2010

19.0 COMMUNITY IMPACT (ARSD 20:10:22:23)

19.1 EXISTING SOCIOECONOMIC AND COMMUNITY RESOURCES

19.1.1 COMMUNITIES

The entire facility is located in Grant and Deuel Counties on land which is designated for agricultural uses. The largest residential areas near the facility are Big Stone City and Gary, South Dakota. Residential dwellings are dispersed throughout the route (see Table 7).

TABLE 7
DEMOGRAPHIC CHARACTERISTICS OF THE FACILITY AREA

Location	Population	Race Percentage (White)	Percentage of Population below Poverty Level	Per Capita Income
City of Big Stone, South Dakota	605	99.2	11.2	$19,297
City of Gary, South Dakota	231	99.6	13.9	$13,480
Deuel County	4498	98.5	10.3	$15,977
Grant County	7847	98.6	9.9	$16,543
South Dakota	754,844	88.7	12.7	$35,282

Source: U.S. Census Bureau. All data from Census 2000.

19.1.2 AGRICULTURE

Within Deuel and Grant Counties, more than 90 percent of the land is used for agriculture. The number of full-time farms in Deuel County decreased by 3 percent from 1997 to 2002. The average farm size increased by 2 percent to 562 acres. Crop sales in 2002 were $22,325,000 (34 percent of agricultural products sold in the County) and livestock sales were $43,409,000 (66 percent). Crops in Deuel County are primarily corn, soybeans and wheat. Livestock sold is primarily cattle and hogs.

In Grant County, the number of full-time farms increased by 3 percent from 1997 to 2002. The average farm size decreased by 5 percent to 672 acres. Crop sales in 2002 were $39,309,000 (48 percent of agricultural products sold in the County) and livestock sales were $42,867,000 (52 percent). Crops in Grant County are primarily corn, soybeans and wheat. Livestock sold is primarily cattle and hogs.

19.1.3 TRANSPORTATION

The transportation network that may be used to develop and operate this project is comprised of largely rural "farm-to-market" or section line roadways with various county and trunk highways. No urban areas exist within the facility area. Various active railroad lines are also present within the facility area.

The facility is located in rural areas served by highways with relatively low traffic volume. The capacity of any roadway is dependent on many factors, as documented in the Highway Capacity Manual. Based on typical peak hour percentages, trucks, terrain and access spacing, the functional capacity of a rural two-way two-lane highway is between 4,000 and 6,000 vehicles per day. A summary of the average daily traffic on an annualized basis is documented in Table 8.

TABLE 8
EXISTING AVERAGE ANNUAL DAILY TRAFFIC (AADT)

Highway Route	Jurisdiction	AADT
State Highway 158	SDDOT	135
State Highway 20	SDDOT	260
U.S. Highway 212	SDDOT	1,650
U.S. Highway 12	SDDOT	2,800
State Highway 101	SDDOT	405
State Highway 22	SDDOT	630

Source: County Highway AADT Map(s)

Given the functional capacity limits of 4,000 to 6,000 vehicles per day (vpd), congestion is not a primary factor on any of the roadways within the project area.

19.1.3.1 Railroad

Two active railroad lines intersect the facility, as documented in Table 9. Temporary and permanent easements for both construction and utility line operation will be required by BNSF Railway Company. Construction activities will be regulated and any impacts to rail service will require approval by the carrier.

TABLE 9
ACTIVE RAILROAD LINES WITHIN FACILITY AREA

Operator	Subdivision	Segment	Classification
BNSF RAILWAY COMPANY	Appleton Sub	Benson-Aberdeen	Main Line
BNSF RAILWAY COMPANY	Watertown Sub	Appleton-Yale	Branch Line

19.1.4 CULTURAL RESOURCES

The following sections present the results of an archival review of previously recorded cultural resources within a three-mile wide study area. The results include counts of known cultural resources and provide general information on those features identified during a Public Land Survey (PLS) map review. For more detailed descriptions of these resources and the study area, please refer to the cultural resources overview prepared by Palmer et al. (2005).

19.1.4.1 Data Collection Methods

Otter Tail sponsored an overview of known cultural resources within the study area (Palmer et al. 2005). For this overview, Otter Tail requested previous survey data and information on known archaeological resources in the project area from the Archaeological Research Center in Rapid City, South Dakota. PLS maps from the Montana/Dakota Bureau of Land Management (BLM) Field Office in Billings, Montana were also acquired. General Land Office (GLO) maps were collected from the BLM. Otter Tail also consulted the Archaeological Resources Management System and Cultural Resources Geographic Research Information Display (CRGRID) databases available on the web from the South Dakota Historical Society in the City of Pierre.

Otter Tail also sponsored a windshield survey of selected portions of the corridor. During the survey, all townships were visited, and selected buildings within the corridors were photographed.

19.1.4.2 Affected Environment

The three-mile wide study area travels through Grant (Big Stone, Alban, Vernon and Adams townships) and Deuel counties (Herrick, Glenwood and Antelope Valley townships) in South Dakota. Briefly, the review of existing cultural resources documentation identified 15 archaeological resources and 14 historic standing structures within the study area. (Appendix G) These resources have been described in 17 cultural resource documentations and management reports (Palmer et al. 2005).

The following is an analysis of those resources in the immediate vicinity of the route. The route crosses four archaeological resources, all of them being railroad corridors (39DE2003, 39GT2000, 39GT2007, 39GT2015) (Appendix G). Two of these corridors are currently operated by BNSF Railway Corporation, namely the Benson-Aberdeen Main Line segment (39GT2000) and the Appleton-Yale Branch Line segment (39GT2007). All of these active and abandoned railroad corridors are eligible for listing on the National Register of Historic Places (NRHP). No other previously identified archaeological resources are within 500 feet of the route.

Eleven previous inventoried standing structures (10 of which are in the City of Gary) are within one mile of the route (Appendix G). Three of these structures (in the City of Gary) are listed on the NRHP. Four other structures in Gary are eligible for listing on the NRHP. The remaining four structures, including a bridge in Antelope Valley Township, are not eligible for listing on the NRHP.

The 19th century (1860s to 1880s) PLS maps illustrate the Euroamerican history of the study area and provide some basis for the types of historic-period cultural resources that are expected in the vicinity. For example, the PLS map of Herrick Township (with a survey completed in 1872) shows the Winona and St. Peter Railroad (later known as the Chicago Northwestern Railroad and recorded as such as 39GT2003) that travels through Sections 3, 4 and 10 through the City of Gary (and not yet established on the map). The 1872 survey of Glenwood Township identified one unlabeled trail/road and the continuation of the Winona and St. Peter Railroad (later Chicago Northwestern Railroad). In addition, the 1860s PLS maps for Alban and Big Stone townships show multiple trails/roads, numerous farms/structures, and the Chicago, Milwaukee, St. Paul and Pacific Railroad (recorded as 39GT2007).

19.2 SOCIOECONOMIC AND COMMUNITY IMPACTS

19.2.1 COMMUNITY IMPACTS

The facility will not have a significant short-term adverse impact on population, income, occupational distribution nor on the integration or cohesion of communities in the facility area.

There will be some long-term beneficial impacts from the new transmission lines. These benefits include an increase to the counties' tax base resulting from the incremental increase in revenues from utility property taxes, which are based on the value of the facility. The availability of reliable power in the area will have a positive effect on local businesses and the quality of service provided to the general public.

Although the facility owners will pay taxes on the facility and the facility will increase Deuel County's and Grant County's tax base, the facility will not result in any significant impact to the affected taxing jurisdiction.

19.2.2 AGRICULTURAL IMPACT

The facility will create impacts to farmland along the route; no impacts are anticipated to livestock operations. However, these impacts will be minimal and will occur primarily due to pole placement. During construction, temporary impacts such as soil compaction and crop damages within the ROW are likely to occur. Approximately 304 acres of agricultural land will be impacted temporarily by the facility. This temporary impact is from temporary roads and staging areas located along the length of the route to allow construction access to the facility. Permanent impacts to agricultural lands will result in areas where poles are placed and are estimated to total approximately 0.7 acres of the project area.

Wherever possible, poles will be placed so that they closely follow the roadway ROW, minimizing permanent impacts to agricultural land. To minimize loss of farmland and ensure reasonable access to the land near the poles, the Applicants intend to place the poles within 15 feet of the road ROW. Pole placement on cross-country ROW will be sited to allow area for farmers to maneuver equipment around the poles.

19.2.3 TRANSPORTATION IMPACTS

The facility will not result in any permanent impacts to the area's transportation resources. There may be some temporary impacts to local roads during the construction phase of the facility. The Applicants will work with Grant and Deuel Counties to minimize any impacts to area transportation from the facility.

There will be no impacts to the rail infrastructure, as the facility will span the BNSF Railway Company, Benson to Aberdeen mainline and Appleton to Yale branch railroad line.

19.3 CULTURAL RESOURCE IMPACTS

The proposed project will require the preparation of an EIS directed by Western. In addition, Western will also function as the lead federal agency for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Western is currently preparing a Programmatic Agreement (PA) to guide the Section 106 compliance process throughout the project, particularly with regard to a definition of Area of Potential Effects (APE) once the routes for the transmission lines are determined. While the EIS will compare the corridors, the consulting parties

to the PA understand that the selection of actual transmission line routes will be a function of the PUC of the State of South Dakota in response to this application. The APE, to be agreed upon in the PA, will be applied to these routes; the APE will be subject to a Phase I cultural resources inventory (i.e. field investigation).

The Applicants' archaeologists will design a survey methodology to document the existing conditions within the APE, identify existing archaeological resources within that area (including previously inventoried properties), provide recommendations for National Register eligibility of identified cultural resources within the APE, and offer recommendations for archaeological site avoidance, impact minimization, or mitigation if necessary. Also, the Applicants' architectural historians will design a methodology to identified properties within the APE for visual effects (as proposed in the PA) and assess impacts to NRHP-listed or eligible standing structures.

The Applicants will make every effort to avoid adverse effects to NRHP-eligible cultural resources. In the event that an impact would occur, Western would determine the nature of the impact in consultation with the South Dakota SHPO and invited consulting parties (particularly Native American Tribes and other state and federal permitting or land management agencies) on whether or not the resource was eligible for listing in the National Register of Historic Places (NRHP). While avoidance of the resource would be a preferred action, mitigation for project-related impacts on NRHP-eligible cultural resources may include an effort to minimize project impacts on the resource and/or additional documentation through data recovery.

Western will integrate into the PA a discovery plan to be in place should previously unknown archaeological resources or human remains be inadvertently encountered during construction along the route. The plan will outline the framework for handling such discoveries in an efficient and legally compliant manner. The discovery plan may include the following topics: construction contractor training, identification of resources in the field, contact information for Otter Tail-designated professionals to address discovery, procedures for avoidance, and associated tasks in the event of work stoppage in a construction area. With regard to a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines (SDCL Chapter 34-27).

20.0 EMPLOYMENT ESTIMATES (ARSD 20:10:22:24)

Construction activity for the Big Stone Transmission project would require approximately 40 personnel. Of the 40 personnel, approximately 25 employees will be needed during transmission line construction and 15 workers will be required for substation construction. Additionally, part-time personnel may also be needed during the construction of the project. The estimated annual expenditures by job classification are listed in Table 10.

TABLE 10
ANNUAL EMPLOYMENT EXPENDITURES BY JOB CLASSIFICATIONS

Job Classification	Annual Expenditure
Linemen	$2.7 Million
Earthmovers	$250,000
Building Construction	$250,000
Relay Technicians	$225,000
Electrical Technicians	$575,000

It is anticipated that the substation workers, other than the earthmovers, will be employees from the Otter Tail substation construction workforce. A portion of the linemen are also anticipated to come from the Applicants' field crews to construct the 115 kV and 230 kV transmission lines and possibly the 345 kV transmission lines. Those linemen positions that cannot be filled by the Applicants will be contracted out. The level of skill and training required for constructing transmission lines will limit the numbers of workers hired locally. After completion of construction, operation and maintenance of the facility will likely be provided by existing Otter Tail employees.

The relatively short-term nature of the project construction and the number of workers who will be hired from outside of the project area should result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services. It is not anticipated that the project will create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area.

21.0 FUTURE ADDITIONS AND MODIFICATIONS (ARSD 20:10:22:25)

The Granite Falls 345 kV transmission line will operate at 230 kV until future transmission system upgrades are completed which will allow this facility to be uprated. The Big Stone 345 kV Substation will be constructed prior to energizing the line from 230 kV to 345 kV. Refer to Section 7.5, Big Stone 345 kV Substation, for the general site description.

The Applicants considered whether a 345 kV transmission line was warranted for either the City of Morris or the City of Willmar. At this time there is not sufficient evidence to warrant building a transmission line of that size to either location.

The Applicants assume that there will be minor system upgrades needed in the future, but current MISO studies have not identified any additional necessary modifications that will result from this project.

22.0 TRANSMISSION FACILITY LAYOUT AND CONSTRUCTION (ARSD 20:10:22:34)

22.1 ROUTE CLEARING

During the acquisition process, individual property owners will be advised as to the construction schedules, needed access to the site and any vegetation clearing required for the facility. To maintain North American Energy Reliability Council (NERC) reliability standards, the ROW will be cleared of the amount of vegetation necessary to construct, operate and maintain the facility. Clear cutting, (i.e. the removal of all trees, brush and other low-growing vegetation), will be used at construction and maintenance access roads and at structure erection sites. Danger trees outside of the ROW will also be removed. Danger trees are those trees which could, in falling, hit the transmission line. Other trees, which are decayed or leaning or may become a potential hazard to the transmission line, will also be removed. Disposal of timber, tree tops, limbs and slash will comply with state and local ordinances. Wood from the clearing operation will be offered to the landowner or removed from the site.

22.2 TRANSMISSION CONSTRUCTION PROCEDURES

Once access to the land is granted, site preparation begins in coordination with landowners. This includes clearing the ROW of vegetation that would interfere with the safe operation of the transmission line. Any vegetation that would prevent construction may also be removed. Additionally, underground utilities are identified in cooperation with local utility companies to minimize conflicts to the existing utilities along the routes. All materials resulting from the clearing operations will either be chipped on site or stacked in the ROW with landowner agreement for their use. If temporary removal or relocation of fences is necessary, installation of temporary or permanent gates would be coordinated with the landowner. The ROW agent also works with the landowners for early harvest of crops where possible. During the construction process, the Applicants may ask the property owner to remove or relocate equipment and livestock from the ROW.

Transmission line structures are generally designed for installation at existing grades. Therefore, structure sites will not be graded or leveled, unless it is necessary to provide a reasonably level area for construction access and activities. For example, minor grading might be performed where the immediate terrain near the structure is such that vehicle or installation equipment could not safely access or perform construction operations properly.

The Applicants have standard construction and mitigation practices that were developed from experience with past practices as well as industry specific Best Management Practices (BMPs). These BMPs address ROW clearance, erecting transmission line structures and stringing transmission lines. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures and other practices. In some cases these activities, such as schedules, are modified to incorporate BMP construction that will assist in minimizing impacts for sensitive environments. Contractors are advised of these BMP requirements during the bid process. For facilities that will have the structures directly embedded in the ground, the structures will be erected by auguring or excavating a hole typically 10 to 15 feet deep and 3 to 4 feet in diameter for each pole. Any excess soil from the excavation will be offered to the landowner or removed from the site.

The steel or wood structures will then be set and the holes back-filled with the excavated material or with native soil or crushed rock. In poor soil conditions, a galvanized steel culvert is sometimes installed vertically with the structure set inside. Other facilities may require the use of concrete foundations. The size of the hole for concrete foundations depends largely on soil type. Based on the known soil types in eastern South Dakota, it is anticipated that the average structure depth would be approximately 12 feet deep. Drilled pier foundations may vary from 4 to 8 feet in diameter. Concrete trucks are normally used to bring the concrete in from a local concrete batch plant.

Steel structures are delivered to a staging area, which are located approximately every 25 miles along the route, which occupy approximately one acre of land. At the staging area, steel structure sections are connected, the arms are attached, and the structure is then loaded onto a structure trailer. The structure is delivered to the staked location and placed within the ROW until the structure is set. Insulators and other hardware are attached while the steel structure is on the ground. The structure is then lifted and placed in the ground for direct buried structures. Structures that cannot be direct buried are secured on the foundation by crane. In some cases temporary lay down areas may be required. These areas will be selected based on their location, access, security and ability to efficiently and safely warehouse supplies. The areas are chosen so minimal excavation and grading is needed. The temporary lay down areas that are outside of the transmission line ROW will be obtained from affected landowners through rental agreements.

Wood structures are also delivered to a staging area. When the transmission line runs parallel with a roadway, wood structures may be placed at the staked location. This occurs when there is room to leave the structure and adequate access to drop off the structure until it is installed. When wood

structures are located away from roadways, they are sorted at the staging area and loaded onto structure trailers for delivery to the staked location. Because the wood structures weigh less, several wood structures can be placed on the trailer for each delivery. Insulators and other hardware are attached to the structure while it is on the ground, then a line truck lifts and places it.

After structures have been erected, conductors are installed by establishing stringing setup areas within the ROW. These stringing setup areas are usually located every two miles along a project route and usually occupy approximately 15,000 square feet of land. Conductor stringing operations also require brief access to each structure to secure the conductor wire to the insulators or to install shield wire clamps once final sag is established. Temporary guard or clearance structures are installed as needed over existing distribution or communication lines, streets, roads, highways, railways or other obstructions, after any necessary notifications are made or permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. In addition, the conductors are protected from damage. During construction, the most effective means to minimize impacts to water areas will be to span all streams and rivers with structures. In addition, the Applicants will not allow construction equipment to be driven across waterways except under special circumstances and after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. In areas where construction occurs close to waterways, BMPs help prevent soil erosion and ensure that equipment fueling and lubricating occur at a distance from waterways.

22.3 SUBSTATION CONSTRUCTION PROCEDURES

Once the final design is complete and necessary property is acquired, construction will begin. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for any transmission lines that may be affected, weather conditions, spring load restrictions on roads and any restrictions placed on certain areas for minimizing permanent impacts from construction. Substation upgrades involve replacing existing equipment with new equipment. All construction work occurs within the existing substation property unless expansion of the site is necessary. Construction of a new facility begins with site preparation work, which involves grading and leveling the site with heavy equipment to support electrical equipment and the control house. This may or may not include replacement of site soils depending on existing soil conditions found and those identified in the Soil Exploration Report. Topsoil will be removed, stockpiled and re-spread onsite. Any excess soil will be offered to the landowner or removed from the site. Once the site is graded, a perimeter fence, typically chain link, is installed to secure the site. All substation equipment will be contained within the fenced area. Concrete foundations are then placed throughout the substation

pad to support the substation equipment. A control house is constructed to house the protective relaying and control equipment. Erection of steel structures follows the foundation installation. These structures are built using rolled I-beams and/or tubular steel materials. Beams are used for mounting electrical conductors, disconnects and equipment. Bare copper conductor is buried around the perimeter of the fence and within the fence to properly ground all of the equipment and provide safety of personnel. Large high-voltage equipment, such as circuit breakers and transformers with associated control cables, are installed following completion of these steel structures. The final step is to properly test and commission each electrical device.

The Applicants will provide erosion control methods to be implemented to minimize runoff during substation construction and since the projects will likely impact more than one acre, a National Pollutant Discharge Elimination System (NPDES) permit will be acquired, as necessary. Additionally, a Storm Water Pollution Prevention Plan (SWPPP) will be implemented in compliance with the NPDES and if necessary, a Spill Prevention, Control, and Countermeasure (SPCC) plan will be developed or updated, as applicable.

Contractors will be committed to safe working practices, maintaining property and equipment in safe working condition and requiring compliance with all applicable safety rules, practices and procedures. Substations will be designed in compliance with the applicable requirements of Rural Utilities Service (RUS), National Electrical Safety Code (NESC), Occupational Safety and Health (OSH) Act (29 CFR 1910) and local regulations. Substations will be reviewed for local conditions, and will include provisions in design beyond the minimum provisions for safety established in the various regulatory codes, where warranted. Substation designs will allow future maintenance to be accomplished with a minimum impact on substation operation and allow adequate clearance to work safely.

22.4 RESTORATION PROCEDURES

During construction, limited ground disturbance at the structure sites may occur. The construction contractor establishes a main staging area for secure, temporary storage of materials and equipment. Typically, a previously disturbed or developed area is used. Such an area includes sufficient space to lay down material and pre-assemble some structure components or hardware. Other staging areas located along the ROW are limited to the structure site areas for structure lay down and framing, prior to structure installation. Additionally, stringing setup areas are used to store conductors, stringing equipment and other stringing equipment necessary for stringing operations. Disturbed areas are restored to their original condition to the maximum extent practicable, or as negotiated with the landowner.

Unless otherwise agreed upon by the landowner, all storage and construction buildings, including concrete footings and slabs and all construction materials and debris will be removed from the site once construction is complete. Post-construction reclamation activities also include the removing and disposing of debris; dismantling all temporary facilities (including staging areas); employing appropriate erosion control measures and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

Once construction is completed, landowners are contacted by the ROW agent to determine if the clean-up measures have been to their satisfaction and if any other damage may have occurred. If damage has occurred to crops, fences or the property, the Applicants will compensate the landowner. In some cases, an outside contractor may be hired to restore the damaged property as near as possible to its original condition.

22.5 MAINTENANCE PROCEDURES

Access to the ROW of a completed transmission line is required periodically to perform inspections, conduct maintenance and repair damage. Regular maintenance and inspections will be performed during the life of the facility to ensure its continued integrity. Generally, the Applicants will inspect the transmission lines at least once per year. Inspections will be limited to the ROW and areas where obstructions or terrain may require off-ROW access. If problems are found during inspection, repairs will be performed and the landowner will be compensated for any loss.

The ROW will be managed to remove vegetation that interferes with the operation and maintenance of the transmission line. Native shrubs that will not interfere with the safe operation of the transmission line will be allowed to reestablish in the ROW. The Applicants' practice provides for the inspection of major transmission lines (230 kV and above) annually to determine if clearing is required. ROW clearing practices include a combination of mechanical and hand clearing, along with herbicide application where allowed to remove or control vegetation growth. Noxious weed control with herbicides will be conducted on a two-year cycle around structures and anchors.

23.0 INFORMATION CONCERNING TRANSMISSION FACILITIES (ARSD 20:10:22:35)

23.1 CONFIGURATION OF TOWERS AND POLES

The Applicants are proposing to use H-frame double pole or single pole Davit arm, wood or steel structures for the 345 kV and 230 kV transmission lines, with the H-frame double pole considered the preferred structure at this time. The final type will be based on final design and an economic analysis. The H-frame poles will have directly embedded foundations where the poles are placed directly in a hole bored 10 to 15 feet deep and three to four feet in diameter. After the poles are placed, the holes will be backfilled with the native soil or aggregate that is approved for the site. The single poles will require concrete foundations. Structures erected on concrete will have foundations approximately six to 12 feet in diameter, and approximately 20 to 40 feet in depth. The structures will have an average height of 100 feet and an average span of 700 to 800 feet.

Appendix B contains diagrams of H-frame and single pole Davit arm single circuit structures for the 345 kV and 230 kV transmission lines, as well as double circuited structures for a portion of the 230 kV transmission line proposed for the Big Stone to Morris or Willmar route.

Special structures may be utilized in areas where long spans, corner structures or special issues arise such as wetland or avian issues.

23.2 CONDUCTOR CONFIGURATION

The conductor for each phase of the transmission lines has not yet been decided. Each portion of transmission line associated with the project is identified below with possible conductor size and type. The final selection of the optimal conductors will depend on a number of factors that will be identified during future detailed engineering studies.

Morris 230 kV Transmission Line from Big Stone 230 kV Substation to Big Stone 345 kV Substation

- 2-954 Aluminum Conductor Steel Supported (ACSS) bundled or
- 2-1272 Aluminum Conductor Steel Reinforced (ACSR) bundled or
- 1590 ACSR

Morris 230 kV Transmission Line from Big Stone 345 kV Substation to Minnesota/South Dakota border

- 1272 ACSR (bundled) or
- 954 ACSS or
- 1590 ACSR

Granite Falls 230 kV Transmission Line from Big Stone 230 kV Substation to Big Stone 345 kV Substation

- 1590 ACSR or
- 2-954 ACSS (bundled) or
- 2-1272 ACSR (bundled)

Granite Falls 345 kV Transmission Line from Big Stone 345 kV Substation to Minnesota/South Dakota border

- 2-1272 ACSR (bundled) or
- 2-954 ACSS (bundled)

23.3 PROPOSED TRANSMISSION SITE AND MAJOR ALTERNATIVES

The facility and major alternatives are identified in Sections 8.0 and 9.2 and shown in relation to aerial photos in Appendix A.1 and A.6 and in relation to land use and zoning in Appendix A.8.

23.4 RELIABILITY AND SAFETY

23.4.1 TRANSMISSION LINE RELIABILITY

The Big Stone plant currently has several existing transmission lines that exit the Big Stone 230 kV Substation, and it would appear that there is an opportunity to double circuit some of the existing transmission lines with the proposed transmission lines from the Big Stone II Transmission Project. NERC defines minimum system performance requirements that must be met for different system conditions. They define different types of system events (or situations in which a transmission system facility is inadvertently taken out of service) into four different categories:

Category A – All Facilities in Service (No Contingencies)

Category B – Event resulting in loss of a single element

Category C – Event(s) resulting in the loss of two or more (multiple) elements.

Category D – Extreme event resulting in two or more (multiple) elements removed or Cascading out of service

For each of the different categories of contingencies, each reliability region is allowed to expand on the NERC requirements to make them more stringent. Minnesota and South Dakota are in the Midwest Reliability Organization (MRO) reliability region, which is a new reliability region under development between the Mid-Continent Area Power Pool (MAPP), the Mid-America Interconnected Network (MAIN) and SaskPower. NERC Category C (contingency C5) includes the loss of "any two circuits of a multiple circuit towerline" with an exclusion for multiple circuit towers used over short distances in accordance with MAPP Regional exemption criteria. Through the transition of MAPP into the MRO, the current MRO regional exemption criteria for this region is defined in the MAPP Reliability Handbook. In this region if the transmission line is operated at a voltage of 100 kV or higher and the overall distance that the transmission line is double circuited is greater than one mile, then it meets the Category C system event.

NERC reliability standards require utilities to plan and be able to survive all category C contingencies without system performance violations. In the case of generation outlet facilities near the Big Stone plant, loss of a structure with two of the generation outlet transmission lines would result in severely reduced generation levels from BSP II in order to avoid system performance violations.

Therefore, separate transmission circuits are needed in order to improve transmission system reliability and to obtain the maximum amount of generation from BSP II in the event that an adjacent transmission circuit is out of service. Therefore, to achieve the most benefit of adding new transmission circuits out of the Big Stone plant for BSP II, new transmission circuits cannot be constructed as double circuit lines. Without the generation available from BSP II, the Applicants might be forced to rely on higher cost generation resources.

Double circuit construction has been found acceptable if the power system can reliably withstand simultaneous failure of both circuits on a common structure. Double circuit construction could be appropriate in situations where the two circuits serve different functions, connect different substations, split away and proceed in different directions, or where high capacity (but not redundancy) is required. Since the transmission circuits leaving the Big Stone Plant are for a

generation outlet being constructed to have high capacity and redundancy, it is not feasible to construct any of the new transmission circuits on common structures with any of the existing transmission circuits. This is based on analysis of single contingencies involving the loss of one transmission line and two transmission lines that may share common structures out of the Big Stone Plant. This analysis indicates that much higher generation levels of BSP II can be maintained if the transmission circuits leaving the Big Stone site use separate structures.

Building the new transmission circuits on separate structures is vital for providing back-up (redundancy) transmission for outage of adjacent outlet circuits. Therefore, new transmission circuits out of the Big Stone Plant must be constructed such that there is minimal chance for "common-mode" failures which would simultaneously take two circuits out of service. Common-mode failure means for double-circuit transmission lines include:

- electrical failure of transmission line insulation due to lightning strike;
- mechanical failure of one or more structures;
- broken shield wire falling into power conductors;
- wind-blown debris causing conductor-conductor short circuits;
- insulator contamination due to road salt, soot, or agricultural chemicals;
- wind/sleet/ice conditions
- contact with aircraft or construction equipment (crane, dump truck)
- protective relaying malfunction ("sympathetic tripping" due to fault on adjacent circuit)

These common-mode failure mechanisms have all been experienced on the transmission system within the northern MRO transmission system on double circuit transmission lines.

23.4.2 SAFETY

Proper safeguards will be implemented for construction and operation of the facility. The facility will be designed with the local, state, NESC and the Applicants' standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. Construction crews will comply with local, state, NESC and the Applicants' standards regarding installation of facilities and standard construction practices. The Applicants' and industry safety procedures will be followed during and after installation of the transmission line. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs and a structure or conductor falls to the ground. The protective devices are breakers and relays located where the transmission line connects to the substation. The protective equipment will de-energize the transmission line should such an event occur. In addition, the substation will be fenced and access limited to authorized personnel. The costs associated with these measures have not been tabulated separately from the overall facility costs since these measures are standard practice for the Applicants.

23.4.2.1 Electric Fields

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

The intensity of electric fields is associated with the voltage of the transmission line and is measured in kilovolts per meter (kV/M). Transmission line electric fields near ground are designated by the difference in voltage between two points (usually one meter).

The Granite Falls 345 kV transmission line will have a peak magnitude of electric field density of approximately 2.2 kV/M underneath the conductors one meter above ground level. The peak magnitude of electric field density for the 230 kV transmission line will be approximately 1.5 kV/M. These predicted levels are significantly less than the maximum limit of eight kV/M that has been a permit condition imposed by the Minnesota Environmental Quality Board (EQB) in other transmission line applications. The standard was designed to prevent serious hazard from static discharges when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater.

23.4.2.2 Magnetic Fields

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as gauss (G).

The question of whether exposure to power-line frequency (60 Hertz (Hz)) magnetic fields can cause biological responses or even health effects has been the subject of considerable research for the past three decades. The most recent and exhaustive reviews of the health effects from power-

line frequency fields conclude that the evidence of health risk is weak. The National Institute of Environmental Health Sciences (NIEHS) issued its final report, NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, on June 15, 1999, following six years of intensive research. NIEHS concluded that there is little scientific evidence correlating extra low frequency electromagnetic field (EMF) exposures with health risk.

While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate. In addressing this issue, the Applicants provide information on EMF to the public, interested customers and employees to assist them in making an informed decision about EMF. The Applicants will provide measurements for landowners, customers and employees who request them. In addition, the Applicants have followed the "prudent avoidance" guidance suggested by most public agencies. This includes using structure designs that minimize magnetic field levels and attempting to site facilities in locations with lower residential densities.

23.4.2.3 Stray Voltage

Stray voltage is defined as a natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. By code, electrical systems, including farm systems and utility distribution systems, must be grounded to the earth to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution, ground currents, EMFs or earth currents. It only affects farm animals that are confined in areas of electrical use. It does not affect humans.

Stray voltage has been raised as a concern on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line. These circumstances are considered in installing transmission lines and can be readily mitigated. The Granite Falls 345 kV transmission line is not proposed to run parallel to any existing distribution line for long distances. Therefore, no stray voltage issues are anticipated with this facility.

23.5 RIGHT-OF-WAY OR CONDEMNATION REQUIREMENTS

The schedule for contacting landowners will be developed by Otter Tail and formal option easement negotiations are expected to begin this year. The expansion of the Big Stone 230 kV Substation will not require additional property; however, the Big Stone 345 kV Substation will require additional property. The majority of the landowners are expected to be aware of the facility since the Applicants have already notified landowners potentially affected by the facility and held two public meetings in the project area to describe the facility and permitting process. Right–of-way agents will work with the landowners at an early stage to answer questions about the facility and to obtain permission for route surveys and soil investigations prior to construction. As the design of the transmission line is further developed, contacts with the owners of affected properties will continue and the negotiation and acquisition phase will begin for the Applicants to obtain the necessary land options for the facilities.

In the event soil investigation is required to assist with the design of the foundations, the Applicants will inform the landowners at the initial survey consultation that soil borings may occur. An independent geotechnical testing company will take and analyze these borings. Survey crews also work with local utilities to identify underground utilities along the route. This minimizes conflicts or impacts to existing utilities along the route.

Where possible, staging and lay down areas will be located within the ROW and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary limited easements (TLE) may be obtained from landowners for the duration of construction. TLEs will be limited to special construction access needs or additional staging or lay down areas required outside of the transmission line ROW.

During the substation construction phase, any affected property owners will be advised as to the construction schedules or needed access to the site. To construct, operate and maintain the proposed substations, all vegetation will be cleared from the substation footprint area, from the substation driveway area, and from a buffer area outside the substation fence. Vegetation on the property outside of the substation footprint, driveway and buffer will be left undisturbed, except where it must be impacted to allow for transmission line access to the substation.

The ROW for the Granite Falls 345 kV transmission line will be 150 feet wide for any sections of the transmission line that do not follow existing corridors, and approximately 98.5 feet wide for the portions that parallel roadway ROW. The ROW for the 230 kV will be 125 feet wide for any sections of the transmission line that do not follow existing corridors, and approximately 82.5 feet

wide for the portions that parallel roadway ROW. The Applicants preferred structures at this time are single circuit, H-frame, wood or steel poles with an average height of approximately 100 feet for most of the route. On average, the transmission line will span 800 feet between structures. Appendix B contains diagrams of H-frame and single pole Davit arm single circuit structures for the 345 kV and 230 kV transmission lines, as well as double circuited structures for a portion of the 230 kV transmission line proposed for the Big Stone to Morris or Willmar route.

23.6 NECESSARY CLEARING ACTIVITIES

The Applicants do not anticipate that the facility will require extensive tree clearing. Isolated trees may need to be cleared to allow safe operation of the transmission line. General ROW clearing and maintenance is described in Section 22.0.

23.7 UNDERGROUND TRANSMISSION

No portion of the facility will require underground transmission. Transmission lines can be placed underground but at substantial additional expense compared to overhead construction. For example, placing a 69 kV transmission line underground costs 10 times as much as building overhead. Because of the significantly greater expense associated with underground transmission construction, the use of underground technology is limited to locations where the impacts of overhead construction are completely unacceptable or where physical circumstances allow for no other option. The Applicants concluded that the environmental and land use setting did not warrant underground construction on any of the proposed transmission lines.

24.0 ADDITIONAL INFORMATION IN APPLICATION (ARSD 20:10:22:36)

The Applicants believe that this Application contains all the information required to meet the Applicants' burden of proof specified at SDCL 49-41B-22. No additional information is provided.

24.1 AGENCY COMMENTS

Federal and state agencies were contacted by the Applicants to inform them of the project at the early stages and to request information regarding potential environmental effects of the project under each agency's jurisdiction. Response letters were received from the U.S. Army Corps of Engineers, Minnesota, South Dakota and North Dakota branches; the U.S. Fish and Wildlife Service in South Dakota and Minnesota; the South Dakota Department of Game, Fish and Parks; U.S. Environmental Protection Agency and South Dakota Department of Environment and Natural Resources. (Appendix E)

24.2 PERMITS THAT MAY BE REQUIRED

Permit	Jurisdiction
Local Approvals	
Road Crossing/ROW Permits	County, Township, City
Lands Permits	County, Township, City
Building Permits	County, Township, City
Overwidth Loads Permits	County, Township, City
Driveway/Access Permits	County, Township, City
South Dakota State Approvals	
Transmission Facility Route Permit	SD PUC
Section 401 Water Quality Certification	SD DENR
Cultural and Historic Resources Review	SD SHPO
Endangered Species Consultation	SD GFP
Permit to Occupy ROW	Mn/DOT
NPDES Permit	SD DENR
Minnesota State Approvals	
Certificate of Need	MN PUC

Permit	Jurisdiction
Route Permit	MN PUC
Cultural and Historic Resources Review	MN SHPO
Endangered Species Consultation	MN DNR – Ecological Services
License to Cross Public Waters	MN DNR – Lands and Minerals
Utility Permit	Mn/DOT
Wetland Conservation Act	BWSR
NPDES Permit	MPCA
Federal Approvals	
Environmental Impact Statement	Western (DOE)
Section 106 Review	Western (DOE)
Regulations for Compliance with Floodplain/Wetlands Environmental Review Requirements	Western (DOE)
Section 7 Consultation	FWS
Section 10 Permit	Corps of Engineers
Section 404 Permit	Corps of Engineers
Permit to Cross Federal Aid Highway	FHWA
Notice of Proposed Construction (7460-1)	FAA
Notice of Actual Construction or Alteration	FAA
Farmland Protection Policy Act/Farmland Conversion Impact Rating	USDA/NRCS
Spill Prevention, Control and Countermeasure (SPCC) Plan	EPA
FWS	Compatibilty Analysis of Disturbed Easements/Lands

24.2.1 LOCAL APPROVALS

Typical local approvals associated with transmission line construction are listed below.

Road Crossing/ROW Permits

These permits may be required to cross or occupy county, township, and city road ROW.

Lands Permits

These permits may be required to occupy county, township, and city lands such as park lands, watershed districts, and other properties owned by these entities.

Building Permits

These permits may be required by the local jurisdictions for substation modifications and construction.

Overwidth/Loads Permits

These permits may be required to move over width or heavy loads on county, township, or city roads.

Driveway/Access Permits

These permits may be required to construct access roads or driveways from county, township, or city roadways.

24.2.2 STATE OF SOUTH DAKOTA APPROVALS

Transmission Facility Route Permit

A transmission line cannot be constructed without a route permit from the Public Utilities Commission.

Section 401 Water Quality Certification

This permit is required for fill in jurisdictional waters of the United States, and is intended to ensure that the project will not impact the stream quality or violate surface water quality standards. The certification is required from the SD DENR.

Cultural and Historic Resources Review

A cultural and historic resources review was conducted by the South Dakota SHPO. This review assists the Applicants in identifying potential impacts to cultural and historic resources.

Endangered Species Consultation

The South Dakota GFP Wildlife Diversity Program maintains and inventory, protects, and manages the species and habitats that comprise the biological diversity of South Dakota. Consultation was requested from the department for the project regarding rare and unique species.

Permit to Occupy ROW

This permit is required by the South Dakota Department of Transportation and is required for the Applicants to gain access to the work site from highway ROW.

NPDES Permit

A NPDES permit is required for stormwater discharges associated with construction activities disturbing equal to or greater than one acre. A requirement of the permit is to develop and implement a stormwater pollution prevention plan (SWPPP), which includes BMPs to minimize discharge of pollutants from the site. This permit will be acquired since the construction will cause a disturbance of greater than one acre for the whole of the project.

24.2.3 STATE OF MINNESOTA APPROVALS

Certificate of Need

Prior to issuance of a route permit, a CON is required from the PUC.

Route Permit

HVTLs cannot be constructed without a route permit approved by the PUC.

Cultural and Historic Resources Review

A cultural and historic resources review was conducted by the Minnesota SHPO. This review assists the Applicants in identifying potential impacts to cultural and historic resources.

Endangered Species Consultation

The Minnesota DNR Natural Heritage and Nongame Research Program collects, manages, and interprets information about nongame species. Consultation was requested from the department for the project regarding rare and unique species.

License to Cross Public Waters

The Minnesota DNR Division of Lands and Minerals regulates utility crossings over, under, or across any State land or public water identified on the Public Waters and Wetlands Maps. A license to cross Public Waters is required under Minn. Stat. §84.415 and Minn. Rules, §6135. The Applicants will file these permits once the design of the transmission line is complete and will acquire the permit prior to construction.

Utility Permit

A permit from the Mn/DOT is required for construction, placement, or maintenance of utility lines that occur adjacent or across the highway ROW. The Applicants will file for this permit once the design of the transmission line is complete and will acquire the permit prior to construction.

NPDES Permit

See South Dakota NPDES permit requirements.

24.2.4 FEDERAL APPROVALS

Environmental Impact Statement

Interconnection of the proposed Transmission Line Project and the associated BSP II Power Plan would incorporate a major new generation resources into Western's transmission system. Western has determined that an EIS is required under U.S. Department of Energy (DOE) NEPA Implementing Procedures (10 CFR 1021). The EIS will be prepared in accordance with the National Environmental Policy Act with Western as the lead Federal agency.

Section 106 Review

Section 106 of the NHPA requires Federal agencies to "take into account" the effects of their actions on "historic properties" (i.e., districts, sites, buildings, structures and objects included in or eligible for the NRHP). Section 106 is implemented by following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). Western is the lead Federal agency for 106 compliance. Agency Section 106 responsibilities can be coordinated with the NEPA process by planning for public participation, analysis and review, such that the purposes and requirements of both statutes are met in a timely and efficient manner.

Section 7 Consultation

The FWS consults with Federal agencies under Section 7 of the Endangered Species Act to ensure the Project does not jeopardize listed species or destroy or adversely modify critical habitat.

Section 10 Permit

The Army Corps of Engineers regulates impacts to navigable waters of the United States. The Minnesota River is classified by the Army Corps of Engineers as a navigable water, and the Applicants will apply for a permit for each of the crossings proposed for the Project.

Section 404 Permit

A Section 404 permit is required from the Army Corps of Engineers for discharges of dredged or fill material into waters of the United States. The Applicants will apply for these permits once a route is awarded for the Project.

Notice of Proposed Construction

Notice and approval are required for structures 200 feet in height or the height of the structures would exceed a slope requirement as defined in the FAA Advisory Circular (AC 70/7460-2K). Form 7460-1 is required for the notice.

Notice of Actual Construction or Alteration

This is required to provide the FAA with final construction as-built information for their records, using Form 7460-2.

Farmland Protection Policy Act (FPPA)/Farmland Conversion Impact Rating

The intent of the FPPA is to minimize the conversion of farmland to nonagricultural uses by Federal Projects. The Applicants will work with Western to meet the requirements of this program.

Spill Prevention, Control and Countermeasure (SPCC) Plan

A SPCC plan is required to prevent discharge of oil into navigable waters of the United States, and is required if the aboveground storage capacity for the substance is greater than 1,320 gallons and there is a reasonable expectation of a discharge into navigable waters of the United States. The Applicants will update and develop their SPCC plans at substations meeting the criteria per 40 CFR 112.

Compatibility Analysis of Disturbed Easements/Lands

This permit is required for work within easements owned by the FWS. Compatibility is determined in accordance with the National Wildlife Refuge System Improvement Act. A compatible use is a wildlife-dependent recreational use or any other use on lands that in the sound professional judgment of the director will not materially interfere with or detract from the fulfillment of the mission of the FWS (wildlife conservation) or purposes of the land. The Applicants will work closely with the FWS on potential impacts to their lands.

25.0 TESTIMONY AND EXHIBITS (ARSD 20:10:22:39)

25.1 LIST OF PREPARERS

The following groups contributed to this report:
Otter Tail Power Company
HDR Engineering, Inc.
Lindquist & Vennum
Boyce, Greenfield, Pashby & Welk, LLP

25.2 APPLICANTS' VERIFICATION

VERIFIED APPLICANTS' SIGNATURE

STATE OF Minnesota)
:SS
COUNTY OF Otter Tail)

Dean Pawlowski, being duly sworn, deposes and says that he is Project Manager of Big Stone Transmission and is the authorized agent of Otter Tail Corporation d/b/a Otter Tail Power Company and is also authorized to sign this application on behalf of the Applicants: Central Minnesota Municipal Power Agency, Great River Energy; Heartland Consumers Power District; Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc.; Otter Tail Corporation d/b/a Otter Tail Power Company; Southern Minnesota Municipal Power Agency, and Western Minnesota Municipal Power Agency.

He states that he does not have personal knowledge of all of the facts recited in the foregoing application, but the information in the application has been gathered by and from employees, contractors of the owners of Big Stone Transmission; and that the information in the application is verified by him as being true and correct on behalf of the Applicants.
Dated this 10th day of January, 2006.

Dean Pawlowski

Penny Mosher

PENNY MOSHER
Notary Public
Minnesota
My Commission Expires January 31, 2010

26.0 DEFINITIONS

A-weighted decibel scale	Decibels with the sound pressure scale adjusted to conform with the frequency response of the human ear.
aggregate	A mass or body of rock particles, mineral grains, or a mixture of both; any of several hard, inert materials, such as sand, gravel, slag, or crushed stone, mixed with a cement or bituminous material to form concrete, mortar, or plaster, or used alone, as in railroad ballast or graded fill. The term can include rock material used as chemical or metallurgical fluxstone.
archaic	of or relating to the period from about 8000 B.C. to 1000 B.C. and the North American cultures of that time
avian	Of or relating to birds.
base load power plant	Provides a steady flow of power regardless of total power demand by the grid. These plants run at all times through the year except in the case of repairs or scheduled maintenance.
biotic	of or relating to life; especially **:** caused or produced by living beings
cairn	a heap of stones piled up as a memorial or as a landmark
capacity	The capability of a system, circuit, or device for storing electric charge.
carbon sequestration technologies	Applicable to the reduction of emissions from electric generation point sources and to the decarbonization of fuels for use in other applications.
clayey	Resembling or containing clay.
conductor	A material or object that permits an electric current to flow easily.
corona	The breakdown or ionization of air in a few centimeters or less immediately surrounding the conductors.
corridor	For the purposes of the Project, an approximately three-mile strip of land that was considered for the placement of the route. The corridors will be analyzed in the Federal EIS.
Cretaceous	144 to 65 million years ago.
debitage	debris that remains from the manufacturing of stone tools.

decibels (dB)	A unit for expressing the ratio of two amounts of electric or acoustic signal power equal to 10 times the common logarithm of this ratio; a unit for expressing the ratio of the magnitudes of two electric voltages or currents or analogous acoustic quantities equal to 20 times the common logarithm of the voltage or current ratio.
de-energized	To disconnect from a source of electricity; shut off the power to.
direct current (DC)	A continuous flow of electric charge through a conductor, such as a wire, from high to low potential.
double-circuited	The transmission structure is carrying two sets of transmission lines, each with three conductors.
Ecological Classification System (ECS)	Part of a nationwide mapping initiative developed to improve our ability to manage all natural resources on a sustainable basis. This is done by integrating climatic, geologic, hydrologic and topographic, soil and vegetation data.
fauna	The collective animals of any place or time that live in mutual association.
flora	The collective plants of any place or time that live in mutual association.
Gauss	units of magnetic flux density
gneiss	a foliated metamorphic rock corresponding in composition to a feldspathic plutonic rock (as granite)
granitic	a very hard natural igneous rock formation of visibly crystalline texture formed essentially of quartz and orthoclase or microcline and used especially for building and for monuments
ionization	Removal of an electron from an atom or molecule.
lignite	a usually brownish black coal intermediate between peat and bituminous coal; especially **:** one in which the texture of the original wood is distinct -- called also brown coal
lithic	of, relating to, or being a stone tool
lobe	a curved or rounded projection or division
mafic	of, relating to, or being a group of usually dark-colored minerals rich in magnesium and iron
mesic	characterized by, relating to, or requiring a moderate amount of moisture

Mollisols	Mollisols are a soil order in USA soil taxonomy. Mollisols form in semi-arid to semi-humid areas, typically under a grassland cover. They are most commonly found latitudinally in a band of 50 degrees north of the equator, although there are some in South America, South-Eastern Australia and South Africa. Their parent material is generally limestone, loess, or wind-blown sand.
oxide	A compound of oxygen with one other more positive element or radical.
ozone	A form of oxygen in which the molecule is made of three atoms instead of the usual two.
palustrine	of or having to do with a marsh or grassy wetland environment.
prime farmlands	A special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law.
Project	Pertains to all portions of the proposal, including proposed transmission facilities and associated facilities.
raptor	A member of the order *Falconiforme*, which contains the diurnal birds of prey, such as hawks, harriers, eagles and falcons.
route	For the purposes of the Application, a 2,000-foot wide section of land that the Applicants propose to construct the transmission line within.
route alignment	For the purposes of the Application, a proposed location within the route for the transmission line to be constructed.
Scientific and Natural Area	A program administered by the DNR with the goal to preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations, for scientific study and public edification as components of a healthy environment.
scoria	The refuse from melting of metals or reduction of ores or rough vesicular cindery lava.
soil associations	Soil associations are made up of a group of geographically associated soils which may be quite different from each other but occur together in repeatable patterns.
soil series	A group of soils having horizons (or layers) similar in characteristics and arrangement in the soil profile, except for the texture of the surface portion. They are given proper names from place names within the areas where they occur. Thus, Norfolk, Miami, and Houston are names of some well-known soil series.
soil units	smallest element used in soils classification system
transformer	An electrical device by which alternating current of one voltage is changed to another voltage.

voltage	Electric potential or potential difference expressed in volts.
wetland	Areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas.

27.0 ABBREVIATIONS

A	ampere
AADT	average annual daily traffic
ACSR	Aluminum conductor steel reinforced
ACSS	Aluminum conductor steel supported
ALJ	Administrative law judge
APE	Area of Potential Effect
ARSD	South Dakota Administrative Rules
BLM	Bureau of Land Management
BMP	best management practice
BPA	Bonneville Power Administration
BRIGO Study	Buffalo Ridge Incremental Generation Outlet
CapX 2020 Vision Study	CapX 2020 Technical Update Identifying Minnesota's Electrical Transmission Infrastructure Needs
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMMPA	Central Minnesota Municipal Power Agency
Commission	South Dakota Public Utilities Commission
CON	Certificate of Need
CRGRID	Cultural Resources Geographic Research Information Display
d/b/a	doing business as
dB	decibels

dBA	A-weighted sound level recorded in units of decibels
DC	direct current
DENR	South Dakota Department of Environment and Natural Resources
DNR	Minnesota Department of Natural Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMF	electromagnetic field
EPA	Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
F	degrees Fahrenheit
FWS	U.S. Fish and Wildlife Service
G	Gauss
GES	Graham Environmental Services
GFP	South Dakota Department of Game, Fish and Parks
GIS	Geographic information system
GLO	General Land Office
GRE	Great River Energy
Heartland	Heartland Consumers Power District
HVTL	high voltage transmission line
Hz	Hertz
kV	kilovolt

kV/m	kilovolts per meter
MAIN	Mid-America Interconnected Network
MAPP	Mid-Continent Area Power Pool
MBTA	Migratory Bird Treaty Act
MDH	Minnesota Department of Health
MISO	Midwest Independent Transmission System Operator
MNDOT	Minnesota Department of Transportation
Montana-Dakota	Montana-Dakota Utilities Co.
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MRES	Missouri River Energy Services
MRO	Midwest Reliability Organization
MVA	megavolt ampere
MW	megawatt
NAC	noise area classification
NERC	North American Electric Reliability Council
NESC	National Electric Safety Code
NEV	Neutral-to-earth voltage
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NPS	National Parks Service

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetland Inventory
OSH	Occupational Safety and Health
OTP	Otter Tail Power Company
PA	Programmatic Agreement
PLS	Public Land Survey
ppm	parts per million
Project	proposed project
PUC	Public Utilities Commission of the State of South Dakota
ROD	Record of Decision
ROW	right-of-way
RUS	Rural Utility Service
SDCL	South Dakota Codified Law
SDDOT	South Dakota Department of Transportation
SHPO	State Historic Preservation Office
SMMPA	Southern Minnesota Municipal Power Agency
spp.	species
SWPPP	stormwater pollution prevention plan
TLE	temporary limited easement

TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
vpd	vehicles per day
WCA	Wetland Conservation Act
WMMPA	Western Minnesota Municipal Power Agency
WPA	Wildlife/Waterfowl Protection Agency

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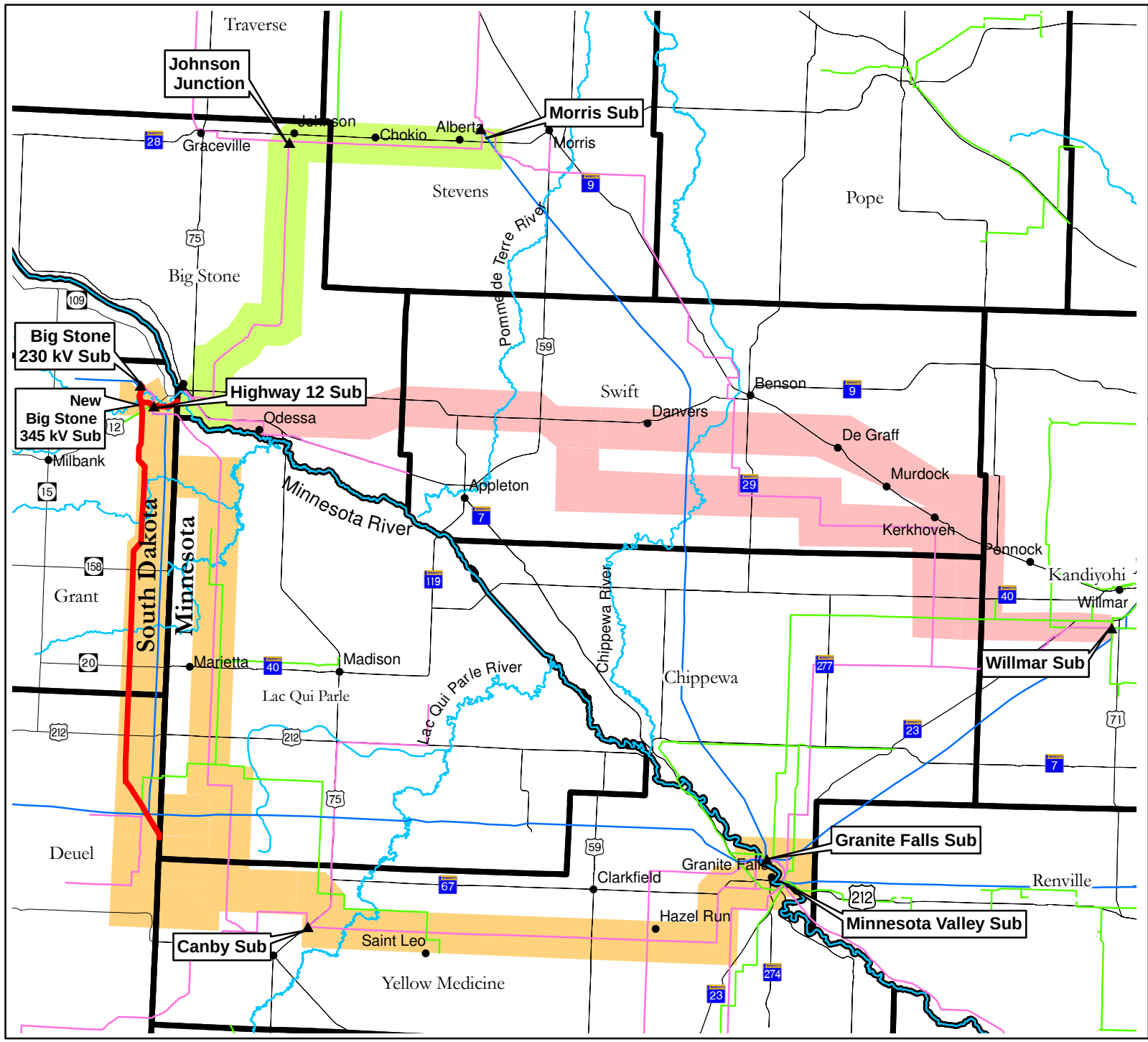
FIGURES



BIG STONE
PARTNERS IN TRANSMISSION

Figure 1
Project Map
Big Stone
Transmission Project
South Dakota PUC
Route
Application

Legend

- Existing Substations
- Potential Route Segments in SD
- County Boundary

Study Corridors

- Morris Corridor
- Willmar Corridor
- Granite Falls Corridor

Existing Transmission Lines

- 69 kV
- 115 kV
- 161 kV
- 230 kV

Data Sources:
MN DNR DataDeli, LMIC, MnDOT

0 2.5 5 10
Miles

N

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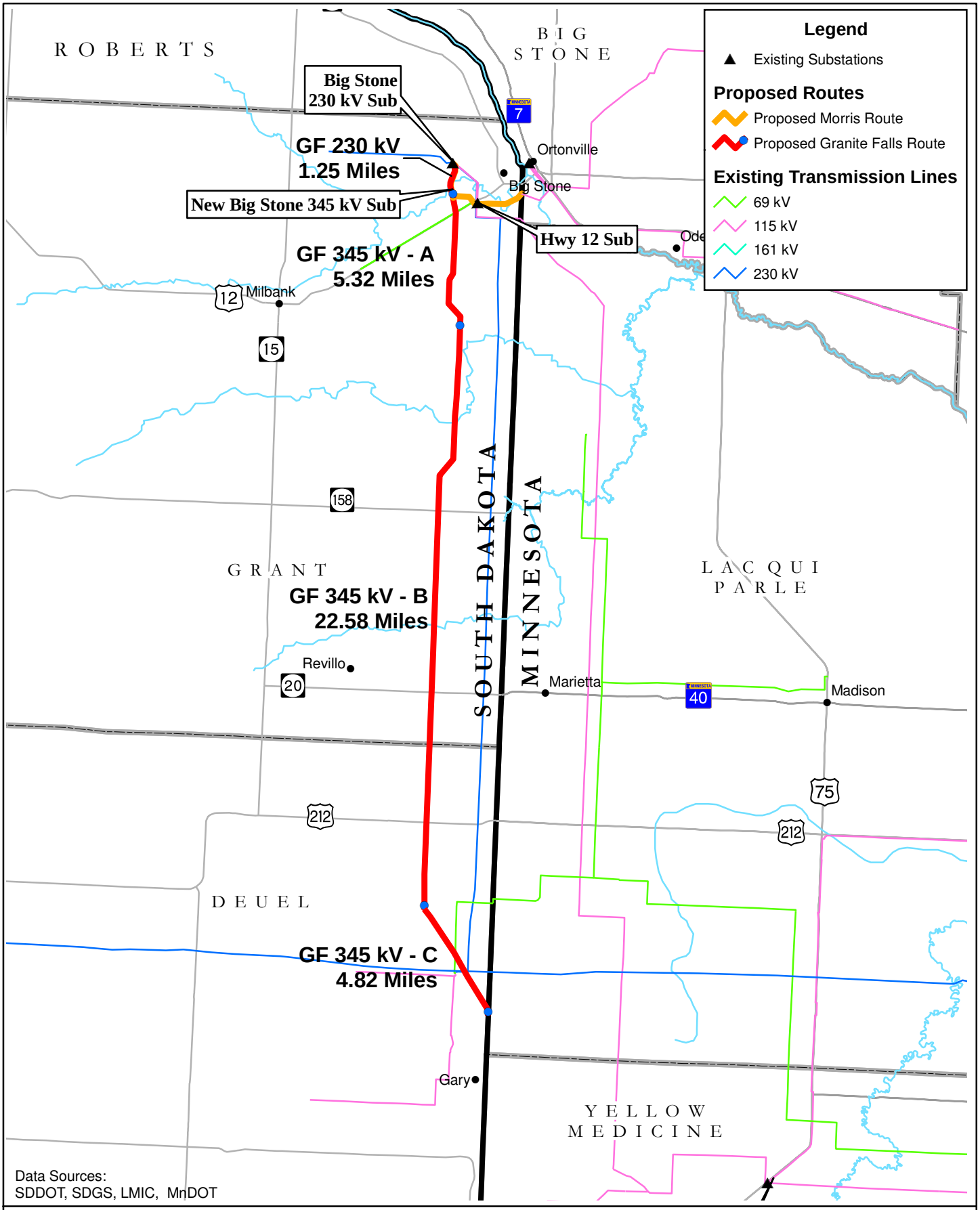


Big Stone Transmission Project
South Dakota PUC Route Application

Figure 2
Proposed Route Segments

Map Document: (N:\gisproj\Ottertail\22595\mxds\sd_route_app\figure_2_route_map_overview.mxd) 12/21/2005 -- 3:33:43 PM

APPENDIX A
MAPS AND PHOTOGRAPHS

Big Stone 230 kV Substation

GF 230 kV

Big Stone Power Plant GPA

Big Stone City

Ortonville

Kolb WAA

145th st.

Big Stone
345 kV Substation

Big Stone 121- 47

Big Stone 121- 46

Whetstone River

Hwy 12
Substation

A portion of this line
will be double circuit

MINNESOTA

12

485th St.

Holtquist Slough

GF 345 kV - A

149th st.

Alban 120- 48

Alban 120- 47

150th st.

Hunter Granite

485th St.

GF 345 kV - B

Legend

- Existing Substations
- Occupied Houses
- Center Pivot Irrigation
- Game Production Areas
- NWI Wetlands

Proposed Route Segments

- GF 230 kV Route
- GF 345 kV Route
- Morris 230 kV Route

Natural Heritage Data - MN

- State Listed Animal
- State Listed Plant
- State Listed Fungus
- Federal Listed Animal

Existing Transmission Lines

- 69 kV
- 115 kV
- 230 kV

Federal Resource Areas

- USFWS NWR
- USFWS Waterfowl Production Areas

USFWS Easements

- Conservation
- Grassland
- Unknown
- WaitingList
- Wetland

Feet
0 1,500 3,000

N

Big Stone Transmission Project
South Dakota PUC Route Application

APPENDIX A.1
DETAILED ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (\\mspe-gis\gispro\gispro\Ottertail\22595\mxds\sd_route_app\appendix_a_1-5_detailed_maps.mxd) 11/28/2005 -- 3:41:22 PM

485th St.

GF 345 kV - B

Alban 120- 48

Alban 120- 47

G-59 Display

North Fork Yellow Bank River

153rd st.

MINNESOTA

Vernon 119- 48

Vernon 119- 47

157th st.

158

GF 345 kV - B

Legend

- Existing Substations
- Occupied Houses
- Center Pivot Irrigation
- Game Production Areas
- NWI Wetlands

Proposed Route Segments

- GF 230 kV Route
- GF 345 kV Route
- Morris 230 kV Route

Natural Heritage Data - MN

- State Listed Animal
- State Listed Plant
- State Listed Fungus
- Federal Listed Animal

Existing Transmission Lines

- 69 kV
- 115 kV
- 230 kV

Federal Resource Areas

- USFWS NWR
- USFWS Waterfowl Production Areas

USFWS Easements

- Conservation
- Grassland
- Unknown
- WaitingList
- Wetland

0 1,500 3,000 Feet

N

Big Stone Transmission Project
South Dakota PUC Route Application

APPENDIX A.2
DETAILED ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (\\mspe-gis\gispro\gispro\Ottertail\22595\mxds\sd_route_app\appendix_a_1-5_detailed_maps.mxd) 11/28/2005 -- 3:41:22 PM

Vernon 119- 48

Vernon 119- 47

Albee

161st st.

South Fork Yellow Bank River

GF 345 kV - B

Adams 118- 48

Adams 118- 4

165th st.

GRANT COUNTY

DEUEL COUNTY

Lowe 117- 48

Antelope

MINNESOTA

20

Legend

- Existing Substations
- Occupied Houses
- Center Pivot Irrigation
- Game Production Areas
- NWI Wetlands

Proposed Route Segments

- GF 230 kV Route
- GF 345 kV Route
- Morris 230 kV Route

Natural Heritage Data - MN

- State Listed Animal
- State Listed Plant
- State Listed Fungus
- Federal Listed Animal

Existing Transmission Lines

- 69 kV
- 115 kV
- 230 kV

Federal Resource Areas

- USFWS NWR
- USFWS Waterfowl Production Areas

USFWS Easements

- Conservation
- Grassland
- Unknown
- WaitingList
- Wetland

Feet
0 1,500 3,000

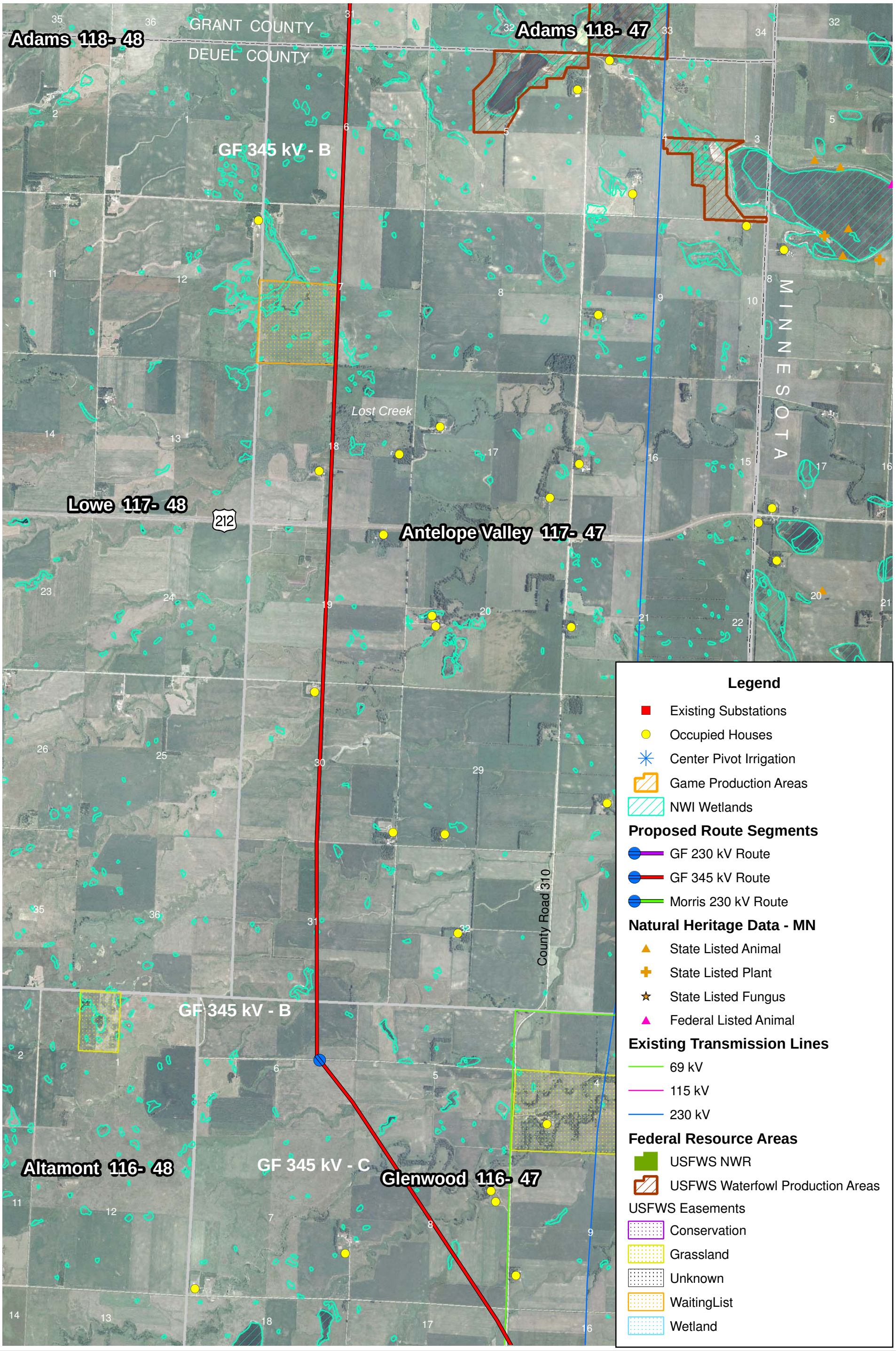
N

Big Stone Transmission Project
South Dakota PUC Route Application

APPENDIX A.3
DETAILED ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (\\mspe-gis\gisproj\gisproj\Otertail\22595\mxds\sd_route_app\appendix_a_1-5_detailed_maps.mxd) 11/28/2005 -- 3:41:22 PM



Feet
0 1,500 3,000

Big Stone Transmission Project
South Dakota PUC Route Application

APPENDIX A.4
DETAILED ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (\\mspe-gis\gisproj\gisproj\Ottertail\22595\mxds\sd_route_app\appendix_a_1-5_detailed_maps.mxd) 11/28/2005 -- 3:41:22 PM

Blair Substation

Glenwood 116- 47

The route will enter Minnesota here and continue to Granite Falls on an alignment to be determined by the Minnesota permitting process.

MINNESOTA

Cole

Gary Gulch

Herrick 115- 47

G-70

101

Legend

- Existing Substations
- Occupied Houses
- Center Pivot Irrigation
- Game Production Areas
- NWI Wetlands

Proposed Route Segments

- GF 230 kV Route
- GF 345 kV Route
- Morris 230 kV Route

Natural Heritage Data - MN

- State Listed Animal
- State Listed Plant
- State Listed Fungus
- Federal Listed Animal

Existing Transmission Lines

- 69 kV
- 115 kV
- 230 kV

Federal Resource Areas

- USFWS NWR
- USFWS Waterfowl Production Areas

USFWS Easements

- Conservation
- Grassland
- Unknown
- WaitingList
- Wetland

Feet
0 1,500 3,000

N

Big Stone Transmission Project
South Dakota PUC Route Application

APPENDIX A.5
DETAILED ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (\\mspe-gis\gisproj\gisproj\Ottertail\22595\mxds\sd_route_app\appendix_a_1-5_detailed_maps.mxd) 11/28/2005 -- 3:41:22 PM

Big Stone 230 kV Substation

GF 230 kV

Morris 230 kV

Big Stone Power Plant GPA

Kolb WAA

Big Stone City

145th St.

New Big Stone
345 kV Substation

Morris 230 kV

Whetstone River

Hwy 12
Substation

485th Ave

12

Holtquist Slough

GF 345 kV - A

149th St.

ter Granite

GF 345 kV - Alternate Route

150th St.

485th Ave

MINNESOTA

G-59 Display

Legend

- Occupied Houses
- Existing Substations
- Center Pivot irrgation
- Game Production Areas
- NWI Wetlands

Proposed Route Segments

- GF 230 kV Route
- Alternate GF 345 kV Route; GF 345 kV Route
- Morris or Willmar Route

Natural Heritage Data

- State Listed Animal
- State Listed Plant
- State Listed Fungus
- Federal Listed Animal

Existing Transmission Lines

- 69 kV
- 115 kV
- 230 kV

Federal Resource Areas

- USFWS NWR
- USFWS Waterfowl Production Areas

USFWS Easements

- Conservation
- Grassland
- Unknown
- WaitingList
- Wetland

0 1,500 3,000 Feet

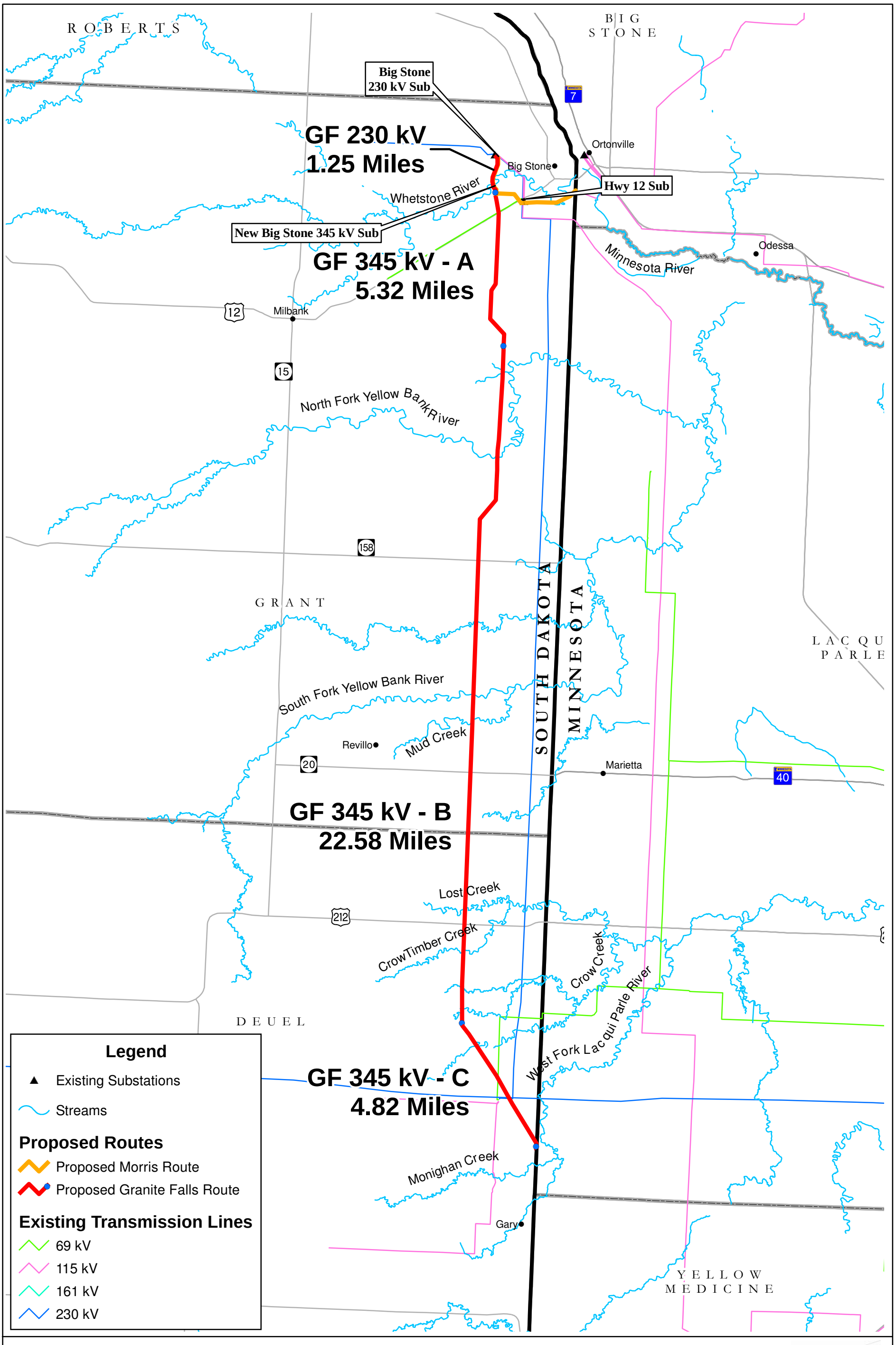
N

Big StoneTransmission Project
South Dakota PUC Route Application

APPENDIX A.6
ALTERNATE ROUTE MAP

BIG STONE
PARTNERS IN TRANSMISSION

Map Document: (N:\gisproj\Ottertail\22595\mxds\sd_route_app\appendix_a6_alt_route.mxd) 12/21/2005 -- 2:30:44 PM


ROBERTS
BIG STONE
Big Stone 230 kV Sub
GF 230 kV
1.25 Miles
Big Stone
Ortonville
Hwy 12 Sub
Whetstone River
New Big Stone 345 kV Sub
GF 345 kV - A
5.32 Miles
Odessa
Minnesota River
Milbank
12
15
North Fork Yellow Bank River
158
GRANT
SOUTH DAKOTA
MINNESOTA
LAC QUI PARLE
South Fork Yellow Bank River
Revillo
Mud Creek
20
Marietta
40
GF 345 kV - B
22.58 Miles
Lost Creek
212
CrowTimber Creek
Crow Creek
West Fork Lacqui Parle River
DEUEL
GF 345 kV - C
4.82 Miles
Monighan Creek
Gary
YELLOW MEDICINE
Legend
Existing Substations
Streams
Proposed Routes
Proposed Morris Route
Proposed Granite Falls Route
Existing Transmission Lines
69 kV
115 kV
161 kV
230 kV
0
1.5
Miles
Data Sources:
SDGS, SDDOT, MN DNR DataDeli, LMIC,
N
Big Stone Transmission Project
South Dakota PUC Route Application
Appendix A.7
Hydrologic Map
BIG STONE
PARTNERS IN TRANSMISSION
Map Document: (N:\gisproj\Ottertail\22595\mxds\sd_route_app\appendix_a7_hydro.mxd) 12/21/2005 -- 3:38:27 PM

ROBERTS

BIG STONE

Big Stone 230 kV Sub

GF 230 kV 1.25 Miles

New Big Stone 345 kV Sub

Hwy 12 Sub

GF 345 kV - A 5.32 Miles

Ortonville

Big Stone

Odessa

Milbank

GRANT

GF 345 kV - B 22.58 Miles

Revillo

Marietta

Madison

SOUTH DAKOTA

MINNESOTA

LAC QUI PARLE

DEUEL

GF 345 kV - C 4.82 Miles

Gary

YELLOW MEDICINE

Legend

▲ Existing Substations

Proposed Routes

Proposed Morris Route

Proposed Granite Falls Route

Land Cover

Agriculture

Woodlands

Hayland

Developed Areas

Pastureland

Wetlands

Existing Transmission Lines

69 kV

115 kV

161 kV

230 kV

0 1.5 3

Miles

Data Sources:
USGS, SDDOT, SDGS

Big Stone Transmission Project
South Dakota PUC Route Application

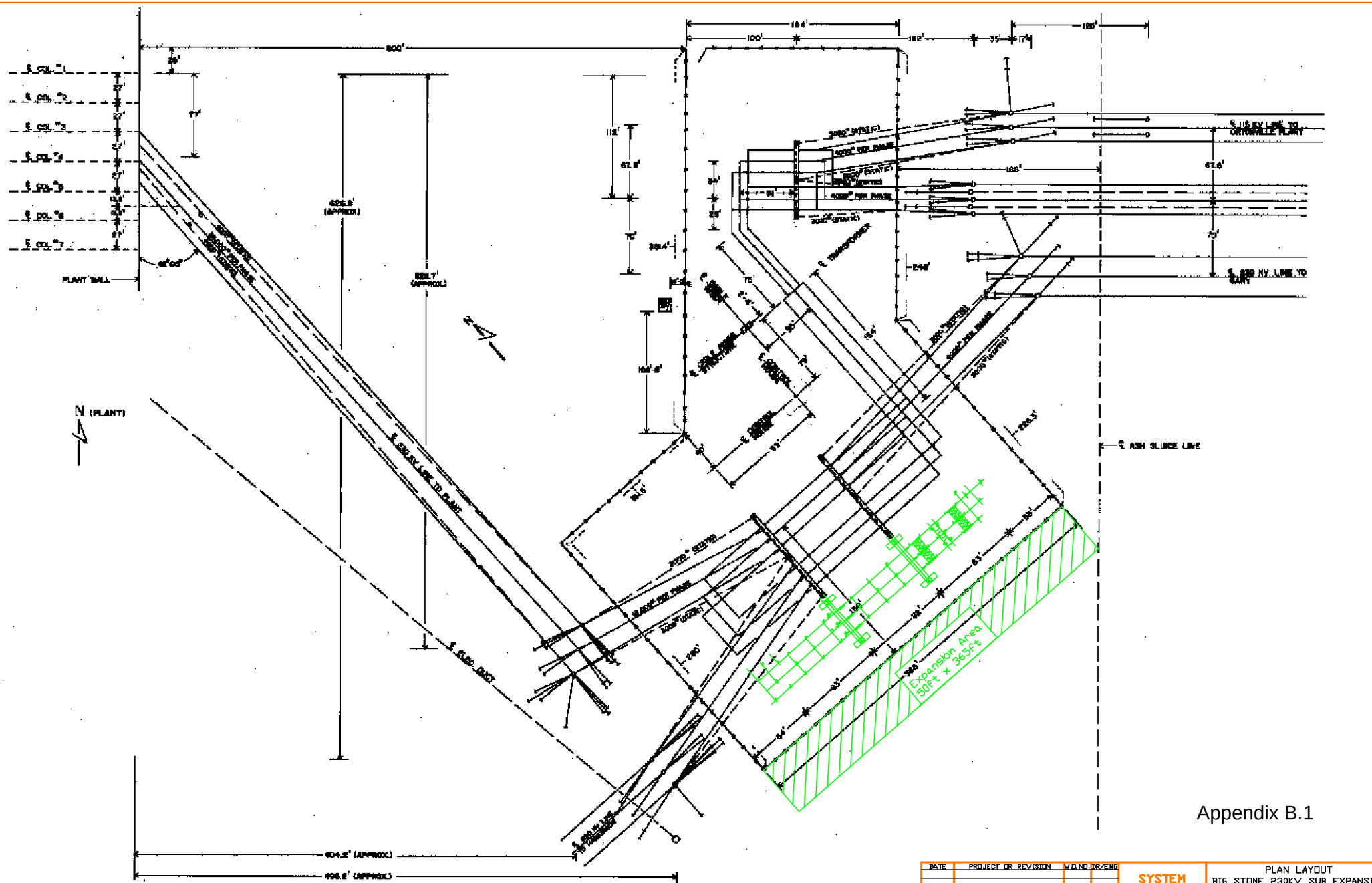
Appendix A.8
Land Cover/Land Use Map

BIG STONE
Partners in Transmission

Map Document: (N:\gisproj\Ottertail\22595\mxds\sd_route_app\appendix_a8_landcover.mxd) 12/21/2005 -- 2:31:12 PM

APPENDIX B
STRUCTURES

B.1 – Big Stone 230 kV Substation Expansion
B.2 – Future 345-230 kV Substation
B.3 – 230 kV H-Frame, Standard
B.4 – 345 kV H-Frame, Standard
B.5 – 345 kV H-Frame, Preferred
B.6 – 230/115 kV H-Frame, Steel
B.7 – 230/115 kV Single Pole
B.8 – 230/115 kV H-Frame, Wood
B.9 – 230 kV Single Pole
B.10 – 345 kV Single Pole
B.11 – 230 kV H-Frame ROW
B.12 – 230 kV H-Frame ROW adjacent to Road
B.13 – 345 kV H-Frame ROW
B.14 – 345 kV H-Frame ROW adjacent to Road



Appendix B.1

DATE	PROJECT OR REVISION	W.O. NO.	DR/ENG

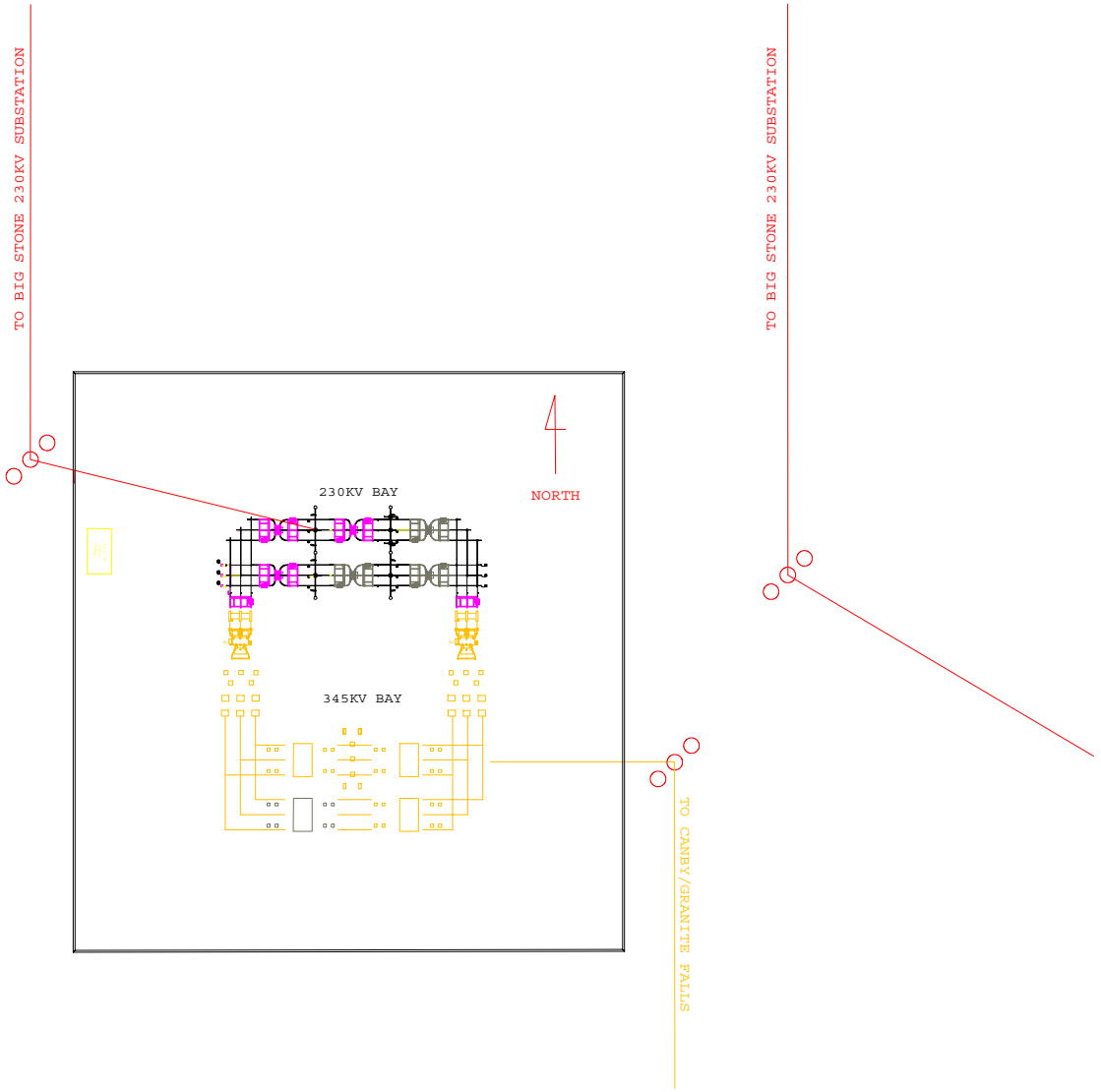
SYSTEM ENGINEERING

DRAWN V.PRESTON
DATE NOV 7,2005
APPR. BY

MicroFilmed

PLAN LAYOUT
BIG STONE 230KV SUB EXPANSION
BIG STONE 230/115KV SUBSTATION
BIG STONE, SOUTH DAKOTA

SHEET	OF	REV
BS-LL-1		



DATE	PROJECT OR REVISION	W.O. NO.	DR/ENG

SYSTEM ENGINEERING

DRAWN W. PRESTON
DATE
APPR. BY

Microfilmed

1 inch equals 200 feet

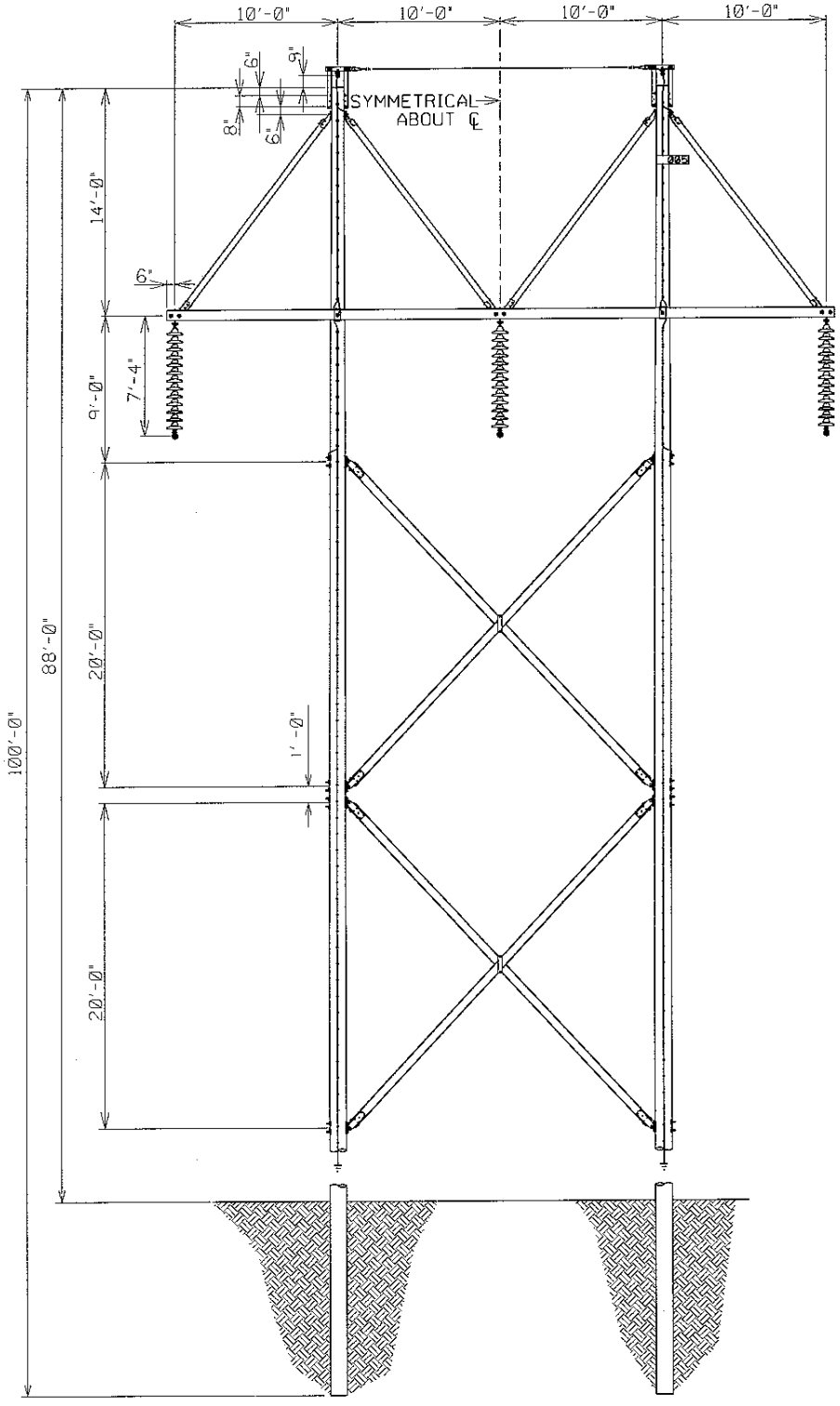
FUTURE 345-230KV LAYOUT
BIG STONE 345KV SUBSTATION
BIG STONE, SOUTH DAKOTA

OTTER TAIL Power Company

SHEET OF REV

BIG345-LL-1F

Appendix B.2

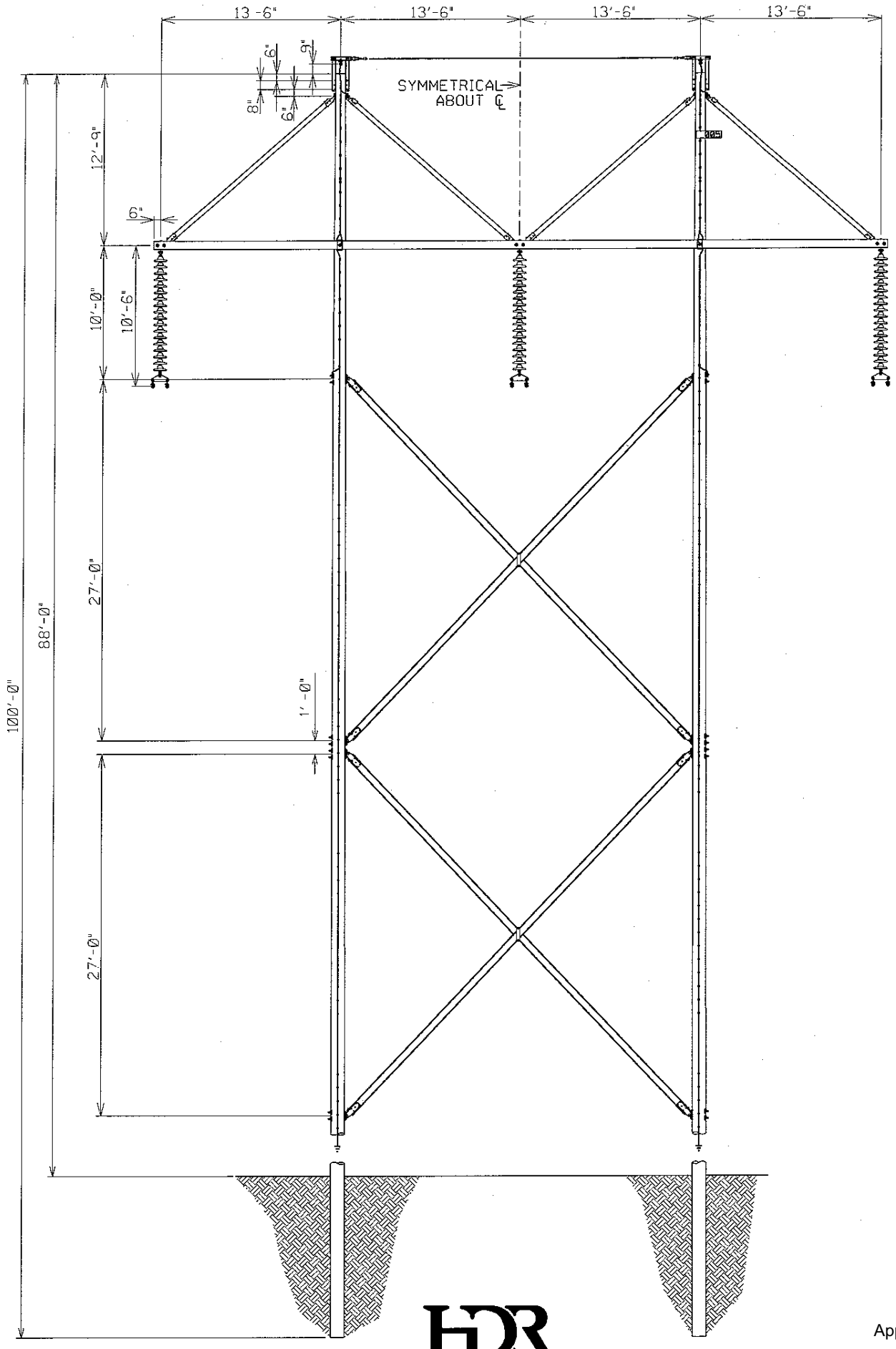


HDR Engineering, Inc.

Appendix B.3

230KV 'H' FRAME STANDARD
TANGENT TO 2° ANGLE

K:\otter trail\h frame.dgn 04/08/2005 09:04:14 AM



HDR Engineering, Inc.

Appendix B.4

TYPICAL STRUCTURE
345KV "H" FRAME STANDARD
TANGENT STRUCTURE

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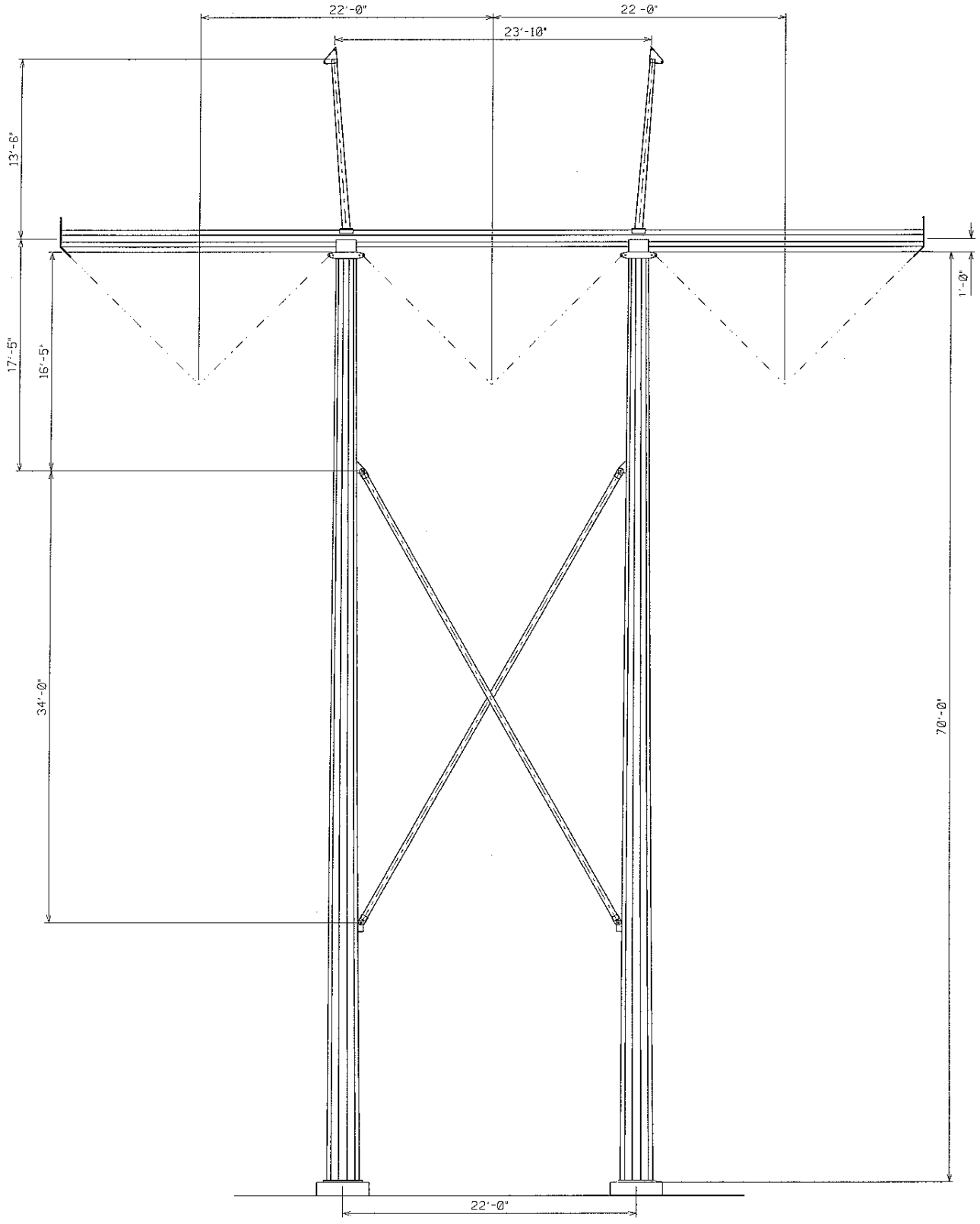

HDR Engineering, Inc

Appendix B.5

PREFERRED CONCEPT
TYPICAL STRUCTURE
SINGLE CIRCUIT 345KV
TANGENT

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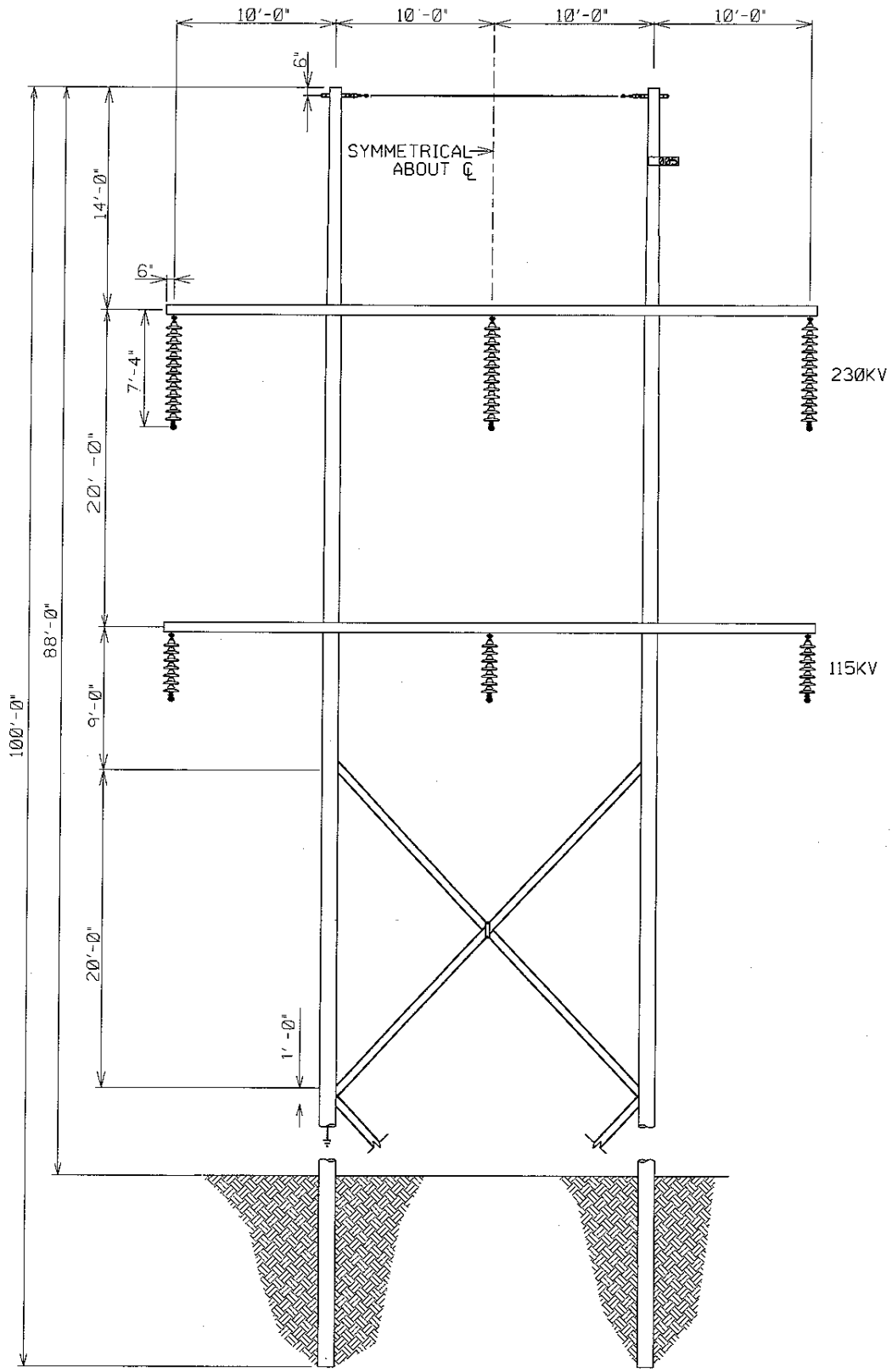
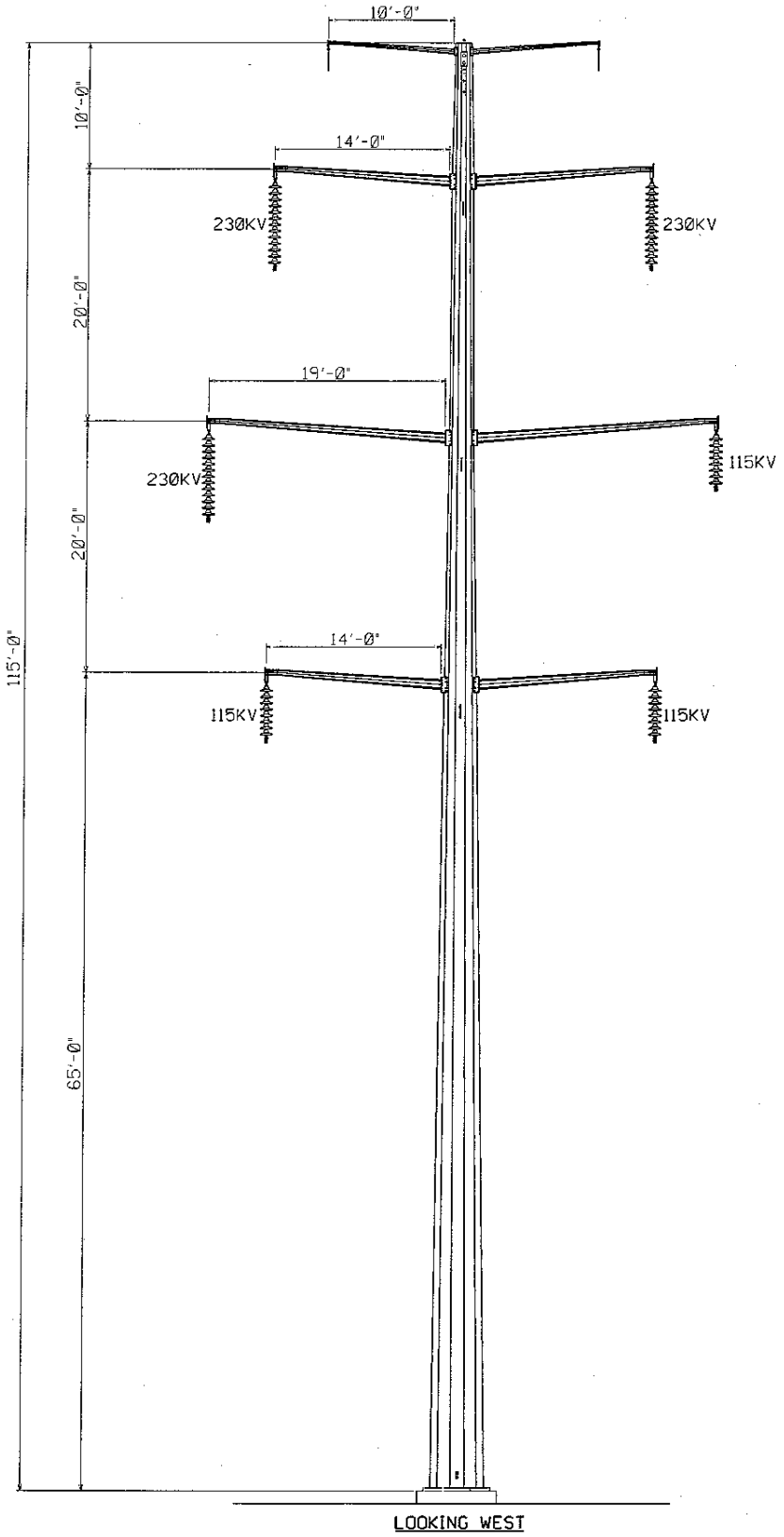


HDR Engineering, Inc.

Appendix B.6

TYPICAL STRUCTURE
230/115KV STEEL "H" FRAME STANDARD
TANGENT TO 2° ANGLE

11/16/2005 9:06:14 AM jjustice K:\Otc\22595\DC 230-115 h frame steel.dgn

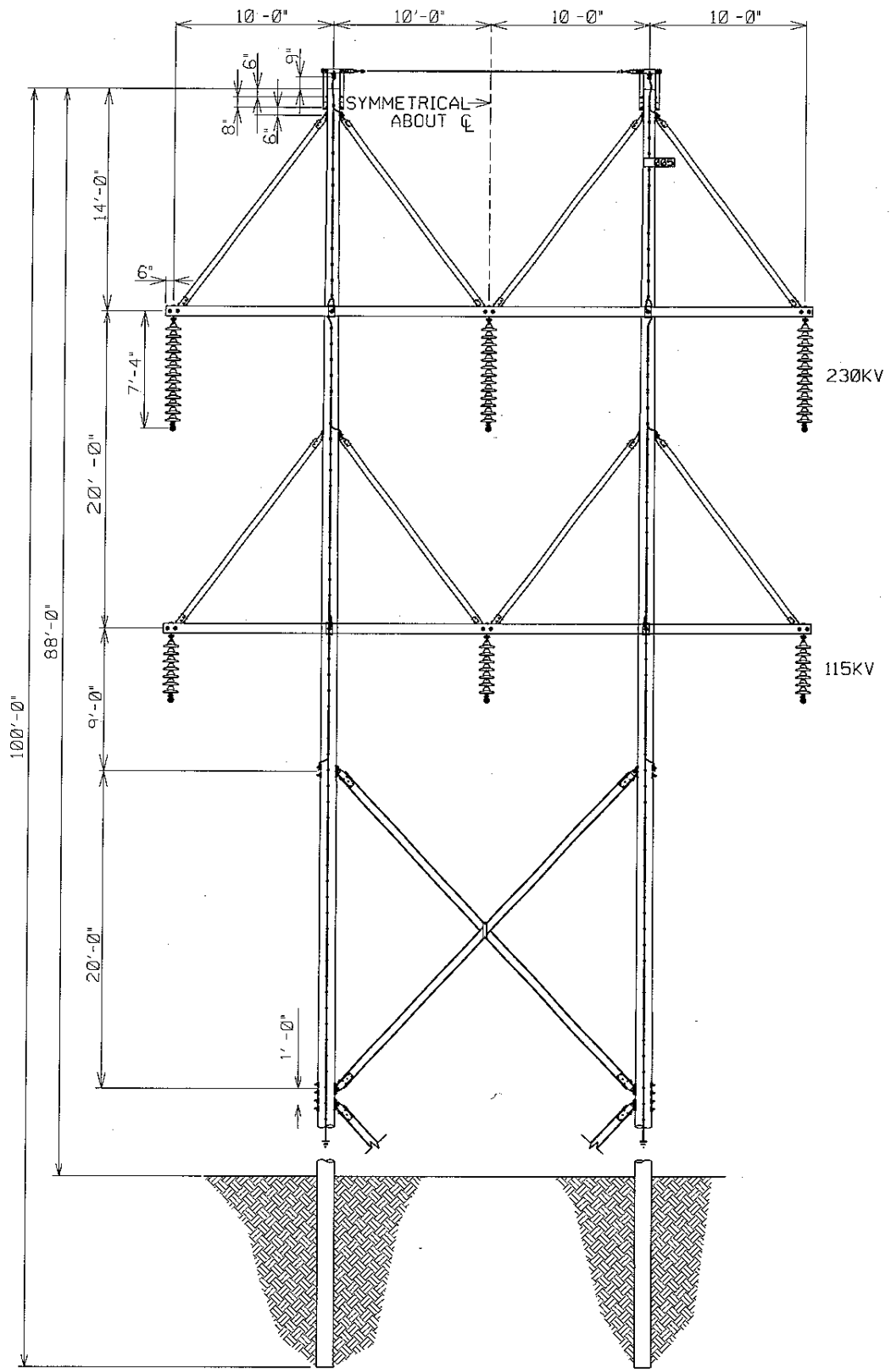


HDR Engineering, Inc.

Appendix B.7

TYPICAL POLE
DOUBLE CIRCUIT 230/115KV
TANGENT

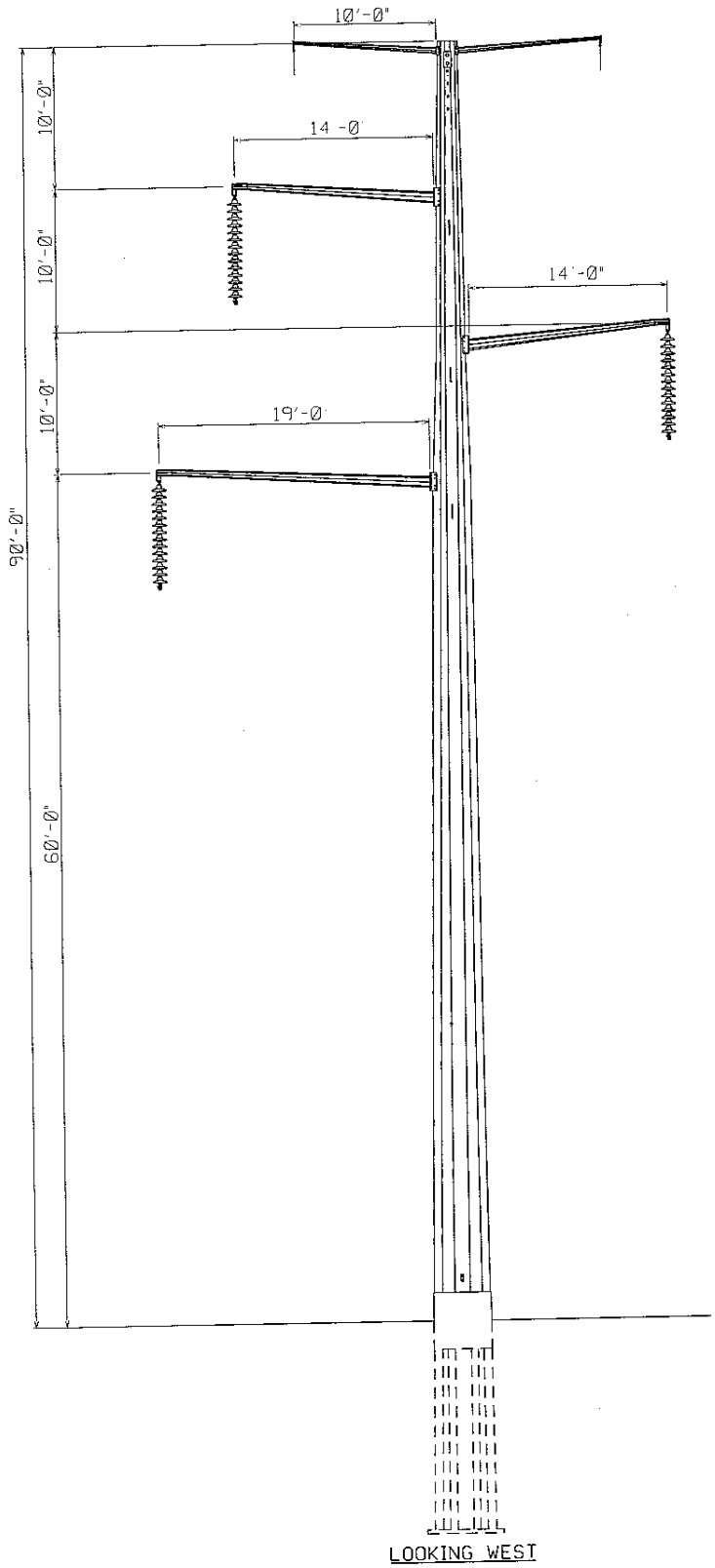
11/9/2005 11:25:53 AM jjustice K:\Otc\22595\DC 230-115 KV.dgn



HDR Engineering, Inc.

Appendix B.8

TYPICAL STRUCTURE
230/115KV WOOD "H" FRAME STANDARD
TANGENT TO 2° ANGLE



LOOKING WEST

HDR Engineering, Inc.

Appendix B.9

TYPICAL POLE
230KV DAVIT ARM
TANGENT

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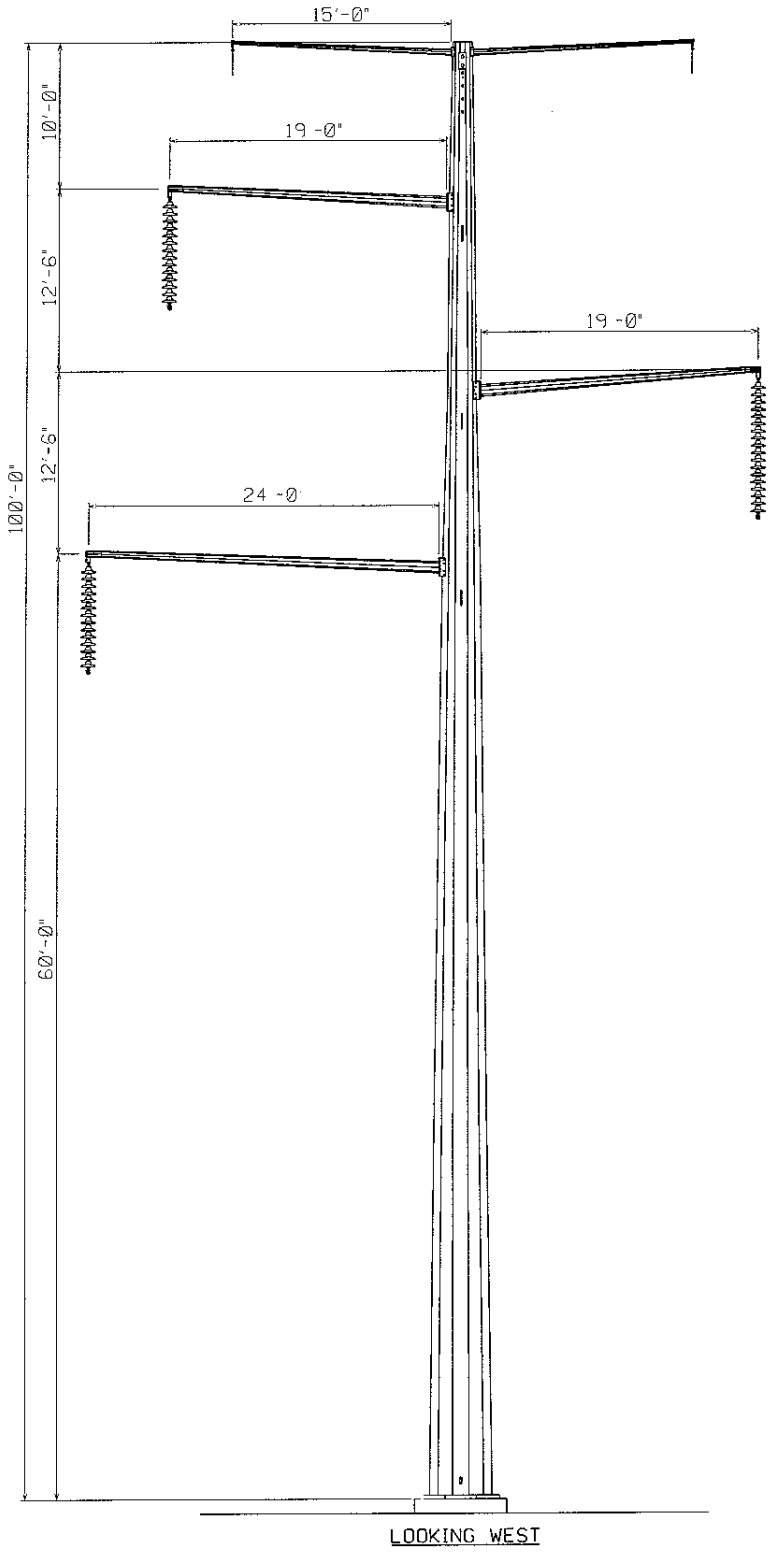

LOOKING WEST

HDR Engineering, Inc.

Appendix B.10

TYPICAL POLE
SINGLE CIRCUIT 345KV
TANGENT

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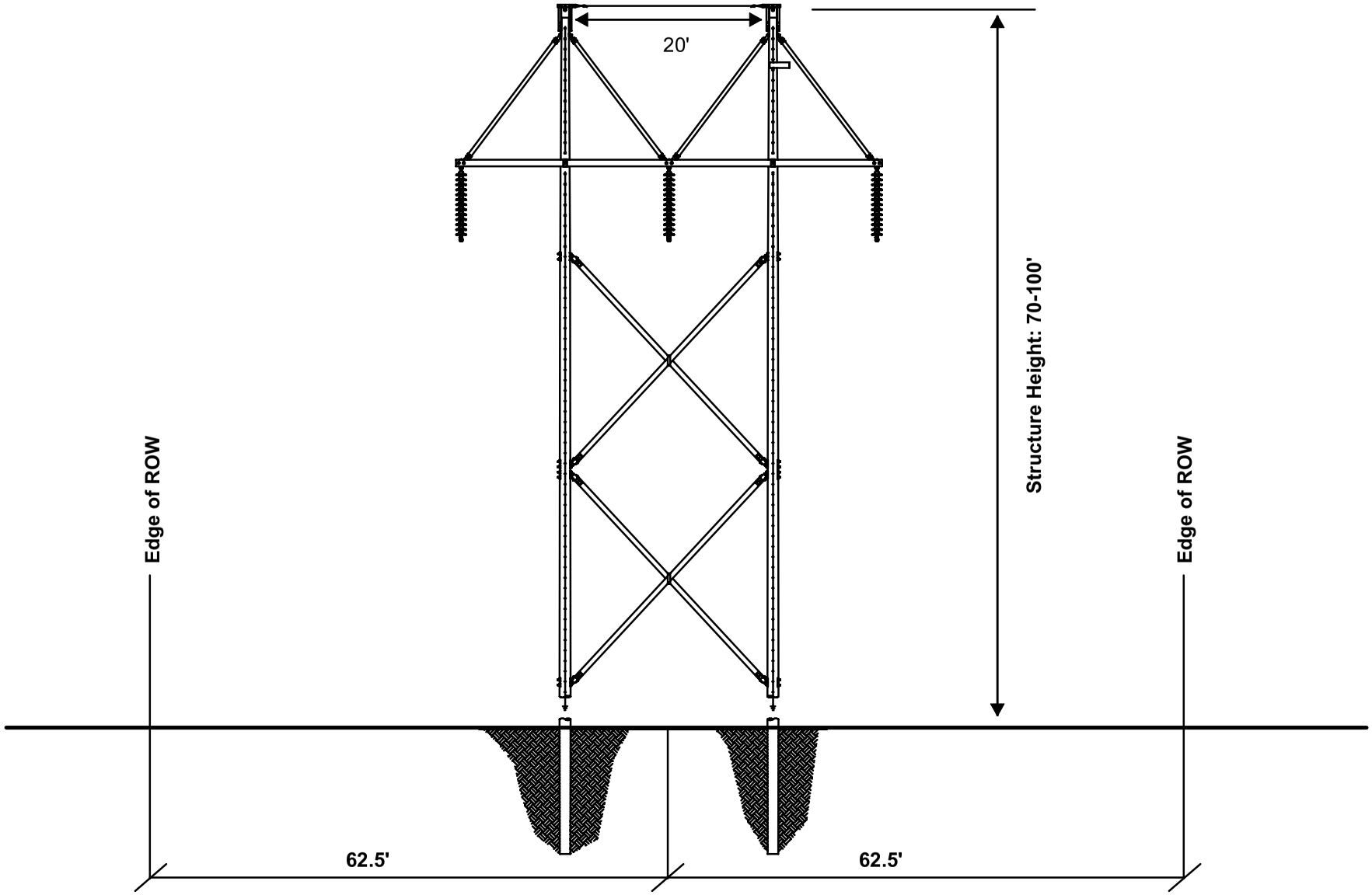
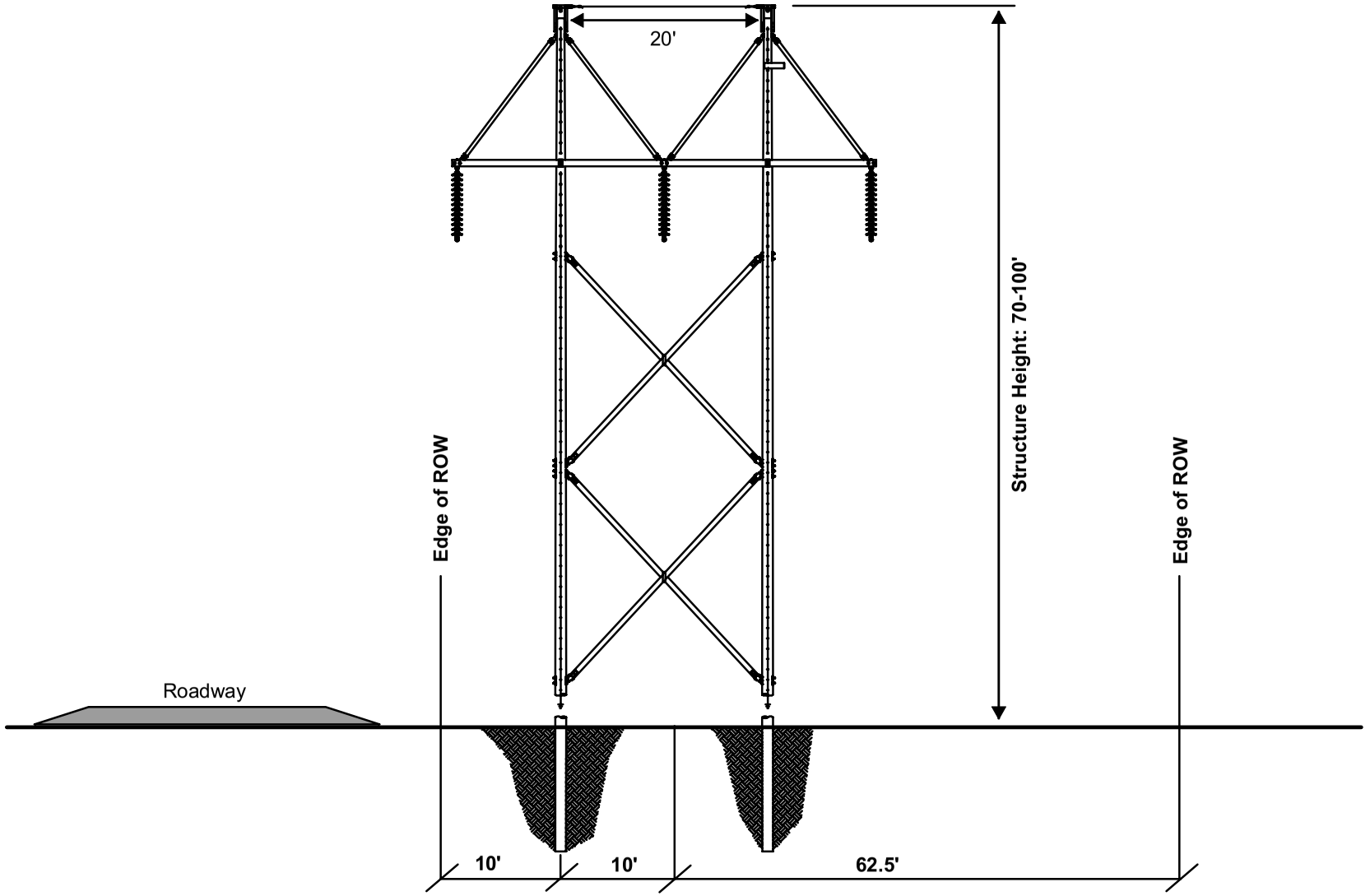


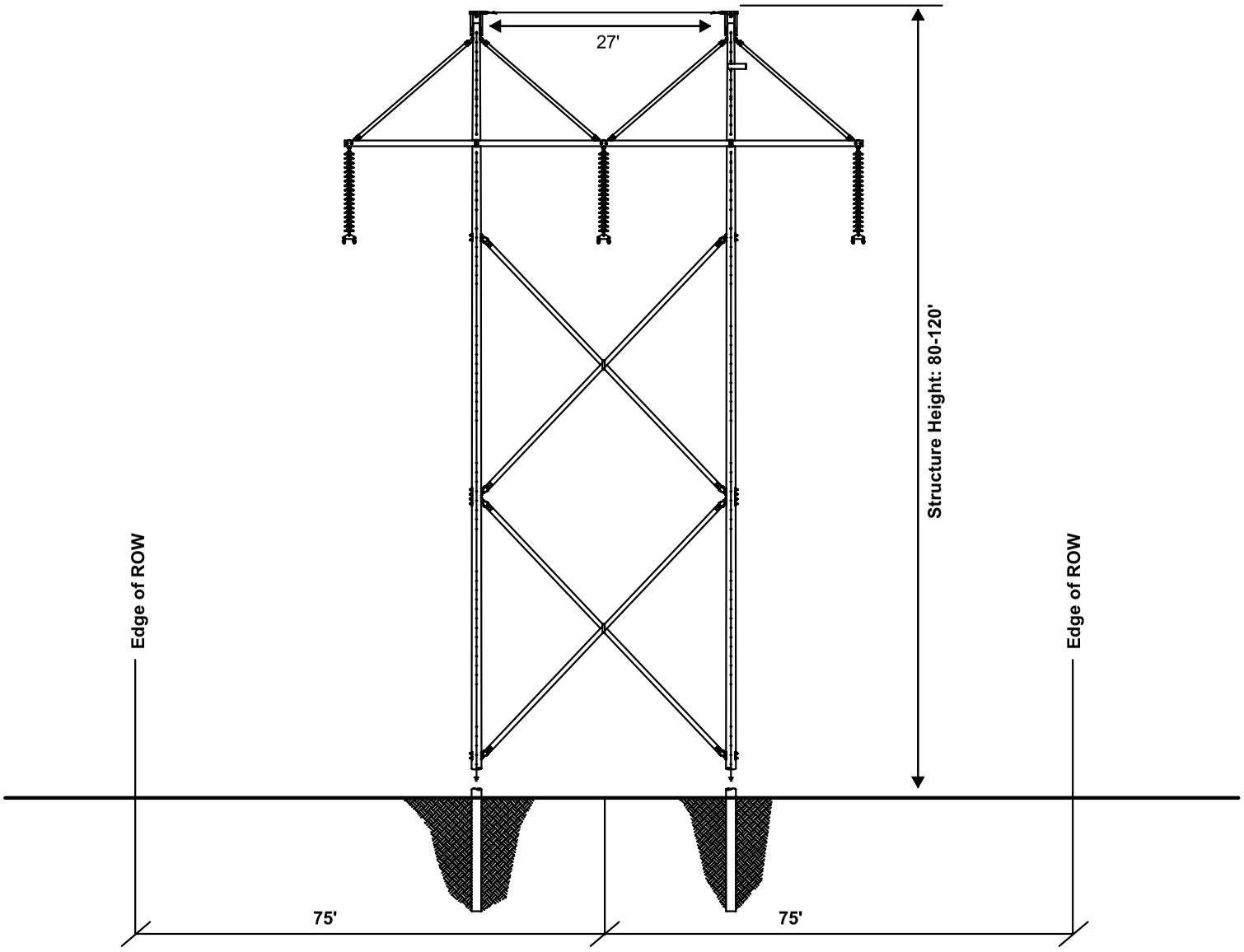
125' Total Right-of-Way

230 kV H-Frame Structure
Right-of-Way Requirements



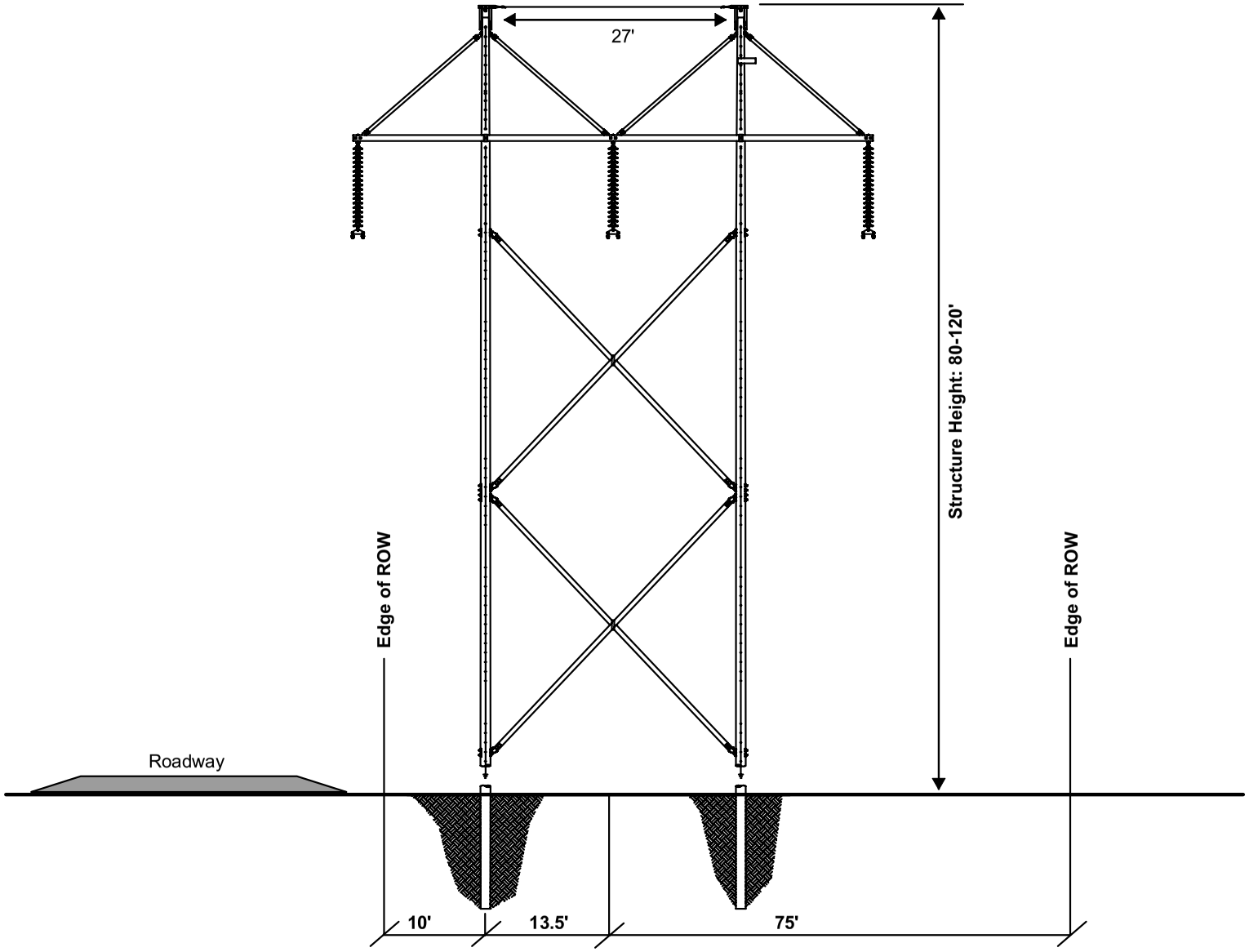
82.5' Total Right-of-Way

230 kV H-Frame Structure
Right-of-Way Requirements
Adjacent to Road



150' Total Right-of-Way

345 kV H-Frame Structure
Right-of-Way Requirements



98.5' Total Right-of-Way

345 kV H-Frame Structure
Right-of-Way Requirements
Adjacent to Road

APPENDIX C
SOILS

Soil Series Phase	General Description
Aastad-Flom Complex	A combination of mostly Aastad soils (Very deep, moderately well drained soils that formed in calcareous loamy glacial till on till plains and ground moraines. These soils have moderately slow permeability. Their slopes range from 0 to 6 percent.), with lesser amounts of Flom soils (see below)
Arvilla Sandy Loam	Very deep, somewhat excessively drained soils formed in moderately coarse textured glacial outwash and the underlying sand and gravel on glacial lake beaches, stream valley terraces and outwash plains. These soils have moderately rapid permeability in the upper part and rapid or very rapid permeability in the underlying material. Slopes range from 0 to 25 percent.
Barnes-Buse Loams	A combination of mostly Barnes soils (Very deep, well drained, moderately or moderately slowly permeable soils that formed in loamy till. These soils are on till plains and moraines and have slopes ranging from 0 to 25 percent), with lesser amounts of Buse soils
Barnes-Svea Loams	A combination of mostly Barnes soils (see above), with lesser amounts of Svea soils (Very deep, well or moderately well drained soils that formed in calcareous till and local alluvium from the till. Permeability is moderate in the solum and moderate or moderately slow in the C horizon. These soils are on concave positions on till plains and have slopes ranging from 0 to 25 percent.)
Buse Loam	Very deep, well drained soils that formed in loamy glacial till on moraines. These soils have moderate and moderately slow permeability. They have slopes of 3 to 60 percent.
Buse-Barnes Loams	A combination of mostly Buse soils, with lesser amounts of Barnes soils
Buse-Forman Loams	A combination of mostly Buse soils, with lesser amounts of Forman soils (Very deep, well drained, moderately slowly permeable soils formed in calcareous till. These soils are on till plains and moraines and have slopes ranging from 0 to 30 percent.)
Buse-Lamoure Complex	A combination of mostly Buse soils, with lesser amounts of Lamoure soils
Castlewood Silty Clay	Very deep, poorly drained soils formed in clayey alluvium on floodplains. Permeability is slow. Slopes range from 0 to 1 percent.
Cubden Silty Clay Loam	Very deep, somewhat poorly drained soils formed in silty glacial till, or in silty material over loamy glacial till. These soils are on low rises and rims slightly above depressions on uplands. Permeability is moderately slow. Slopes range from 0 to 6 percent.
Divide Loam	Very deep, somewhat poorly drained soils that formed in loamy sediment over sand and gravel. Permeability is moderate over rapid or very rapid. These soils are on slightly depressed areas in outwash plains, flood plains, terraces and interbeach areas and have slope ranging from 0 to 3 percent.
Egeland Fine Sandy Loam	Very deep, well drained soils formed in glaciofluvial deposits. These soils are on terraces, outwash plains, and uplands. They have moderately rapid permeability. Slopes range from 0 to 20 percent.
Estelline Silty Clay Loam	Very deep, well drained soils formed in silty material overlying sand and gravel on stream terraces and glacial outwash plains. Permeability is moderate in the upper mantle and very rapid in the sand and gravel. Slopes range from 0 to 9 percent.
Flom Clay Loam	Very deep, poorly drained and very poorly drained soils formed in loamy glacial till or glacial lacustrine sediments on moraines. Permeability is moderately slow. Slope ranges from 0 to 3 percent.

Soil Series Phase	General Description
Fordville Loam	Very deep, well drained soils formed in loamy sediments that are moderately deep over sand and gravel on outwash plains and terraces. Permeability is moderate in the upper mantle and very rapid in the underlying sand and gravel. Slopes range from 0 to 9 percent.
Forman-Aastad Loams	A combination of mostly Forman soils, with lesser amounts of Aastad soils
Forman-Buse Loams	A combination of mostly Forman soils, with lesser amounts of Buse soils
Hamerly-Badger Complex	A combination of mostly Hamerly soils (Very deep, somewhat poorly drained soils that formed in calcareous loamy till. Permeability is moderate in the upper horizons and moderate or moderately slow in the lower horizons. These soils are on flats on lake plains and on convex slopes surrounding shallow depressions and on slight rises on till plains. They have slopes ranging from 0 to 3 percent.), with lesser amounts of Badger soils (Very deep, somewhat poorly drained soils formed in alluvium over silty or loamy glacial till in upland swales, drainageways toeslopes. Permeability is slow. Slopes range from 0 to 3 percent.)
Heimdal-Sisseton Loams	A combination of mostly Heimdal soils (Very deep, well drained, moderately permeable soils that formed in calcareous glacial till. These soils are on glacial till plains and moraines. Slope ranges from 0 to 40 percent.), with lesser amounts of Sisseton soils (Very deep, well drained soils formed in calcareous, stratified, loamy and silty glacial drift on uplands. These soils have moderate permeability. Slope range from 2 to 40 percent.),
La Prairie Loam Consociation	Very deep, moderately well drained, moderately permeable soil that formed in loamy alluvium. These soils are on terraces and bottom lands in stream valleys. Slope ranges from 0 to 6 percent.
Ladelle Silt Loam	Very deep, moderately well drained soils formed in alluvium on terraces and flood plains. Permeability is moderately slow or moderate. Slopes range from 0 to 9 percent.
Lamoure-Rauville Silty Clay Loams	A combination of mostly Lamoure soils, with lesser amounts of Rauville soils (see below)
Lamoure Silty Clay Loam	Very deep, somewhat poorly drained or poorly drained soils formed in silty alluvium on flood plains. Permeability is moderate or moderately slow. Slopes are less than 2 percent.
Ludden Silty Clay	Very deep, poorly or very poorly drained, slowly permeable soils that formed in clayey alluvium. These soils are on floodplains of streams and have slopes of 0 to 1 percent.
Maddock Loamy fine sand	Very deep, well drained or somewhat excessively drained, rapidly permeable soils that formed in fine sands deposited by wind or water. These soils are on sandy glaciolacustrine or glaciofluvial, outwash and delta plains and have slopes ranging from 0 to 35 percent.
Marysland Loam	Very deep, poorly and very poorly drained soils that formed in glacial lacustrine, alluvium or outwash sediments which consists of a 20 to 40 inch loamy mantle over sandy or sandy-skeletal sediments. These soils are on stream terraces, outwash channels, outwash plains, flood plains and lake plains. They have moderate permeability in the upper part and rapid permeability in the underlying material. Slopes range from 0 to 2 percent.
Moritz-Lamoure Complex	A combination of mostly Moritz soils (Very deep, somewhat poorly drained soils on flood plains. They formed in alluvium. Permeability is moderate. Slopes range from 0 to 2 percent.), with lesser amounts of Lamoure soils

Soil Series Phase	General Description
Orthents, gravelly	Very deep, excessively drained soils formed in outwash plains. Permeability is very rapid. Slopes range from 0 to 60 percent.
Parnell Silty Clay Loam	Very deep, very poorly drained and poorly drained soils that formed in water-sorted sediments from glacial drift in depressions, swales and drainageways on glacial moraines. These soils have slow permeability. Slopes range from 0 to 3 percent.
Peever Clay Loam	Very deep, well drained soils on uplands. Permeability is slow. These soils form in fine textured glacial till. Slopes range from 0 to 9 percent.
Peever-Cavour Complex	A combination of mostly Peever soils, with lesser amounts of Cavour soils(Very deep, moderately well and well drained soils formed in glacial till on uplands. The soils have slow or very slow permeability. Slopes range from 0 to 6 percent.)
Playmoor Silty Clay Loam	Very deep, poorly drained soils formed in alluvium on flood plains. Permeability is moderately slow. Slopes are less than 2 percent.
Poinsett Silt Loam	Very deep, well drained soils formed in silty glacial till on uplands. Permeability is moderate. Slopes range from 0 to 15 percent.
Rauville Silty Clay Loam	Very deep, very poorly drained soils formed in alluvium on flats and flood plains. Permeability is moderately slow in the upper part and moderately rapid in the underlying sand and gravel. Slopes are less than 2 percent.
Renshaw Loam	Very deep, somewhat excessively drained soils formed in loamy sediments and the underlying sand and gravel on outwash plains and terraces. Permeability is moderate in the upper part and very rapid in the underlying material. Slopes range from 0 to 25 percent.
Renshaw-Sioux Complex	A combination of mostly Renshaw soils, with lesser amounts of Sioux soils (Excessively drained soils formed in sand and gravel on outwash plains, terraces and eskers. They are very shallow over sandy-skeletal material. Saturated hydraulic conductivity is high or very high. Slopes range from 0 to 40 percent.)
Rentill Loam	Very deep, well drained soils formed in loamy outwash sediments over clayey glacial till on uplands. Permeability is moderate to rapid in the upper part and moderately slow or slow in the underlying glacial till. Slopes range from 0 to 6 percent.
Sioux-Renshaw Complex	A combination of mostly Sioux soils (see Renshaw-Sioux above), with lesser amounts of Renshaw soils
Sisseton-Heimdal Loams	A combination of mostly Sisseton soils (see Heimdal-Sisseton above), with lesser amounts of Heimdal soils see (Heimdal-Sisseton above)
Southam Silty Clay Loam Consociation	Very deep, very poorly drained, slowly permeable soils that formed in local alluvium from glacial drift. These soils are in basins and depressions on till plains, moraines and lake plains. Slope is 0 to 1 percent.
Svea Loam	Very deep, well or moderately well drained soils that formed in calcareous till and local alluvium from the till. Permeability is moderate in the solum and moderate or moderately slow in the C horizon. These soils are on concave positions on till plains and have slopes ranging from 0 to 25 percent.
Swenoda Fine Sandy Loam	Very deep, well drained and moderately well drained soils formed in loamy sediments underlain by silty and loamy sediments on uplands. Permeability is moderately rapid in the upper part and moderate or moderately slow in the underlying material. Slopes range from 0 to 9 percent.

Soil Series Phase	General Description
Tonka Silt Loam	Very deep, poorly drained, slowly permeable soils that formed in local alluvium over till or glaciolacustrine deposits. These soils are in closed basins and depressions on till and glacial lake plains and have slopes of 0 to 1 percent.
Vallers Loam	Very deep, poorly drained soils that formed in calcareous fine-loamy till on till plains, moraines and lake plains. These soils have moderately slow permeability. Slopes range from 0 to 3 percent.
Vallers-Tonka Complex	A combination of mostly Vallers soils, with lesser amounts of Tonka soils.
Water	Open water covers this series the majority of the time3.

APPENDIX D
GRAHAM ENVIRONMENTAL SERVICES
REMNANT PRAIRIES AND GRASSLAND REPORT

Remnant Prairies and Grassland Survey Report

Big Stone II Transmission Line Corridors
Prepared for: HDR Engineering, Inc.

Minnesota and South Dakota

August 3, 2005

GES Project No. 2005.082

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Remnant Prairie and Grassland Survey Report

Prepared for: HDR Engineering, Inc.

Big Stone II Transmission Line Corridors in Minnesota and South Dakota

August 3, 2005

Introduction and Purpose

When preparing documents required by the National Environmental Policy Act (NEPA), the evaluation of natural resources within alternative corridors assists utility companies and agencies to identify impacts to wildlife and other biological resources. Graham Environmental Services, Inc. (GES) contracted with HDR Engineering, Inc. (HDR) to conduct a review of potential prairie habitats and species listed by the Minnesota Department of Natural Resources as Endangered, Threatened, or Special Concern (TES) that lie within the alternative transmission line corridor alignments through Big Stone, Chippewa, Kandiyohi, Stevens, Swift, and Yellow Medicine Counties in Minnesota and Grant and Deuel Counties, South Dakota (**Figure 1**). This investigation generally follows the habitat assessment approach outlined by HDR in their Threatened, Endangered, and Rare Species and Communities Survey Approach document submitted to and approved by agency personnel in June 2005 (**Appendix 1**). The surveys were conducted on June 21 – 24 and 28, 2005 and involved cursory corridor reviews that relied on a preliminary grassland identification survey conducted by HDR, review of relatively current aerial photographs (2003), and electronic data acquired from existing Department of Natural Resources natural community surveys available at the Minnesota DNR Data Deli.

This report focuses on identifying remnant prairie communities and potential TES habitat within the alternative transmission line corridors as identified in Figure 1. The majority of TES species in western Minnesota and eastern South Dakota are likely to occur on remnant prairies, rock outcrops, or in wetlands than on any other land classification types that occur in west-central or south-western Minnesota, and northeastern South Dakota.

Project Area

Transmission line corridor alignments were evaluated through portions of western Minnesota and eastern South Dakota Figure 1. The following descriptions are of various corridor alignments that were reviewed.

Common Corridor

The Common Corridor originates southwest of Ortonville, Minnesota and follows the Minnesota/South Dakota border southward for approximately 37 miles through Grant and Deuel Counties in South Dakota. The Common Corridor then turns east one-mile south of Gary, South Dakota and two-miles south of the Lac Qui Parle/Yellow Medicine County line in Minnesota. This corrridor is generally three (3)-miles wide and roughly follows Yellow Medicine County Route 33 for 41 miles. The corridor then turns northward centered on Yellow Medicine County Route 43 to its intersection with Minnesota State Route 67, then follows Minnesota State Route 67 into Granite Falls and Chippewa County, Minnesota. This corridor then terminates at the State Route 23/U.S. Highway 212 intersection.

Common Corridor Alternative A

The Common Corridor Alternative A is located where the Common Corridor turns eastward and enters Minnesota from South Dakota. This alternative includes an approximate eight (8) square miles east of Gary, South Dakota at the extreme northwest corner of Yellow Medicine County, Minnesota.

Common Corridor Alternative B

Common Corridor Alternative B is located northeast of Granite Falls, Minnesota. It encompasses approximately 12 square miles parallel to the Minnesota River valley in Chippewa County, Minnesota.

Alternative Corridor 1

Alternative Corridor 1 and originates in Ortonville, Minnesota. The Alternative 1 corridor is generally a three (3)-mile wide corridor centered on Big Stone County Route 12 to the northeast of Ortonville until it reaches County Route 21. Alternative Corridor 1 then follows Big Stone County Route 21 for 12 miles until it reaches State Route 28 near Johnson, Minnesota. This alignment then turns eastward and follows

Minnesota State Route 28 through Stevens County, Minnesota until it terminates at the Morris Municipal Airport.

Alternative Corridor 2

Alternative Corridor 2 originates at the southeast corner of Ortonville, Minnesota. This alternative corridor is also a three (3)-mile wide corridor which follows U.S. Highway 12 through Big Stone County and Swift County until it reaches Kerkhoven, Minnesota where the corridor deviates north of the U.S. Highway 12 corridor and follows Swift County Route 33 and Kandiyohi County Route 27 two (2) miles into Kandiyohi County. This alternative then terminates at 120th Street NW in Mamre township and becomes one of two options, either Alternative Corridor 2A or Alternative Corridor 2B.

Alternative Corridor 2A

Alternative Corridor 2A begins at the terminus of Alternative Corridor 2 roughly following Kandiyohi Route 27 for approximately 17 miles until it reaches the terminus at the east edge of Diamond Lake northeast of Kandiyohi, Minnesota.

Alternative Corridor 2B

This alternative deviates south of Alternative Corridor 2 near the Swift/Kandiyohi County line. Alternative Corridor 2B is a three (3)-mile wide corridor roughly centered on the Kandiyohi/Swift and Kandiyohi/Chippewa County lines for seven miles after it crosses U.S. Highway 12. Alternative Corridor 2B then follows 45th Avenue SW (County Roads 87 and 88) for 15 miles as it skirts the southern limits of Willmar, Minnesota, then turns north until it reaches the southern limit of Alternative Corridor 2A northwest of Kandiyohi, Minnesota.

The survey area lies within the Southwestern Minnesota Grassland (II) regional landscape ecosystem (Albert 1995). The alternative transmission line corridors cross two subsections of this landscape and include; the Upper Minnesota River Country (II.2), Ivanhoe-Worthington Coteau (II 2.3). Albert (1995) broadly characterizes the Southwest Minnesota Grassland as once supporting tallgrass prairie that has been almost completely converted to cropland on soils that are primarily classified as Mollisols Minnesota Soil Survey Staff (1983). The presettlement natural plant communities within this landtype association consisted of mesic tallgrass prairie, dry hill prairie, wet prairie, brush prairie, rock outcrops, and gravel prairie. The tallgrass prairie ecosystem has ceased to exist except in small isolated sites (i.e. on steep slopes, in ditches along road or railroad corridors, and on lands that have escaped plowing) throughout the

Midwest. The tallgrass prairie has been converted to agriculturally related land uses and few areas that are dominated by remnant prairie vegetation remain along the proposed route.

The proposed project traverses numerous natural and planted vegetation community types. The principal natural community types encountered, in accordance with Minnesota's Native Vegetation: A Key to Natural Communities Version 1.5, include; Mesic Prairie, Dry Prairie, Dry Prairie Hill subtype, Dry Prairie Sand-Gravel subtype, Wet Prairie, and Rock Outcrops. These classifications are based on the dominant plant community assemblages present at a particular location. Lands where native species assemblages persist essentially unaltered by plowing or other agricultural practices were further designated as "remnant". Remnant communities are distinguished from planted native communities by greater ecological function, more complex species assemblages, and a diversity of fauna within remnant systems. The following community descriptions refer to remnant community types observed within the survey corridors.

Remnant Mesic Prairie

Remnant Mesic Prairie is a dry to wet-mesic plant community dominated by grasses and sedges that are located on level to rolling glacial till and glacial lake sediments. Big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and prairie dropseed (*Sporobolus heterolepis*) are typically the dominant species with numerous other species of grasses occurring at different levels of dominance based upon moisture availability or disturbance (**Figure 2**). Invasive species such as Kentucky bluegrass (*Poa pratensis*) and Canada bluegrass (*P. compressa*) occur in varying abundance on these sites depending upon the level of disturbance at a particular site.

Forbs on remnant Mesic Prairie sites are abundant and have a high level of diversity. Forb communities also vary in diversity and makeup with available soil moisture levels. Soils within Mesic Prairie are generally classified as Molisolls.

Remnant Mesic Prairie communities are fire-dependent and where fire is absent woody species invade. Many remnant Mesic Prairie areas that host TES species will have an abundance of trees such as green ash (*Fraxinus pennsylvanica*) and eastern red cedar (*Juniperus virginiana*). **Table 1** lists remnant Mesic Prairie sites identified along the three transmission line corridors. A list of species observed on remnant Mesic Prairies throughout the survey area are attached in **Appendix 2**.

Table 1.

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
#1 - Alternative Corridor 2A	Small mesic prairie remnant along an old railroad grade maintained as a State Bike Trail.	Bike Trail	N
#2 - Alternative Corridor 2A	Dry-mesic prairie on rolling glacial till. Low areas and wetlands are dominated by non-native grasses and cattails.	Gravel Mining	N
#3 - Alternative Corridor 2A	Dry-mesic prairie remnants occur in isolated patches on slope faces.	Pasture, Fallow land	N
#4 - Alternative Corridor 2A	This is a large semi-wooded area that harbors pockets of dry-mesic prairie on slopes and at wetland transitions.	Pasture, Fallow land	N
#5 - Alternative Corridor 2A	This area exhibits patches of native grasses. The remaining areas are dominated by non-native grasses and forbs.	Fallow land, Hay	N
#6 - Alternative Corridor 2A	The majority of this large area is utilized as pasture. Slopes harbor patches of remnant dry-mesic plant communities.	Pasture, Fallow land, Hay	N
#7 - Alternative Corridor 2A	Much of this land is mowed for hay remnant mesic prairie plant communities occur along road ditch and were visible from road.	Hay	N
#8 - Alternative Corridor 2A	Most of this parcel is managed prairie; however, some pockets of remnant mesic and wet-mesic prairie remain intact.	Waterfowl Management Area	N
#9 – Alternative Corridor 2A	This area is planted in native grasses and forbs with some remnants along wetland fringes.	Set aside lands	N
#10 - Alternative Corridor 2	Several large high quality remnant mesic and wet-mesic prairies persist on slopes and in low areas.	Set aside lands	N
#12 - Alternative Corridor 2	Small remnant wet-mesic prairie located in road ditch and on adjacent areas.	Set aside lands	N
#17 - Alternative Corridor 2	Isolated pockets of remnant mesic prairie located between road and wetland areas.	Waterfowl Management Areas	N
#19 - 2 Alternative Corridor 2	This area is designated as remnant mesic prairie by the MCBS but appeared to be dominated by non-native grasses with few forbs.	Set aside lands	N
#20 - Alternative Corridor 2	This area is designated as remnant mesic prairie by the MCBS and maintains a healthy forb community but much of the area is dominated by non-native grasses.	Set aside lands	N
#25 - Alternative Corridor 2	Several remnant mesic prairie communities occur within areas managed for prairie chickens.	Waterfowl Management Areas	N
#27 - Alternative Corridor 1	Small wetland surrounded by remnant mesic prairie especially on east side of site.	Fallow land	N
#34 – Common Corridor	Remnant mesic prairie surrounding rock outcrops at a local nature preserve.	Nature Preserve	Y

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
#36 - Common Corridor	Large grassland pasture with areas of remnant rock outcrops surrounded by remnant mesic prairie.	Pasture	N
#37 - Common Corridor	This is a small remnant mesic prairie adjacent to a waterway that drains to the Minnesota River.	Fallow lands	N
#38 - Common Corridor	Fallow grasslands and pasture with some remnant mesic prairie located on slopes and adjacent an intermittent stream.	Pasture, Set aside lands	N
#46 - Common Corridor	Pastured areas along a creek that harbor remnant mesic prairie communities on slopes and adjacent the creek.	Pasture, Set aside lands	Y
#48 - Common Corridor	Large rolling areas that exhibit numerous prairie remnant indicators and communities including; dry prairie, calcareous fens, mesic prairie, and wet prairies.	Pasture, Set aside lands, Scientific Natural Area	Y
#49 - Common Corridor	Linear slopes that exhibit remnant mesic prairie communities on steepest slopes.	Pasture, Gravel mines	N
#50 - Alternative Corridor 1	This is a large WPA that contains large tracts of remnant mesic prairie and is managed for prairie species.	Waterfowl Production Area	N
#51 - Alternative Corridor 1	This is a large WMA that contains large tracts of remnant dry prairie, mesic prairie and wet prairie and is managed for prairie chickens.	Waterfowl Management Area	N
#52 - Alternative Corridor 1	This area is a mosaic of wetlands, wet prairie, mesic prairie and other grasslands mowed for hay.	Set aside	N
#53 - Alternative Corridor 1	Managed lands with some remnant mesic prairie forb communities but that are dominated by non-native grasses.	Waterfowl Production Area	N
#56 - Alternative Corridor 1	Several areas within this WPA harbor remnant mesic prairie communities.	WPA	N
#60 - Alternative Corridor 2B	These areas are managed grasslands that harbor some isolated remnant mesic prairie communities.	Waterfowl Management Area	N
#61 - Alternative Corridor 2B	Remnant mesic prairie and wet prairie managed for maintenance of these communities.	Waterfowl Management Area	N
#62 – Alternative Corridor 2B	Old railroad grade with numerous areas that harbor remnant prairie plant assemblages.	Pasture, State Bike Trail	N
#63 – Alternative Corridor 2B	Residential development with hillsides that harbor some remnant mesic prairie communities.	Residential Development	N
#65 - Alternative Corridor 2B	Remnant mesic prairie communities adjacent to wet prairies.	Set aside lands	N

Remnant Dry Prairie

Remnant Dry Prairie is a dry to dry-mesic plant community dominated by grasses and sedges. It occurs throughout the Southwest Minnesota Grassland landscape ecosystem. Generally, remnant Dry Prairies have a greater component of Great Plains species than remnant Mesic Prairies (Aaseng et. al. 1993). Mid-height and short grasses and sedges are

usually dominant in remnant Dry Prairie communities (Figure 2). Porcupine grass (*Stipa spartea*), prairie junegrass (*Koeleria macrantha*) and sun-loving sedge (*Carex heliophila*) were the most readily identified species observed on remnant dry prairie during our review of the survey area. Invasive species such as musk thistle (*Carduus nutans*) and yellow sweet clover (*Melilotus officinalis*) vary based upon frequency and duration of grazing on these sites.

Forb abundance within the remnant Dry Prairie community type was generally more sparse than on remnant Mesic Prairie community types observed in the survey area. Low shrubs such as leadplant (*Amorpha canescens*), prairie rose (*Rosa arkansana*), and wolfberry (*Symphoricarpos occidentalis*) were present in varying amounts based upon the level of grazing that occurred on remnant Dry Prairie sites.

Remnant Dry Prairies are maintained by fire but require less frequent fires than remnant Mesic Prairies due to the droughty conditions where Dry Prairies occur. These dry and poor soil conditions slow the advance of woody species. Soils within the Dry Prairie community type are generally well-drained to excessively drained depending upon the degree of slope (Aaseng et. al. 1993).

Two remnant Dry Prairie subtypes occurred within the survey area and included; Hill subtype and Sand-Gravel subtype. The Hill subtype occurs on steep terrain and has the greatest species overlap with Mesic Prairies of the Dry Prairie subtypes. Soils are classified as Molisolls but are generally thinner than on Mesic Prairie sites. The Sand-Gravel subtype occurs on the former shorelines of Glacial Lake Agassiz, on outwash deposits, and on ice-contact kames and eskers. These areas have a higher sand-gravel component than on other Dry Prairie communities. **Table 2** lists remnant Dry Prairie sites identified in the survey area. A list of species observed on remnant Dry Prairies within the survey area are attached in **Appendix 3**.

Table 2.

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
#13 - Alternative Corridor 2	Much of this area is grown over with eastern red cedar that harbors remnant dry prairie communities in openings.	Fallow lands	N
#14 - Alternative Corridor 2	The majority of this area is set aside as CRP but some of the slopes maintain remnant dry prairie communities.	Set aside lands	N
#15 - Alternative Corridor 2	Remnant dry prairie communities that remain on steepest portions of west facing slopes.	Set aside lands	N
#16 -	Designated by MCBS as a dry hill prairie	Set aside lands	N

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
Alternative Corridor 2	with remnant dry prairie communities remaining on only the steepest slopes.		
#18 - Alternative Corridor 2	Designated by MCBS as a dry hill prairie with remnant dry prairie communities remaining on only the steepest slopes.	Set aside lands, Pasture	N
#21 - Alternative Corridor 2	This is a large area adjacent to an area designated as wet-mesic and mesic prairie remnants.	Set aside lands	N
#23 - Alternative Corridor 2	This is an area that exhibits remnant dry prairie on slopes that face south.	Fallow lands	N
#26 - Alternative Corridor 2	Much of this area is designated as remnant dry hill prairie by the MCBS. Several slopes that are not designated also exhibit the same prairie communities.	Fallow lands, Set aside lands	N
#29 - Alternative Corridor 2 & Alternative Corridor 1	Remnant dry prairies on slopes with numerous encroaching trees and homes built at the base of the slope.	Fallow lands, Residential development	N
#30 – Common Corridor	Remnant dry prairies along transmission line corridors that are surrounded by successional woodland	Fallow lands	N
#31 – Common Corridor	Remnant dry prairies on slopes facing the Minnesota River.	Fallow lands	Y
#32 – Common Corridor	Remnant dry prairies on slopes facing the Minnesota River.	Fallow lands	Y
#33 – Common Corridor	Remnant dry prairies on slopes facing the Minnesota River.	Fallow lands, Pasture	Y
#35 – Common Corridor	Remnant dry prairies with large areas of encroaching successional woodlands.	Fallow lands	N
#40 – Common Corridor	Remnant dry prairie with large areas of encroaching successional woodland.	Fallow lands	N
#42 – Common Corridor	Remnant dry prairie with large areas of encroaching successional woodland.	Fallow lands	N
#44 – Common Corridor	Pastured areas along a creek that appear to harbor isolated pockets of remnant dry prairie.	Fallow lands	N
#45 – Common Corridor	Pastured areas along a creek that appear to harbor isolated pockets of remnant dry prairie.	Fallow lands	N
#47 – Common Corridor	Expansive rolling country that is set aside and that the MCBS has designated as dry prairies. Several sensitive species records occur from these areas.	Fallow lands	Y
#49 – Common Corridor	Slopes that are dominated by non-native grasslands but that harbor isolated pockets of remnant dry prairies.	Pasture	N
#55 - Alternative Corridor 1	Pastured grasslands that may harbor remnant dry prairie communities on the steepest slopes.	Pasture	N
#56 - Alternative Corridor 1	This site is managed for prairie communities and several pockets harbor remnant dry prairies.	Waterfowl Management Area	N
#57 -	Two areas of MCBS designated dry prairie	Waterfowl Management	N

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
Alternative Corridor 1	that are currently managed for prairie species.	Area	
#59 – Common Corridor Alternative A	This is a pastured creek bed with slopes that are dominated by non-native grasses but where isolated remnant dry prairies occur on adjacent slopes.	Pasture	N
#66 – Common Corridor Alternative A	Pastured land with several areas designated as dry prairie by the MCBS. Much of this area is dominated by non-native grasses.	Pasture, Set aside lands	N

Remnant Wet Prairie

The remnant Wet Prairie community type is a plant community that is dominated by sedges and grasses. Prairie cordgrass (*Spartina pectinata*), Canada bluejoint (*Calamagrostis canadensis*) are the dominant grasses observed in this community type but a large number of sedge species including (*Carex pellita*, *C. sartwellii*, and *C. praegracilis*) occur in this community type (**Figure 3**).

Forbs within the remnant Wet Prairie are less abundant than in other community types observed in the survey area. Species such as giant goldenrod (Solidago gigantea), giant sunflower (*Helianthus giganteus*) and tall meadow rue (*Thalictrum dasycarpum*) were present in varying amounts based upon soil moisture levels. Reed canary grass (Phalaris arundinacea) occurs in varying levels of abundance based upon the amount of historic and current disturbance to the remnant Wet Prairie sites.

Remnant Wet Prairies are maintained by fire or mowing and succumb to shrub and tree cover in the absence of these activities. This community type occurs in depressions or drainageways with high water tables throughout a good portion of the growing season. Remnant Wet Prairies occur on soils that are mainly Mollisols and mucks. **Table 3** lists Remnant Wet Prairie sites identified within the survey area. A list of species observed on remnant Wet Prairies throughout the survey area are attached in **Appendix 4**.

Table 3.

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
#11 - Alternative Corridor 2	Remnant wet prairie communities located along a drain.	Fallow land	N
#22 - Alternative	This is a large area designated as wet-mesic prairie by the MCBS but	Set aside	N

Corridor 2	that is more accurately called wet prairie.		
#24 - Alternative Corridor 2	This is a large remnant wet prairie dominated by native sedges, forbs and grasses.	Big Stone NWR	N
#58 – Alternative Corridor 1	This is a remnant wet prairie located along a perennial drainage.	Pasture	N
#64 - Alternative Corridor 1	This area is designated as remnant wet prairie by the MCBS and has native grasses planted adjacent to the wetland areas.	Set aside lands	N

Remnant Rock Outcrops

Remnant Rock Outcrop plant communities occur on areas of exposed bedrock within the Minnesota River Valley. The bedrock outcrops in the Minnesota River Valley are composed of granite and gneiss (Figure 3). Most plant species present on these outcrops grow in shallow dry soil that collects in small depressions on sloping rock faces and contain species more typically associated with the flora of the Great Plains including, ball cactus (*Escobaria vivipara*), plains prickly pear (*Opuntia macrorhiza*), and fameflower (*Talinum parviflorum*) (Aaseng et. al. 1993). Small depressions within the rock outcrops often contain wetland species assemblages such as Carolina foxtail (*Alopecurus carolinianus*), water hyssop (*Bacopa rotundifolia*) and mudwort (*Limosella aquatica*).

Remnant Rock Outcrops are maintained by fire and succumb to shrub and tree cover in the absence of fire. **Table 4** lists Remnant Rock Outcrop communities identified within the survey area. A list of species observed on remnant Rock Outcrop communities throughout the survey area is attached in **Appendix 5**.

Table 4.

Community ID # / Corridor Alternative	Comments	Dominant Land Use	Rare Species observed (Y/N)
#28 - Alternative Corridor 2 & Alternative Corridor 1	Remnant rock outcrop prairies with several land use types located between remaining native communities.	Big Stone NWR and Granite Mining	Y
#39 – Common Corridor	Remnant rock outcrop prairies that are being encroached upon by woody vegetation. High quality areas persist in transmission line corridors where maintenance has removed the trees.	Fallow land and Scientific Natural Area	Y
#41 – Common Corridor	Remnant rock outcrop prairies that are being encroached upon by woody vegetation. High quality areas persist in transmission line corridors where maintenance has removed the trees.	Pasture and Granite Mining	N

#43 – Common Corridor	This is a large area located adjacent the Minnesota River where land use is dominated by pasture, mining and hay land. Numerous rock outcrops occur throughout this area.	Pasture, Fallow lands, Hayed lands	N

A majority of lands within the survey area have been converted to crop production or are set aside lands. Set aside areas are characterized by a dominance of planted grasses or invasive non-native grasses with few native forbs. Most grassland communities evaluated within the survey area were dominated by invasive grasses such as Kentucky bluegrass, Canada bluegrass, smooth brome (*Bromus inermis*), orchard grass (*Dactylis glomerata*), quack grass (*Agropyron repens*), and perennial rye grass (*Lolium perenne*). Most land is planted in crops such as corn, soybeans, sugar beets, oats and other small grains, with pasture land comprising the second largest land use type throughout the survey area. Towns, gravel mines, granite mines, road and railroad corridors occur to a lesser extent. Numerous Waterfowl Production Areas owned by the U.S. Fish and Wildlife Service and State owned Waterfowl Management Areas (WMA) and Scientific and Natural Areas also occur within the survey area.

Methodologies

Transmission line corridors were assessed for sensitive species using information gathered from preliminary grassland identification surveys conducted by HDR, a review of relatively current aerial photographs (2003), and electronic data provided from Minnesota County Biological Surveys (MCBS) conducted since1987. GES reviewed potential prairie survey information and aerial photographs of potential remnant sites. Areas deemed most likely to provide suitable habitat for targeted species were identified and then evaluated in the field where accessible. A GES biologist drove along the proposed corridors stopping at areas that were:

- identified by HDR as potential prairie;
- identified as natural communities by previous MCBS surveys;
- exhibited plant communities that are characteristic of remnant native prairies (i.e. an abundance and diversity of native forbs and grasses) ;
- located in landscape positions that are difficult to plow;
- pastured, fallow, or set-aside lands.

After stopping at publicly-availability access points, GES scanned sites to identify prairie indicator species that occurred on the site and noted the ecological condition of the site by assessing historic land use evidence and plant community characteristics. Areas that exhibited an abundance

of native forbs, grasses and that were located in landscape positions that were difficult to plow (i.e. abundant rock outcrops, steep slopes, areas located between roads and railroads) or that were grazed were also scanned for the presence and abundance of native grasses and forbs. Those areas that were planted in native grasses, or that were part of WMA's that were restored to prairie, or set aside lands planted to native grasses, were considered lower quality sites and were documented in ArcGIS®. Those areas that were dominated by non-native species were designated as grassland and were also documented in ArcGIS®. On publicly owned properties where access was unimpeded, a cursory meander search was conducted to evaluate prairie quality and identify sensitive species. Goff et al. (1982) utilized a time meander search to catalogue plants in a variety of plant communities and statistically illustrated through species area curves that this method adequately samples a given vegetative community for rare plants. A qualitative assessment of the effectiveness of using the transect versus meander-search method conducted by Penskar (1991) in the Ottawa National Forest, Michigan, indicated that the meander-search method is in all probability the best technique to adequately sample for rare taxa in both small and large sample areas.

GES modified the meander search method by identifying potentially suitable habitats and screening out obviously unsuitable habitats. This modification allowed us to conduct even more intensive surveys in the areas most likely to harbor target species and eliminate the timed survey intervals described by Goff (1982). Quantitative analysis of the vegetation was not the principal goal of the survey.

Areas that were evaluated for prairie characteristics were digitized onto 2003 color aerial photographs and dominant plant community characteristics were documented in the ArcGIS 9.1® attribute table. Those parcels that exhibit an abundance and diversity of native forbs and grasses in some portion of the parcel were given an identification number. Generally, evaluated parcels were at least one-acre in size or larger unless GES was able to conduct a meander search. In those cases where meander searches were conducted, smaller parcels may have been identified.

Results

Remnant Prairies

A total of 297 different sites were evaluated for characteristics exhibited by remnant prairies and sensitive species along the survey route (Figure 1). The highest quality sites were typically previously identified by the MCBS as natural communities or located in road ditches, however, a small number of MCBS sites did exhibit degraded conditions or were dominated by non-native species. There were a total of 66 prairie systems on 92 sites on all transmission line corridor alternatives that contained remnant prairie that range in size from isolated pockets (< 1 acre) to large (over 40 acres) contiguous areas. Remnant prairies were found in a variety of stages of succession and ecological health. All of the native plant communities identified along the survey routes were affected by the presence of invasive species such as reed canary grass in the wetlands or by smooth brome or bluegrass in the upland communities. Each community type varied in the abundance and location of native species present. All of the sites that were reviewed showed evidence of encroachment by woody species and other invasive or pioneering non-native species. In general, those sites that were managed for prairie species via woody vegetation removal and periodic burning, exhibited a dominance of native grasses and forbs typical of remnant prairies.

Transmission line corridors that were kept free of woody vegetation were another example of when woody vegetation removal benefited prairie communities. This was especially obvious in and around Granite Falls, Minnesota, where transmission line corridors were kept free of woody vegetation and a healthy diversity of native grasses and forbs were present. Several pastures in rotation also exhibited an abundance of forbs and native grasses when fallow.

Sensitive (TES) Species

In addition to evaluating sites for remnant prairies, GES located 49 individual TES species occurrences within the transmission line corridors. Locations for 1 species of butterfly, 2 species of birds, and 6 species of plants identified on Minnesota's List of Endangered, Threatened, and Special Concern Species were located on public lands or in road ditches along the various corridors. No species identified on the Department of Game, Fish and Parks Threatened, Endangered, and Candidate Species of South Dakota list (November 2004) were identified in the survey area.

Regal Fritillary (*Speyeria idalia*) (Minnesota Special Concern, Federal Category 2 candidate species)

The regal fritillary is considered a prairie obligate butterfly that has suffered population declines in the Midwest mainly due to the conversion of tallgrass prairies into cropland. Pesticides have also contributed to the species' decline. Large tracts of native prairie that harbor abundant forbs, prairie remnants, or lightly grazed pasture lands containing prairie vegetation are habitats utilized by the regal fritillary. Larval food plants are violets, primarily prairie violet (*Viola pedatifida*), birdsfoot violet (*V. pedata*) and arrowleaf violet (*V.sagittata*) (Opler,1984, WDNR). Adults utilize the nectar of numerous forb species including milkweeds, thistle, blazing star, and purple coneflowers. The regal fritillary was found at three locations in Yellow Medicine County, Minnesota on remnant mesic and dry hill prairie types.

Bald Eagle (*Haliaeetus leucocephalus*, L.) (Minnesota Special Concern, Federal Threatened)

The bald eagle is classified as threatened under the Endangered Species Act and breeds in particularly large numbers in northern Minnesota. Typical breeding habitat includes super-canopy trees, primarily red pine and white pine, associated with lakes and rivers supporting fish for a food supply (Mathisen 1983) According to the MDNR nongame program web site, the statewide total of breeding pairs is now about 600 and increasing at the rate of 30 pairs per year. Although most nest sites are located in areas with minimal human activity, some eagles have adapted to human presence and nest in close proximity to human dwellings and other activity. An adult bald eagle was observed within the transmission line corridor at the edge of a wetland in Swift County, Minnesota.

Wilson's Phalarope (*Phalaropus tricolor*, Vieillot) (Minnesota Threatened)

The Wilson's phalarope is associated with prairie wetlands across the prairie states and provinces of Canada (Coffin et. al., 1988). This species is a very local summer resident mainly in the northwestern and central regions of Minnesota (Janssen, 1988). A Wilson's phalarope was observed on the western shore of Salt Lake in Deuel County, South Dakota and on the Minnesota side of the lake.

Ball Cactus (*Escobaria vivipara*, Minnesota Endangered)

The ball cactus is a one of three species of cacti that are native to Minnesota and is the rarest of the three species. The only known population is known from granite outcrops near Ortonville in Big Stone County. The ball cactus was identified on numerous granite outcrops within the Big Stone National Wildlife Refuge in Big Stone County, Minnesota.

Missouri Milk-Vetch (*Astragalus missouriensis,*) (Minnesota Special Concern)
Missouri milk-vetch is a species that occurs on dry plains and river bluffs in the plains states from Alberta to Texas and extends into western Minnesota. Missouri milk-vetch is a many-stemmed perennial with outer stems that may bend toward the ground. Several Missouri milk-vetch plants were observed on dry hill prairie in Chippewa County, Minnesota.

Small White-Ladyslipper(*Cypripedium candidum,* Minnesota Special Concern)
In Minnesota, the small white-ladyslipper is a species associated with moist prairies, calcareous fens, and sedge meadows (Smith, 1993). It has become rare throughout most of its range. Small white-ladyslippers were found in a road ditch near several MCBS mesic and dry hill prairies in Yellow Medicine County, Minnesota.

Plains Prickly Pear(*Opuntia macrorhiza,* Minnesota Special Concern)
In Minnesota, the plains prickly pear is found on native prairie, pasture land, often in overgrazed areas, sand blow-outs, and on rocky hillsides. It prefers sandy, gravelly or rocky soils. Plains prickly pear was found on scattered remnant rock outcrop prairies in Yellow Medicine and Big Stone Counties, Minnesota.

Mudwort (*Limosella aquatica*, Minnesota Special Concern)
The mudwort is found along stream banks, shores, mud flats of temporary ponds and marshes, and in the temporary pools created by accumulated rain on rock outcrops of western Minnesota. This species was found growing next to water hyssop on the granite outcrops within the Big Stone National Wildlife Refuge in Big Stone County, Minnesota.

Water Hyssop (*Bacopa rotundifolia*, Minnesota Special Concern)
Water hyssop is found on mud flats, in shallow water of ponds or marshes and in temporary pools created by accumulated mud of rock outcrops. This species was found growing next to water hyssop on the granite outcrops within the Big Stone National Wildlife Refuge in Big Stone County, Minnesota.

Regulatory Jurisdiction

Minnesota Regulations

Minnesota Statutes 84.0985, Subp. 3 defines endangered, threatened and special concern species as follows:

Endangered: the species is threatened with extinction throughout all or a significant portion of its range,

Threatened: the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and

Special Concern: although the species is not endangered or threatened, it is extremely uncommon in this state, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered buy now have increasing or protected, stable populations.

Species listed as endangered or threatened species are protected and a take permit is required for such species to be destroyed or transplanted. Special concern species do not have any specific statutory protection.

South Dakota Regulations

South Dakota State Law defines endangered, threatened, and non-game species in chapter 335 Subp. 1; 34A-8-1. Definition of terms:

(1) "Endangered species," any species of wildlife or plants which is in danger of extinction throughout all or a significant part of its range other than a species of insects determined by the Game, Fish and Parks Commission or the secretary of the United States Department of Interior to constitute a pest whose protection under this chapter would present an overwhelming and overriding risk to man;

(2) "Nongame species," any wildlife species not legally classified a game species, fur-bearer, threatened species, or as endangered by statute or regulations of this state;

(3) "Threatened species," any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range;

The information contained herein represents my findings during sensitive

plant survey activities conducted on June 22-24 and 30, 2005 along the three transmission line corridors.

Graham Environmental Services, Inc.

Scott Krych Date
Wildlife Biologist/Professional Wetland Scientist No. 000303

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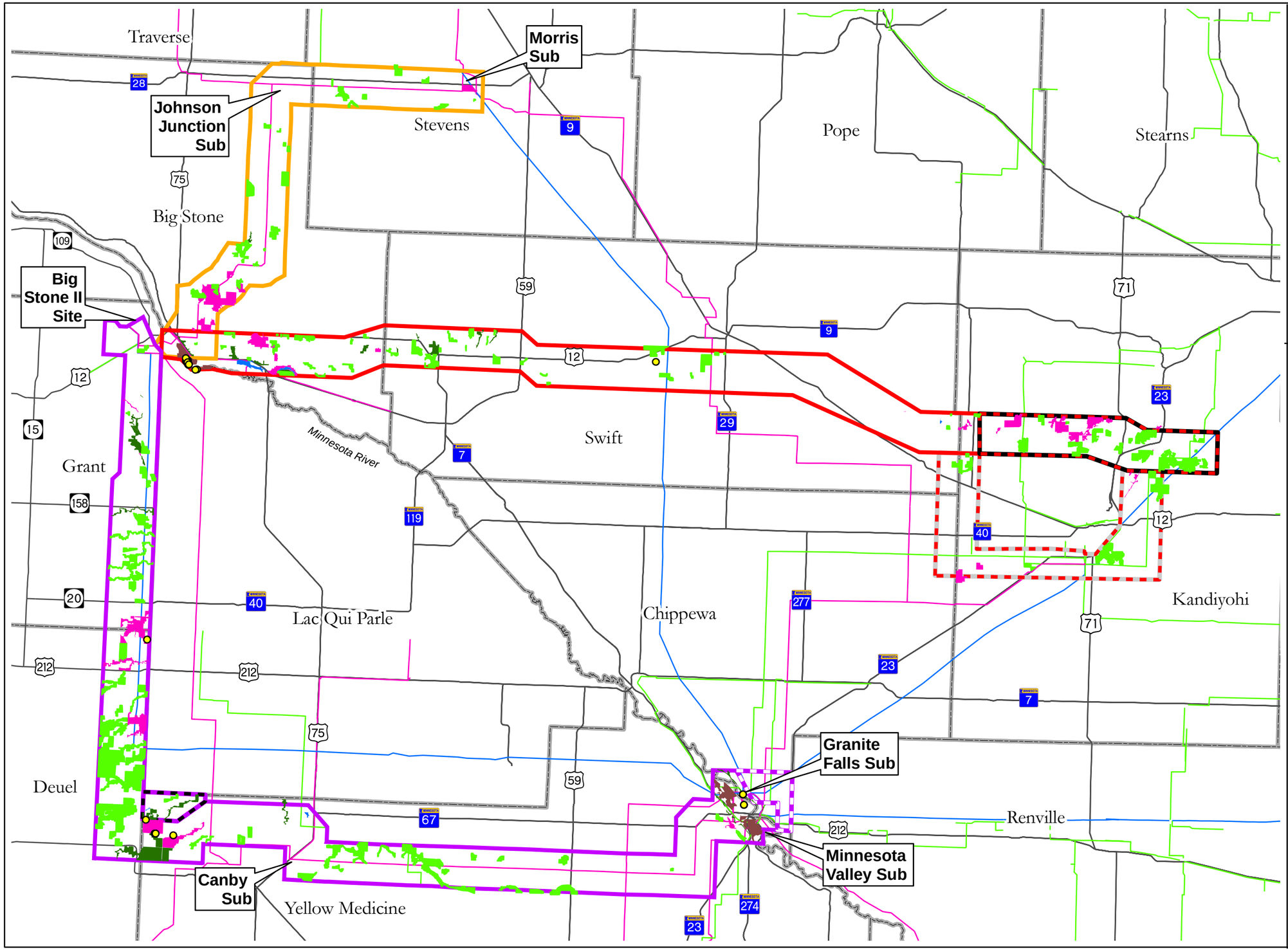


BIG STONE
PARTNERS IN TRANSMISSION

Figure 1 - Remnant Prairies & Special Status Species Map
Remnant Prairies & Grassland Survey Report
Minnesota & South Dakota

Legend

- Special Status Species

Grasslands & Remnant Prairies

- Non-Prairie Grasslands
- Dry Prairie
- Mesic Prairie
- Rock Outcrop
- Wet Prairie

Project Corridors

- Common Alternative
- Common Alternative A
- Common Alternative B
- Alternative 1
- Alternative 2
- Alternative 2A
- Alternative 2B

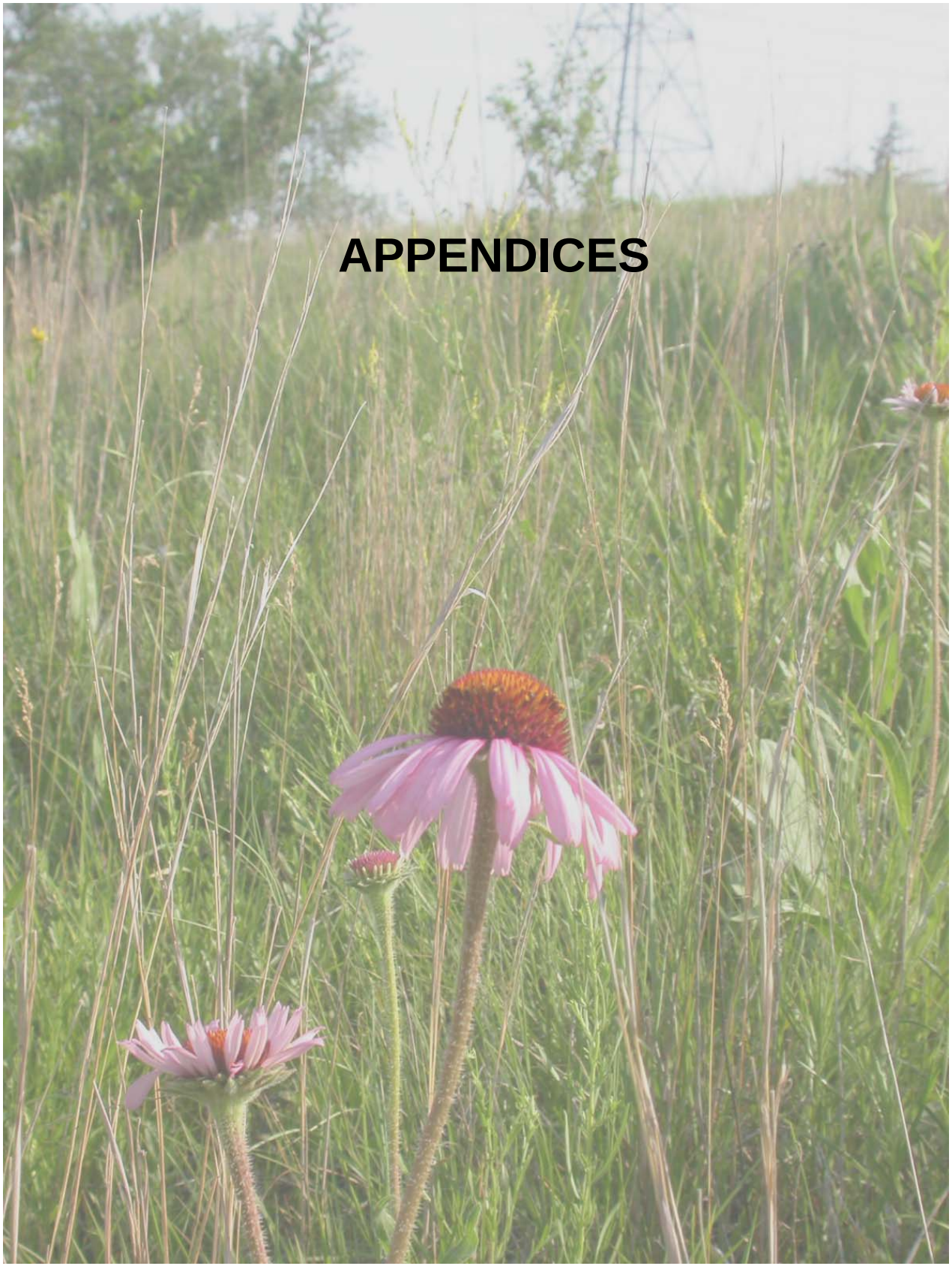
Existing Transmission Lines

- 69 kV
- 115 kV
- 161 kV
- 230 kV

Data Sources:
MnDOT

0 2.5 5 10 Miles

N



APPENDICES

Threatened, Endangered, and Rare Species and Communities
Survey Approach

HDR is proposing a habitat assessment approach to focus threatened and endangered species review around the probable habitat that the species may occur. The majority of the species of concern inhabit native prairie and rock outcrops within the proposed corridors. HDR will review the habitat within the proposed corridors and will initially identify 40 acre blocks (¼ ¼ Section) as habitat.

Prairie Defined

Unplowed fields of native grassland or pasture with 10 or more prairie indicator species. The prairie indicator species are found in Appendix 3 and its supplement in Minnesota's Native Vegetation: A Key to Natural Communities (Minnesota Department of Natural Resources Natural Heritage Program, 1993).

Survey Approach

Step 1: Identify Areas of Potential Prairie Habitat

Method

- Complete a desktop survey of potential locations with information from the MCBS, DNR NHIS, the Railroad ROW Native Prairie Fragment Survey, and preliminary field notes on the corridor. We will also consult with the NRCS on CRP lands within the corridor.
- Consult with agencies to identify additional potential areas of concern.

Step 2: Verify Presence of Prairie Habitat

Method

Prairie will be identified in 40 acre parcels (¼ ¼ Section).

- Assume access to property: Complete a rapid field assessment by walking a transect through potential prairie areas identified in Step 1.
- If no property access: Use publicly-available access points and identify prairie plants from the edge of public land adjacent to potential prairie areas identified in Step 1.
- If the areas identified above have greater than 10 prairie indicator species, then classify as prairie and move to Step 3.

Step 3: Identify Avoidance/Minimization Measures

Method

Once ROW and plan and profiles for the transmission lines have been established:

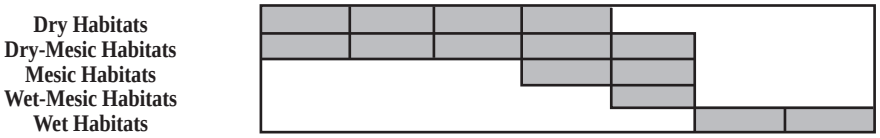
- Surveys for threatened and endangered species will be conducted in probable habitat.
- Design options will be considered to avoid and minimize impacts to prairie species.

Appendix 3. Common plants of prairie communities in Minnesota, by community in which they occur

(Emphasis on species that occur throughout the range of the community in Minnesota; exceptions are noted (e.g.,-SE=absent from southeastern Minnesota, NW = typical in Northwestern Minnesota). Species that may be common in a prairie community but that are also typical of non-prairie communities (such as Sedge Meadow) are omitted.)

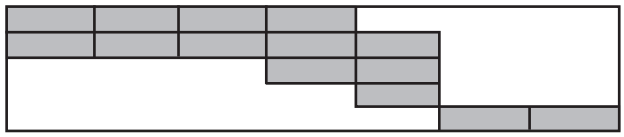
T = typically present
O = occasional but not typical, or typically present only in some subtypes

Barrens = Dry Prairie Barrens Subtype and Dry Oak Savanna Barrens Subtype
Gravel = Dry Prairie Sand -Gravel Subtype
Bluff = Dry Prairie Bewdrock Bluff Subtype
Hill = Dry Prairie Hill Subtype and Dry Oak Savanna Hill Subtype
Mesic = Mesic Prairie and Mesic Brush Prairie
Wet = Wet Prairie and Wet Brush Prairie
Saline = Wet Prairie Saline Subtype



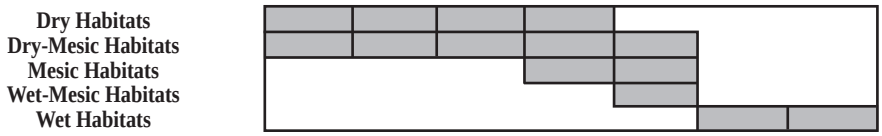
Species	Barrens	Gravel	Bluff	Hill	Mesic	Wet	Saline
Graminoids							
Calamovilfa longifolia	T	O		O			
Bouteloua gracilis	T(NW)	T(NW)		O(NW)			
Bouteloua hirsuta	T	T	T	O			
Muhlenbergia cuspidata		T	T	T			
Carex heliophila	T	T	T	T	T		
Stipa spartea	T	T	T	T	T		
Koeleria macrantha	T	T	T	T	T		O
Bouteloua curtipendula	O	T	T	T	T		
Schizachyrium scoparium	T	T	T	T	T	O	T
Panicum leibergii		O	T	T	T		
Sorghastrum nutans	O	O	T	T	T	O	O
Sporobolus heterolepis		T	T	T	T	O	O
Andropogon gerardii	T	T	T	T	T	T	T
Panicum virgatum				O	T	T	T
Muhlenbergia richardsonis (-SE?)					O	T	T
Spartina pectinata					O	T	T
Hierochloe odorata					O	T	O
Distichlis stricta							T
Muhlenbergia asperifolia							T
Spartina gracilis							T
Puccinellia nuttalliana							O
Broad-leaved Herbs							
Petalostemon villosum	T						
Tradescantia occidentalis	T						
Artemisia frigida	T	T	O	O			
Pulsatilla nuttalliana	T	T	T	T	O		
Castilleja sessiliflora		T	T	O			
Aster oblongifolius		T	T	T	O		
Lithospermum incisum	O	T	T	O			
Liatris cylindracea			T	O(C)			
Liatris punctata	O	T	O	T	O		
Aster sericeus	T	T	T	T	O		
Liatris aspera	T	T	T	T	T		
Heterotheca villosa	T	T		T	O		
Geum triflorum	O	T	T	T	T		
Delphinium virescens	T	T	O	T	T		
Anemone cylindrica	T	T	T	T	T		
Helianthus rigidus	T	T	T	T	T		
Astragalus crassicarpus		T	O	T	T		
Echinacea angustifolia (-E)		T		T	O		
Calylophus serrulatus	O	T	O	T	O		
Psoralea argophylla		O		T	T		

Appendix 3. (cont.)



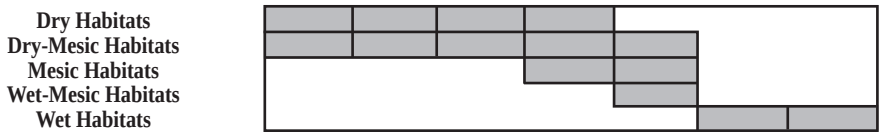
Species	Barrens	Gravel	Bluff	Hill	Mesic	Wet	Saline
Broad-leaved Herbs (cont.)							
Psoralea esculenta		T	O	T	T		
Senecio plattensis		T	O	T	O		
Potentilla arguta	O	T	T	T	T		
Petalostemon candidum	O	O	O	O	T		
Heuchera richardsonii	O	T	O	T	T		
Comandra umbellata	T	T	T	T	T	O	
Solidago rigida	T	T	T	T	T	O	
Solidago nemoralis	T	T	T	T	T	O	O/T
Sisyrinchium campestre	T	T	T	T	O		
Solidago missouriensis	T	T	O	T	T		
Solidago ptarmicoides	T	T	T	T	T	O	
Allium stellatum	T	T		T	T	O	O
Lithospermum canescens	T	T	T	T	T	O	
Artemisia ludoviciana	T	T	O	T	T		
Petalostemon purpureum	O	T	T	T	T	O	O
Phlox pilosa (-NW)	O	O	O	T	T		
Aster laevis		T	O	T	T		
Coreopsis palmata (-NW)	T	T	T	T	T		
Viola pedatifida	T	T	T	T	T	O	
Cirsium flodmanii		T		T	T	O	
Lilium philadelphicum		O	O	T	T	O	
Zizia aptera		O	O	T	T	O	T
Zigadenus elegans		O	O	T	T	O	O
Oxalis violacea		O	O	T	T		
Asclepias speciosa		O			T	O	
Pedicularis canadensis			T	O	T	O	
Thalictrum dasycarpum				T	T	T	
Glycyrrhiza lepidota				O	T	O	
Helianthus maximilianii				O	T	O	O
Prenanthes racemosa				O	T	O	
Heliopsis helianthoides					T	O	
Liatris ligulistylis					T	T	T
Pycnanthemum virginianum					O	T	
Liatris pycnostachya					O	T	O
Aster novae-angliae					O	T	
Hypoxis hirsuta					O	T	
Zizia aura					O	T	
Gentiana andrewsii					O	T	
Lysimachia quadriflora					O	T	
Solidago riddellii					O	T	
Euthamia graminifolia					O	T	O
Plantago eriopoda							T
Shrubs							
Amorpha canescens	T	T	T	T	T		

Supplement to Appendix 3. Species of more restricted geographic distribution, species not so clearly indicative of prairie vegetation or species whose status is unknown.



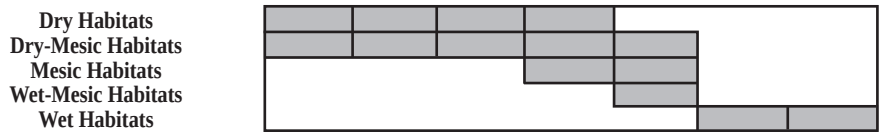
Species	Barrens	Gravel	Bluff	Hill	Mesic	Wet	Saline
Graminoids							
Agropyron trachycaulum var.unilat.		O		T	T		
Agropyron trachycaulum var. glauc.					O	T	T
Aristida basiramea (E)	T						
Calamagrostis canadensis						T	
Calamagrostis inexpansa (-SE)					O	T	T
Carex bebbii					O?	T?	
Carex bicknellii	O?			O?	T?	?	
Carex crawei (NW)					O	T	
Carex eleocharis (W)	?	T		O			
Carex filifolia (W)		T		O			
Carex foenea	T	O					
Carex hallii							T
Carex lanuginosa					O	T	
Carex meadii			O	T	T		
Carex muhlenbergii (E)	T	O					
Carex praegracilis (-SE)						O	T
Carex sartwellii						O	
Carex tetanica					O	T	
Cyperus schweinitzii	T						
Elymus canadensis					O?		
Eragrostis spectabilis	O	O?			O?		
Glyceria striata						T	
Helictotrichon hookeri (NW)		T					
Leptoloma cognatum (SE)	T						
Muhlenbergia glomerata						O	
Panicum lanuginosum						T	
Panicum oligosanthes		T	T	O	T		
Panicum perlongum	T	O	T	O			
Panicumwilcoxianum		T		T	O		
Sporobolus asper		O		T?	?	O	T
Sporobolus cryptandrus	T	O					
Stipa comata (W?)	T?	T		O			
Broad-leaved Herbs							
Agalinus aspera		?		T	O?		
Agalinus tenuifolia						O?	
Agoseris glauca (W)		T		T	T	O	
Allium canadense					?	T	
Allium textile (W)		T					
Ambrosia coronopifolia	T	?		?	T		T
Anemone canadensis					O	T	
Antennaria plantaginifolia	T	TA	O				
Apocynum sibiricum				O	T	T	
Asclepias incarnata						T	
Asclepias lanuginosa		?		T?			
Asclepias ovalifolia				O	T		
Asclepias tuberosa (SC, SE)	T	O	O	T	T		
Asclepias viridiflora	T	T	O	T			
Aster ericoides		T	T	T	T	O	T
Aster lanceolatus					O	T	O
Aster umbellatus (-SW)						O	
Astragalus adsurgens (W)		T		T			
Astragalus agrestis (W)				O	T	O	
Cacalia tuberosa (SE)					T?	T?	
Cerastium arvense	?	T		O?			
Cicuta maculata					O	T	
Cirsium muticum (-SW)						O	

Supplement to Appendix 3. (cont.)



Species	Barrens	Gravel	Bluff	Hill	Mesic	Wet	Saline
Broad-leaved Herbs (cont.)							
Cypripedium candidum					O	T	
Desmodium canadense					T	T	
Equisetum hymale	T?	?	O	T?			
Equisetum laevigatum		O			T?		
Erysimum inconspicuum		T?		T	O		
Eupatorium maculatum						T	
Euphorbia corollata (-W)	T	T	T	T	O?		
Euthamia gymnospermoides	O	O		T?	T?		
Gaillardia aristata		T		O?			
Galium boreale	O	T	O	T	T	O	
Gaura coccinea (W)		T		T	O		
Gentiana puberulenta		?	?	T	T		
Gentianopsis crinita						O	
Gentianopsis procera (-S)			O			O	
Helenium autumnale					O	T	
Helianthemum bicknellii (-SW)	T						T
Helianthus giganteus					O	T	
Helianthus grosseserratus					O	T	
Helianthus occidentalis (-W)	T		O	?	T?		
Hudsonia tomentosa	T						
Kuhnia eupatorioides		T	T	T			
Lactuca ludoviciana		?		T	O		
Lactuca pulchella	?	T		T	O		
Lathyrus palustris					O	T	
Lathyrus venosus					T		
Lechea stricta (-W)	T	T	O	?			
Lespedeza capitata	T	O	O		O		
Lilium michiganense (-W)						T	
Linum rigidum (-E?)		T		O			
Linum sulcatum		T	T	T	T		
Lithospermum caroliniense (E) T	T	O	O?				
Lobelia kalmii (N)						O	
Lobelia siphilitica (-N)						T	
Lobelia spicata			T	O	T	O	
Lomatium orinetale (W)		T		O			
Lythrum alatum						T	
Nothocalais cuspidata (-NW)		T		O			
Oenothera nutallii (NW?)	T	T		?			
Onosmodium molle		O	O	O	T		
Oxytropis lambertii (W)		T		T			
Pedicularis lanceolata						T	
Penstemon albidus (W)		T		O			
Penstemon gracilis	?	T	O	O?	O?		
Physalis heterophylla				O	T		
Physalis virginiana	O	T	T	T	O		
Polygala senega					T	?	
Polygala verticillata		O		T?	O		
Potentilla pensylvanica (-SE)		T		T			
Ranunculus rhomboideus	O	O	O?	T	O		
Ratibida columnifera (W?)		T		T	O		
Ratibida pinnata (S)			T	O	T		
Senecio aureus						T?	
Senecio integerrimus					T?	?	
Senecio pseudaureus						T	
Silphium laciniatum (S)		T?	T	T	O		
Sisyrinchium montanum					T		
Sisyrinchium mucronatum						T	
Solidago gigantea						T	
Solidago speciosa	T?	O?	O?	O?	T		

Supplement to Appendix 3. (cont.)



Species	Barrens	Gravel	Bluff	Hill	Mesic	Wet	Saline
Broad-leaved Herbs (cont.)							
Tradescantia bracteata					T?	O	
Verbena stricta	T?	T	T	T	O		
Vernonia fasciculata						T	
Shrubs							
Amorpha nana (-SE)					T	O	
Ceanothus americanus (-W)	O	O	O	T?			
Ceanothus herbaceus (-W)							
Rosa arkansana	?	T	T	T	T?		
Rosa blanda					T?	?	?
Salic humilis (-SW)	T	T	O	?	T		
Spirea alba						T	
Symphoricarpos occidentalis		T		T	T		

Appendix 2: Species Observed in Remnant Mesic Prairie Type

Genus	Species	Species Author	Variety or Subspecies Author	Common Name
Understory Trees				
Quercus	*macrocarpa*			Bur oak
Juniperus	*virginiana*	L.		Eastern red cedar
Populus	*deltoides*			Eastern cottonwood
Ulmus	*americana*	L.		American elm
Shrubs				
Symphoricarpos	*occidentalis*	Moench		Wolfberry
Amorpha	*canescens*	Pursh		Lead plant
Amorpha	*nana*			Lead plant
Rhus	*glabra*			Smooth sumac
Prunus	*pumila*			Sand cherry
Amelanchier	*alnifolia*			Juneberry
Forbs				
Phlox	*pilosus*			Downy phlox
Artemesia	*ludoviciana*	Nutt.		Prairie sage
Rosa	*arkansana*			Prairie rose
Liatris	*aspera*			Rough blazing star
Liatris	*punctata*			Dotted blazing star
Aster	*sericeus*			Silvery aster
Ambrosia	*artemissiifolia*			Common ragweed
Galium	*boreale*			Northern bedstraw
Glycyrrhiza	*lepidota*	Nutt.		Wild licorice
Cirsium	*discolor*	Spreng.		Pasture thistle
Lilium	*philadelphicum*			Wood lily
Liatris	*ligulistylis*			Plains blazing star
Solidago	*rigida*	L.		Stiff goldenrod
Lithospermum	*canescens*			Hoary puccoon
Heliopsis	*helianthoides*	L.		Smooth oxeye
Solidago	*nemoralis*	Aiton		Gray goldenrod
Cicuta	*maaculata*			Water hemlock
Geum	*triflorum*			Prairie smoke
Sisyrinchium	campestre			Field blue-eyed grass
Echinacea	*angustifolia*			Purple coneflower
Pedicularis	*canadensis*	L.		Wood betony
Petalostemon	*purpureum*	Vent.		Purple prairie clover
Coreopsis	*palmata*			Coreopsis
Rudbeckia	*hirta*	L.		Black-eyed Susan
Psoralea	*argophyllum*	Pursh		Silverleaf scurfpea
Zizea	*aurea*			Golden alexanders
Comandra	*umbellata*			Bastard toadflax
Calylophus	*serrulatus*			Toothed evening primrose
Chrysopsis	*villosa*			Golden aster

Anemone	*cylindrica*			Long-headed thimbleweed
Erigeron	*strigosus*			Daisy fleabane
Monarda	*fistulosa*	L.		Wild bergamot
Physalis	*virginiana*	Mill.		Ground cherry
Tradescanti	*bracteata*			Spiderwort
Heuchera	*americana*			Alum root
Potentilla	*arguta*	Pursh		Prairie quinquefoil
Artemisia	*dracunculus*			wormwood
Petalostemon	*candidum*			White prairie-clover
Convovulus	*sepium*			Hedge bindweed
Delphinium	*virescens*	Nutt.		White larkspur
Astragalus	*crassicarpus*			Ground plum
Linum	*rigidum*	Pursh		Flax
Asclepias	*viridflora*			Green milkweed
Anemone	*canadense*	L.		Meadow anemone
Achillea	*millefolium*	L.		Yarrow
Heleanthus	*grosseserratus*			Sawtooth sunflower
Hypoxis	*hirsuta*	L.		Yellow star grass
Helianthus	*maximiliani*	Schrad.		Maximilian's sunflower
Lobelia	*spicata*	Lam.		Pale spiked lobelia
Lycopus	*americana*			American bugleweed
Apocynum	*sibericum*	Jacq.		Dogbane
Solidago	*missouriensis*			Missouri goldenrod
Thalictrum	*dasycarpum*	Fisch. & Ave-Lall.		Purple meadow rue
Astragalus	*agrestis*	Douglas		
Zigadenus	*glaucaus*	Nutt.		White camas
Cirsium	*undulatum*			Thistle
Cirsium	*flodmanii*			Flodman's thistle
Vicia	*americana*	Willd.		American vetch
Zizia	*aptera*			Heart-leaved alexanders
Fragaria	*virginiana*			Strawberry
Grasses, Rushes and Sedges				
Stipa	*spartea*			Porcupine grass
Stipa	*comatas*	Trin. & Rupr.		Needle-and-thread
Andropogon	*scoparius*			Little bluestem
Andropogon	*gerardii*			Big bluestem
Spartina	*pectinata*			Cord grass
Koeleria	*macrantha*			June grass
Panicum	*wilcoxianum*	Vasey		Wilcox's panic grass
Panicum	*virgatum*			Panic grass
Carex	*sartwellii*			Sartwell's sedge
Panicum	*liebergii*	Vasey		Prairie panic grass

Sorghastrum	*nutans*			Indian grass
Carex	*gravida*	L.H.Baily		Heavy sedge
Bouteloua	*curtipendula*			Side-oats grama
Carex	*granularis*	Willd.		Pale sedge
Carex	*pellita*			Wooly sedge
Carex	*vulpinoidea*			Fox sedge
State listed or rare species				
Cyprepedium	*candidum*	Willd.		Small white ladyslipper
Exotic Invasive Species				
Melilotus	*officinalis*	L.		Yellow sweet clover
Melilotus	*alba*	Medik.		White sweet clover
Cirsium	*arvense*	(L.) Scop.		Canada thistle
Polygonum	*convolvulus*	L.		Black bindweed
Asclepias	*syriaca*			Common milkweed
Rumex	*crispus*	L.		Curly dock
Tragopogon	*pratensis*	L.		Goat's beard
Carduus	*nutans*			Musk thistle
Bromus	*inermis*			Smooth brome
Ulmus	*pumila*			Siberian elm
Phleum	*pratense*			Timothy
Poa	*compressa*			Canada bluegrass
Poa	*pratensis*	L.		Kentucky bluegrass

Appendix 3: Species Observed in Dry Prairie Southwest Type

Genus	Species	Species Author	Variety or Subspecies Author	Common Name
Understory Trees				
Fraxinus	*pennsylvanica*	Marsh.		Green ash
Quercus	*macrocarpa*			Bur oak
Juniperus	*virginiana*	L.		Eastern red cedar
Populus	*deltoides*			Eastern cottonwood
Ulmus	*americana*	L.		American elm
Shrubs				
Symphoricarpos	*occidentalis*	Moench		Wolfberry
Amorpha	*canescens*	Pursh		Lead plant
Amorpha	*nana*			Lead plant
Rhus	*glabra*			Smooth sumac
Prunus	*pumila*			Sand cherry
Amelanchier	*alnifolia*			Juneberry
Forbs				
Plantago	*aristida*	Michx.		Poor Joe
Artemesia	*ludoviciana*	Nutt.		Prairie sage
Rosa	*arkansana*			Prairie rose
Liatris	*aspera*			Rough blazing star
Liatris	*punctata*			Dotted blazing star
Aster	*sericeus*			Silvery aster
Ambrosia	*artemissiifolia*			Common ragweed
Silene	*antirrhina*	L.		Sleepy catchfly
Cirsium	*discolor*	Spreng.		Pasture thistle
Lilium	*philadelphicum*			Wood lily
Verbena	*stricta*	Vent.		Hoary vervain
Asclepias	*verticellata*			Whorled milkweed
Asclepias	*viridiflora*			Green milkweed
Heterotheca	*villosa*			Hairy false golden aster
Solidago	*rigida*	L.		Stiff goldenrod
Lithospermum	*canescens*			Hoary puccoon
Heliopsis	*helianthoides*	L.		Smooth oxeye
Solidago	*nemoralis*	Aiton		Gray goldenrod
Viola	*palmata*			Bearded birdfoot violet
Sisyrinchium	campestre			Field blue-eyed grass
Echinacea	*angustifolia*			Purple coneflower
Pedicularis	*canadensis*	L.		Wood Betony
Petalostemon	*purpureum*	Vent.		Purple prairie clover
Coreopsis	*palmata*			Coreopsis
Rudbeckia	*hirta*	L.		Black-eyed Susan
Psoralea	*argophyllum*	Pursh		Silverleaf scurfpea
Zizea	*aurea*			Golden alexanders
Comandra	*umbellata*			Bastard toadflax

Calylophus	*serrulatus*			Toothed evening primrose
Chrysopsis	*villosa*			Golden aster
Anemone	*cylindrica*			Long-headed thimbleweed
Erigeron	*strigosus*			Daisy fleabane
Monarda	*fistulosa*	L.		Wild bergamot
Physalis	*virginiana*	Mill.		Ground cherry
Tradescanti	*bracteata*			Spiderwort
Heuchera	*americana*			Alum root
Potentilla	*arguta*	Pursh		Prairie quinquefoil
Artemisia	*dracunculus*			wormwood
Petalostemon	*occidentale*			White prairie-clover
Convovulus	*sepium*			Hedge bindweed
Delphinium	*virescens*	Nutt.		White larkspur
Astragalus	*crassicarpus*			Ground plum
Linum	*rigidum*	Pursh		Flax
Anemone	*canadense*	L.		Meadow anemone
Achillea	*millefolium*	L.		Yarrow
Heleanthus	*grosseserratus*			Sawtooth sunflower
Helianthus	*maximiliani*	Schrad.		Maximilian's sunflower
Lepidium	*densiflorum*			Peppergrass
Fragaria	*virginiana*			Strawberry
Grasses, Rushes and Sedges				
Stipa	*spartea*			Porcupine grass
Stipa	*comatas*	Trin. & Rupr.		Needle-and-thread
Andropogon	*scoparius*			Little bluestem
Bouteloua	*gracilis*			Blue grama
Bouteloua	*hirsuta*	Lag.		Hairy grama
Koeleria	*macrantha*			June grass
Panicum	*wilcoxianum*	Vasey		Wilcox's panic grass
Carex	*gravida*			Heavy sedge
Carex	*heliophila*			Sun-loving sedge
Carex	*filifolia*			Thread-leaved sedge
Panicum	*liebergii*	Vasey		Prairie panic grass
Sorghastrum	*nutans*			Indian grass
Bouteloua	*curtipendula*			Side-oats grama
Sporobolis	*heterolepis*	A.Gray		Prairie dropseed
Muhlenbergia	*cuspidata*			Plains muhly
State listed or rare species				
Astragalus	*missouriensis*			Missouri milk-vetch
Exotic Invasive Species				
Melilotus	*officinalis*	L.		Yellow sweet clover
Melilotus	*alba*	Medik.		White sweet clover
Cirsium	*arvense*	(L.) Scop.		Canada thistle

Polygonum	*convolvulus*	L.		Black bindweed
Rumex	*crispus*	L.		Curly dock
Tragopogon	*pratensis*	L.		Goat’s beard
Carduus	*nutans*			Musk thistle
Bromus	*inermis*			Smooth brome
Bromus	*tectorum*			Cheet
Phleum	*pratense*			Timothy
Poa	*compressa*			Canada bluegrass
Poa	*pratensis*	L.		Kentucky bluegrass

Appendix 4: Species Observed in Wet Prairie Type

Genus	Species	Species Author	Variety or Subspecies Author	Common Name
Understory Trees				
Populus	*deltoides*			Eastern cottonwood
Fraxinus	*pennsylvanica*			Green ash
Ulmus	*americana*	L.		American elm
Shrubs				
Symphoricarpos	*occidentalis*	Moench		Wolfberry
Amorpha	*canescens*	Pursh		Lead plant
Spirea	*alba*			Steeplebush
Rhus	*glabra*			Smooth sumac
Prunus	*pumila*			Sand cherry
Amelanchier	*alnifolia*			Juneberry
Forbs				
Phlox	*pilosus*			Downy phlox
Artemesia	*ludoviciana*	Nutt.		Prairie sage
Rosa	*arkansana*			Prairie rose
Liatris	*aspera*	Michx.		Rough blazing star
Liatris	*spicata*	Willd.		Gay feather blazing star
Aster	*sericeus*			Silvery aster
Ambrosia	*artemissiifolia*			Common ragweed
Galium	*boreale*			Northern bedstraw
Glycyrrhiza	*lepidota*	Nutt.		Wild licorice
Lilium	*philadelphicum*			Wood lily
Liatris	*ligulistylis*			Plains blazing star
Sium	*suave*			Water parsnip
Ranunculus	*longirostris*			White buttercup
Cicuta	*maaculata*			Water hemlock
Geum	*triflorum*			Prairie smoke
Sisyrinchium	*campestre*			Field blue-eyed grass
Rudbeckia	*hirta*	L.		Black-eyed Susan
Psoralea	*argophyllum*	Pursh		Silverleaf scurfpea
Zizea	*aurea*			Golden alexanders
Chrysopsis	*villosa*			Golden aster
Anemone	*cylindrica*			Long-headed thimbleweed
Erigeron	*strigosus*			Daisy fleabane
Monarda	*fistulosa*	L.		Wild bergamot
Potentilla	*arguta*	Pursh		Prairie quinquefoil
Convovulus	*sepium*			Hedge bindweed
Asclepias	*incarnata*			Swamp milkweed
Anemone	*canadense*	L.		Meadow anemone
Polygonum	*amphibium*			Water smartweed
Hypoxis	*hirsuta*	L.		Yellow star grass

Helianthus	*maximiliani*	Schrad.		Maximilian's sunflower
Lobelia	*spicata*	Lam.		Pale spiked lobelia
Lycopus	*americana*			American bugleweed
Apocynum	*sibericum*	Jacq.		Dogbane
Solidago	*missouriensis*			Missouri goldenrod
Thalictrum	*dasycarpum*	Fisch. & Ave-Lall.		Purple meadow rue
Zigadenus	*glaucaus*	Nutt.		White camas
Vicia	*americana*	Willd.		American vetch
Zizia	*aptera*			Heart-leaved alexanders
Fragaria	*virginiana*			Strawberry
Grasses, Rushes and Sedges				
Typha	*latifolia*			Broad-leaved cattail
Andropogon	*gerardii*			Big bluestem
Scripus	*fluviatilis*			River bulrush
Spartina	*pectinata*			Cord grass
Panicum	*virgatum*			Panic grass
Carex	*sartwellii*	Dewey		Sartwell's sedge
Panicum	*liebergii*	Vasey		Prairie panic grass
Glyceria	*striata*	Hitchcock		Fowl manna grass
Calamagrostis	*canadensis*			Canada bluejoint
Sorghastrum	*nutans*			Indian grass
Scirpus	*validus*			Soft-stemmed bulrush
Carex	*granularis*	Willd.		Pale sedge
Carex	*praegracilis*	Boot		Expressway sedge
Carex	*pellita*	Willd.		Wooly sedge
Carex	*vulpinoidea*	Michx.		Fox sedge
State listed or rare species				
Cyprepedium	*candidum*	Willd.		Small white ladyslipper
Exotic Invasive Species				
Melilotus	*officinalis*	L.		Yellow sweet clover
Melilotus	*alba*	Medik.		White sweet clover
Cirsium	*arvense*	(L.) Scop.		Canada thistle
Polygonum	*convolvulus*	L.		Black bindweed
Rumex	*crispus*	L.		Curly dock
Tragopogon	*pratensis*	L.		Goat's beard
Phalaris	*arundinacea*			Reed canary grass
Bromus	*inermis*			Smooth brome
Ulmus	*pumila*			Siberian elm
Phleum	*pratense*			Timothy
Poa	*compressa*			Canada bluegrass
Poa	*pratensis*	L.		Kentucky bluegrass

Appendix 5: Species Observed in Rock Outcrop Southwest Type

Genus	Species	Species Author	Variety or Subspecies Author	Common Name
Understory Trees				
Fraxinus	*pennsylvanica*	Marsh.		Green ash
Quercus	*macrocarpa*			Bur oak
Ulmus	*americana*	L.		American elm
Shrubs				
Symphoricarpos	*occidentalis*	Moench		Wolfberry
Amorpha	*canescens*	Pursh		Lead plant
Amorpha	*nana*			Lead plant
Rhus	*glabra*			Smooth sumac
Amelanchier	*alnifolia*			Juneberry
Spiraea	*alba*	Du Roi		Meadowsweet
Salix	*exigua*	Nutt.	(Rowlee) Cronq.	Sandbar willow
Forbs				
Plantago	*aristida*	Michx.		Poor Joe
Artemesia	*ludoviciana*	Nutt.		Prairie sage
Rosa	*arkansana*			Prairie rose
Talinum	*parviflorum*			Fame flower
Allium	*stelllatum*	Ker Gawl.		Prairie onion
Aster	*sericeus*			Silky aster
Ambrosia	*artemissiifolia*			Common ragweed
Silene	*antirrhina*	L.		Sleepy catchfly
Cirsium	*discolor*	Spreng.		Pasture thistle
Houstonia	*longifolia*	Gaertn.		Long-leaved bluets
Verbena	*stricta*	Vent.		Hoary vervain
Solidago	*rigida*	L.		Stiff goldenrod
Solidago	*nemoralis*	Aiton		Gray goldenrod
Viola	*palmata*			Bearded birdfoot violet
Sisyrinchium	campestre			Field blue-eyed grass
Penstemon	*gracilis*	Nutt.		Slender beardtongue
Pedicularis	*canadensis*	L.		Wood Betony
Petalostemon	*purpureum*	Vent.		Purple prairie clover
Oxytropis	*lambertii*			Lambert's locoweed
Lathyrus	*venosa*			Veiny pea
Psoralea	*argophyllum*	Pursh		Silverleaf scurfpea
Zizea	*aurea*			Golden alexanders
Comandra	*umbellata*			Bastard toadflax
Calylophus	*serrulatus*			Toothed evening primrose
Chrysopsis	*villosa*			Golden aster
Anemone	*cylindrica*			Long-headed thimbleweed
Erigeron	*strigosus*			Daisy fleabane

Potentilla	*pensylvanica*	Douglas		Prairie quiqefoil
Physalis	*virginiana*	Mill.		Ground cherry
Tradescanti	*bracteata*			Spiderwort
Heuchera	*americana*			Alum root
Potentilla	*arguta*	Pursh		Prairie quinquefoil
Convovulus	*sepium*			Hedge bindweed
Delphinium	*virescens*	Nutt.		White larkspur
Polygonum	*aronastrum*			Knotweed
Anemone	*canadense*	L.		Meadow anemone
Achillea	*millefolium*	L.		Yarrow
Gratiola	*lutea*			Water hyssop
Lepidium	*densiflorum*			Peppergrass
Fragaria	*virginiana*			Strawberry
Grasses, Rushes and Sedges				
Stipa	*spartea*			Porcupine grass
Stipa	*comatas*	Trin. & Rupr.		Needle-and-thread
Andropogon	*scoparius*			Little bluestem
Bouteloua	*gracilis*			Blue grama
Bouteloua	*hirsuta*	Lag.		Hairy grama
Koeleria	*macrantha*			June grass
Panicum	*wilcoxianum*	Vasey		Wilcox's panic grass
Carex	*heliophila*			Sun-loving sedge
Carex	*filifolia*			Thread-leaved sedge
Carex	*gravida*			Heavy sedge
Panicum	*liebergii*	Vasey		Prairie panic grass
Eleocharis	*obtusa*	Willd.		Blunt spike rush
Eleocharis	*smallii*	Britton		Marsh spike rush
Juncus	*interior*	Wiegand		Inland rush
Sporobolis	*heterolepis*	A.Gray		Prairie dropseed
Alopecurus	*carolinianus*	Walter		Carolina foxtail
Muhlenbergia	*cuspidata*			Plains muhly
Eleocharis	*compressa*	Steud.		Flat spike rush
Carex	*bebbii*			Bebb's sedge
Carex	*pellita*	Muhl.		Woolly sedge
State listed or rare species				
Escobaria	*vivipara*	Nutt.		Ball cactus
Opuntia	*macrorhiza*			Plains prickly pear
Bacopa	*rotundifolia*	Michx.		Water hyssop
Limosella	*aquatica*			Mudwort
Exotic Invasive Species				
Phalaris	*arundinacea*	L.		Reed canary-grass
Cirsium	*arvense*	(L.) Scop.		Canada thistle

Polygonum	*convolvulus*	L.		Black bindweed
Rumex	*crispus*	L.		Curly dock
Cirsium	*vulgare*	(Savi) Tenore		Bull thistle
Bromus	*inermis*			Smooth brome
Bromus	*tectorum*			Cheet
Phleum	*pratense*			Timothy
Poa	*compressa*			Canada bluegrass
Poa	*pratensis*	L.		Kentucky bluegrass

APPENDIX E
COMMENTS

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

March 25, 2005

MAR 3 0 2005

HDR Engineering, Inc.

[200560053]

Ms. Michelle Bissonnette – Project Manager
HDR Engineers, Inc.
6190 Golden Hills Drive
Minneapolis, MN 55416

Dear Ms. Bissonnette:

We have reviewed your request for Department of the Army, Corps of Engineers (Corps) jurisdictional wetland determination on a parcel of land located in several Sections in Townships 156, 157 and 158, Range 71, 72, 73 West, Pierce County, North Dakota.

Through Section 404 of the Clean Water Act the Corps regulates the discharge of dredged or fill material into waters of the United States. Waters of the United States may include, but are not limited to, lakes, ponds, rivers, streams, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, and vernal pools. Based on the information that you provided to this office, we have made a preliminary determination that Section 33, T157N, R72W; Section 6, T156N, R72W; and Section 1, T156N, R73W appear to contain jurisdictional waters of the United States. Therefore, should the proposed project and/or associated construction activities result in the discharge of dredged or fill material into waters of the United States, a Corps permit may be required. If however, the project and associated work can be accomplished by avoiding impacts to waters of the United States, a Corps permit would not be required.

In order for the Corps to fully review the proposed mitigation project for Section 404 authorization, a completed Corps of Engineers permit application must be submitted to this office. Should construction activities associated with this project result in impacts to waters of the United States, please complete and submit the enclosed permit application to the U.S. Army Corps of Engineers, North Dakota Regulatory Office, 1513 South 12th Street, Bismarck, North Dakota 58504. It is essential to identify all impacts to waters of the United States resulting from the proposed project.

Should you have any questions regarding this determination, please do not hesitate to contact this office at telephone number (701)-255-0015 or at the letterhead address and reference project number 200560053.

Sincerely,

Jason Renschler
Project Manager
North Dakota Regulatory Office

Enclosure

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
SOUTH DAKOTA REGULATORY OFFICE
28563 POWERHOUSE ROAD, ROOM 118
PIERRE SD 57501-6174

REPLY TO
ATTENTION OF :

May 2, 2005

South Dakota Regulatory Office
28563 Powerhouse Road, Room 118
Pierre, South Dakota 57501

HDR Engineering Inc
Attn: Michelle Bissonnette
6190 Golden Hills Drive
Minneapolis, Minnesota 55416

Dear Ms. Bissonnette:

Reference is made to the preliminary information received April 27, 2005, concerning Department of the Army authorization requirements for construction of new 230 kV transmission facilities, in Grant and Deuel Counties, South Dakota.

The Corps' jurisdiction is derived from Section 10 of the Rivers and Harbors Act of March 3, 1899, and Section 404 of the Clean Water Act passed by Congress in 1972. Section 10 calls for Federal regulation of activities in or affecting navigable waters of the United States including adjacent wetlands. Waterways and their adjacent wetlands in South Dakota subject to regulation under the provisions of Section 10 include the Missouri River, the James River, the lower five miles of the Big Sioux River and Lake Traverse (Bois de Sioux River). Section 404 calls for Federal regulation of the discharge of dredged or fill material into certain waterways, lakes and/or wetlands (i.e. waters of the United States), including the above noted navigable waters. Activities that do not involve work in or affecting navigable waters (Section 10) or activities that do not involve a discharge of dredged or fill material into waters of the United States (Section 404) do not require Department of the Army authorization.

Based on the preliminary information provided, it can not be determined if the proposed construction activities involve the discharge of dredged or fill material into waters subject to Federal regulation. Therefore, a Department of the Army permit may be required. For our final determination and for processing of permits, we would ask that the project proponent submit final plans when they become available.

Enclosed is the necessary application form (ENG Form 4345) and information pamphlet. When completing the application form, we would request from the applicant (a) a detailed description of the work activity [i.e., explain precisely what you are going to do and how you are going to accomplish it; include fill and/or excavation quantities and dimensions to be performed below the ordinary high water elevation (if in a lake, river or stream) or to be performed within the boundary of jurisdictional wetlands (if the project involves wetlands), along with the source/type of fill and the type of equipment to be used during construction]; (b) the purpose, need and/or benefits of the proposed project; and (c) any alternative project designs or locations considered.

Along with the completed application form, we would request from the applicant (1) detailed drawings (plan and cross-sectional views; the drawings should be submitted on 8-1/2x11 inch paper), (2) location map(s) showing all jurisdictional work sites (i.e., where the utility line will be placed in a waterway, lake, and/or wetland). Any crossing that will exceed 500 feet in length will need to be clearly identified. (3) a delineation of affected wetlands if the project involves wetlands, (4) if available, colored pictures showing at least two views of the proposed project site(s) and (5) any ecological or environmental information available that you feel may be pertinent to your project (i.e., area wildlife activity, area vegetation, area land use, quality of fishery, etc.).

Adherence to the above information requests will speed up the application evaluation and permit processing time. The requested information is used to help the Corps determine the type of permit to process if a permit is required and is used in the public review.

Regarding your request for comment relative to environmental impacts, this office assesses project impacts, including environmental impacts, after receipt of the detailed, site specific information required via our permit application process. However, in general terms, utility line crossings of waters of the United States generally result in minimal impact and are typically permitted under Nationwide Permit No. (12) found in the

January 15, 2002, Federal Register, Issuance of Nationwide Permits; Notice (67 FR 2020-2095) and the February 13, 2002, Federal Register, Issuance of Nationwide Permits; Notice Correction (67 FR 6692-6695).

Please note that you must notify the Corps of Engineers in the form of a permit application to do work under this Nationwide Permit when one or more of the following criteria apply to the proposed project:

a. Mechanized landclearing in a forested wetland.
b. The utility line crosses one of the above noted navigable waterways that is subject to regulation under Section 10 of the Rivers and Harbors Act.
c. The utility line in waters of the United States, excluding overhead lines, exceeds 500 feet.
d. The utility line is placed within a jurisdictional area (i.e., a water of the United States), and it runs parallel to a streambed that is within that jurisdictional area.
e. Discharges associated with the construction of utility line substations that result in the loss of greater than 1/10th acre of water of the United States.
f. Permanent access roads constructed above grade in waters of the United States for a distance of more than 500 feet; of
g. Permanent access roads constructed in waters of the United States with impervious materials. (Section 10 and 404).

You can obtain additional information about the Regulatory Program and download forms from our website: https://www.nwo.usace.army.mil/html/od-rsd/frame.html

If you have any questions or need any assistance, please feel free to contact this office at the above Regulatory Office address or telephone (605) 224-8531.

Sincerely,

Steven E. Naylor
Regulatory Program Manager,
South Dakota

Enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

May 13, 2005

Michelle F. Bissonnette
HDR Engineering, Inc.
6190 Golden Hills Drive
Minneapolis, Minnesota 55416

Re: Big Stone Transmission Project in Deuel and Grant Counties, South Dakota

Dear Ms. Bissonnette:

This letter is in response to your request dated April 21, 2005, for environmental comments regarding the above referenced project which involves construction of new transmission lines in Minnesota and South Dakota to support a proposed 600-MW coal-fired power plant in Big Stone, South Dakota. Transmission routes presented in your letter indicate that proposed South Dakota lines may be installed in Grant and Deuel Counties parallel to the South Dakota/ Minnesota border.

According to National Wetlands Inventory maps (available online at http://wetlands.fws.gov/), numerous wetlands exist within the proposed construction corridor. If a project may impact wetlands or other important fish and wildlife habitats, the U.S. Fish and Wildlife Service (Service), in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible; then minimization of any adverse impacts; and finally, replacement of any lost acres; in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland acres to be impacted and the methods of replacement should be prepared and submitted to the resource agencies for review.

Our records indicate that the Service holds easements on some of the properties included in the proposed transmission corridor. For exact locations of these easements and any additional restrictions that may apply regarding these sites within Deuel County, you will need to contact the Service's Madison Wetland Management District at P.O. Box 48, Madison, South Dakota 57042, Telephone No. (605) 256-2974. For easement issues in Grant County, please contact the Service's Waubay Wetland Management District at 44401 134A Street, Waubay, South Dakota 57273, Telephone No. (605) 947-4521.

The proposed transmission corridor crosses the following waterways that have been classified by the Service as Type II High Priority Fisheries Resources: Whetsone River, North Fork Yellow Bank River, Monighan Creek, West Fork Lac Qui Parle Creek, and Cobb Creek. As per a telephone conversation with you on May 11, 2005, the proposed transmission lines are to be

installed as overhead lines, not buried. In the unlikely event that some of these lines may be buried, we suggest contacting this office again for recommendations regarding minimizing impacts due to stream-crossings.

The primary concern of the Service in regard to overhead power lines is the threat of electrocution to raptors (hawks, owls, eagles, and falcons). Thousands of these birds, including endangered species, are killed annually as they attempt to utilize overhead power lines as nesting, hunting, resting, feeding, and sunning sites. The Service recommends the installation of underground, rather than overhead, powerlines whenever possible and appropriate to minimize environmental disturbances. For all new overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent raptor electrocutions. The publication entitled "Suggested Practices for Raptor Protection on Power Lines - The State of the Art in 1996" has many good suggestions, including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute via their website at www.eei.org or by calling 1-800-334-5453.

However, please note that the spacing recommendation within the "Suggested Practices . . ." publication of at least 60 inches between conductors or features that cause grounding may not be protective of larger raptors such as eagles. This measure was based on the fact that the skin-to-skin contact distance on these birds (i.e., talon to beak, wrist to wrist, etc.) is less than 60 inches. An adult eagle's wingspan (distance between feathertips) may vary from 70 to 90 inches depending on the species (golden or bald) and gender of the bird. Unfortunately, wet feathers in contact with conductors and/or grounding connections can result in a lethal electrical surge. Thus, the focus of the above precautionary measures should be to a) provide more than 90 inches of spacing between conductors or grounding features, b) insulate exposed conducting features so that contact will not cause raptor electrocution, and/or c) prevent raptors from perching on the poles in the first place.

Additionally, utilizing just one of the "Suggested Practices . . ." methods may not entirely remove the threat of electrocution to raptors. In fact, improper use of some methods may increase electrocution mortality. Perch guards, for example, may be only partially effective as some birds may still attempt to perch on structures with misplaced or small-sized guards and suffer electrocution as they approach too close to conducting materials. Among the most dangerous structures to raptors are poles that are located at a crossing of two or more lines, exposed above-ground transformers, or dead end poles. Numerous hot and neutral lines at these sites, combined with inadequate spacing between conductors, increases the threat of raptor electrocutions. Perch guards placed on other poles have in some cases served to actually shift birds to these more dangerous sites, increasing the number of mortalities. Thus, it may be necessary to utilize other methods or combine methods to achieve the best results. The same principles may be applied to substation structures.

In addition to electrocution, power lines located adjacent to wetlands or crossing streams may increase the threat of line strike mortality to migratory birds. In situations where these lines are adjacent to large wetlands or where waters exist on opposite sides of the lines, we recommend marking them in order to make them more visible to birds. Orange or yellow aviation balls are frequently used for this purpose. We encourage the use of yellow balls, preferably with a vertical black stripe around the center, as these have been shown to be most effective in preventing line strikes by birds. Most bird strikes occur at mid-span; thus, balls should be placed at least along the central portion of a span. For spans 50 meters or less, place one ball at the center of the span. For more information on bird strikes, please see "Mitigating Bird Collisions With Power Lines:

The State of the Art in 1994" which may be obtained by contacting the Edison Electric Institute at the same website and telephone number listed above.

Additional information regarding simple, effective ways to prevent raptor electrocutions on power lines is available in video form. "Raptors at Risk" may be obtained by contacting EDM International, Inc. at 4001 Automation Way, Fort Collins, Colorado 80525-3479, Telephone No. (970) 204-4001, or by visiting their website at http://www.edmlink.com/raptorvideo.htm.

Although the size, design, and spacing of devices on transmission lines (as compared to relatively smaller distribution lines) may preclude some of the concerns described above, the Service still recommends that, if burial of the lines is not possible, every effort be made to minimize the electrocution and collision risk posed to migratory birds by these structures.

Although the "Suggested Practices . . ." publications and "Raptors at Risk" video will provide protective recommendations for migratory birds, implementation of these recommendations alone will not remove any liability should violations of the law occur. Please be apprised of the potential application of the Migratory Bird Treaty Act of 1918 (MBTA), as amended, 16 U.S.C. 703 et seq., and the Bald Eagle Protection Act of 1940 (BEPA), as amended, 16 U.S.C. 668 et seq., to your project. The MBTA does not require intent to be proven and does not allow for "take," except as permitted by regulations. Section 703 of the MBTA provides: "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner, to . . . take, capture, kill, attempt to take, capture, or kill, possess . . . any migratory bird, any part, nest, or eggs of any such bird . . . ." The BEPA prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing activities.

In accordance with section 7(c) of the Endangered Species Act, as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

Species	Status	Expected Occurrence
Bald eagle (Haliaeetus leucocephalus)	Threatened	Migration, Winter Resident, Possible Nesting.
Western prairie fringed orchid (Platanthera praeclara)	Threatened	Possible Habitat, No Recent Specimens.

Bald eagles occur throughout South Dakota, and new nests are appearing each year. One known nest is located very near Big Stone City in Grant County. No construction should occur within one-quarter mile of any known active bald eagle nest. The species' nesting season is January to August. Any nests found should be reported to this office.

The Western prairie fringed orchid has not recently been documented in South Dakota. However it is recognized that the life cycle of the plant often makes it difficult to detect. Additionally, populations currently exist in the neighboring states of Nebraska, Minnesota, and North Dakota, and potential habitat may still be found in South Dakota. Although the plant is typically associated with intact native prairie, the Western prairie fringed orchid has also been found on disturbed sites. Potential habitats generally include mesic upland prairies, wet prairies, sedge meadows, subirrigated prairies, and swales in sand dune complexes. If these habitats exist within the State Highway 42 corridor, surveys for the Western prairie fringed orchid should be considered prior to construction.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

Additionally, the Dakota skipper (Hesperia dacotae) has been located in areas adjacent to the proposed transmission line corridor; thus, it may occur on native prairie areas within the proposed transmission corridor in Grant and Deuel Counties. The Dakota skipper is a candidate species and accordingly is not at present provided Federal protection under the Endangered Species Act. It's candidate status defines this small prairie butterfly as a species in decline that the Service believes needs to be listed as threatened or endangered, but listing is currently precluded by other priorities.

Dakota skippers are obligate residents of high quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed grass prairie. In northeastern South Dakota, Dakota skippers inhabit dry-mesic hill prairies with abundant purple coneflower but also use mesic to wet-mesic tallgrass prairie habitats characterized by wood lily and smooth camas. Avoidance of impacts to potential Dakota skipper habitat is recommended. Of all states, populations in South Dakota may be the strongest and most interconnected in the United States. It has been suggested that up to six groups of local populations interconnected by dispersal may occur in South Dakota.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 34.

Sincerely,

Pete Gober
Field Supervisor
South Dakota Field office

cc: FWS/Twin Cities ES, Bloomington, MN
FWS/Waubay WMD; Waubay, SD
FWS/Madison WMD; Madison, SD

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

May 18, 2005

Bruce Moreira
HDR Engineering, Inc.
6190 Golden Hills Drive
Minneapolis, MN 55416-1518

Bruce:

I have searched the SD Natural Heritage Database for records of rare, threatened or endangered species in the areas indicated on the map that was included with your letter of May 6.

There are a number of records of rare and state listed species. I have sent you a database with those species and coordinates via email.

Most of the area along the proposed line has not been surveyed for rare species. It is very possible that more rare or T&E species exist in that area. Bald eagles, federally threatened species, are possible. Bald eagles are nesting in increasing numbers in northeast South Dakota. It is possible that unreported bald eagle nests are along the proposed transmission line route.

If you have any questions or need additional information, please contact me.

Sincerely,

Doug Backlund
Wildlife Biologist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 East 80th Street
Bloomington, Minnesota 55425-1665

MAY 20 2005

Ms. Michelle Bissonnette
Senior Environmental Consultant
HDR Engineering Inc
6190 Golden Hills Drive
Minneapolis, Minnesota 55416

Dear Ms. Bissonnette:

We have reviewed your letter dated April 21, 2005, requesting review of the proposed Big Stone Transmission Line Project. The project is located in Big Stone, Swift, Yellow Medicine, Stevens, Kandiyohi, and Chippewa Counties in Minnesota and Deuel and Grant Counties in South Dakota. The comments below are specific to fish and wildlife resources in the project area within Minnesota. Fish and wildlife resources located in South Dakota counties have been addressed in a letter dated May 13, 2005, from our Pierre Ecological Services Field Office (ESFO).

In addition to parts of Big Stone National Wildlife Refuge, the Fish & Wildlife Service (Service) holds conservation easements and manages Waterfowl Production Areas in a number of sections within Big Stone County that are included in the proposed transmission corridor. For exact locations of these public lands, you should contact Ms. Alice Hanley, Refuge Manager, Big Stone National Wildlife Refuge, at (320) 273-2191 and Mr. Steve Delehanty, District Manager, Morris Wetland Management District (WMD), at (320) 589-1001. The Morris WMD also manages Service lands within Chippewa, Stevens, Swift, and Yellow Medicine counties. The Litchfield WMD manages Service lands within Kandiyohi County and Mr. Scott Glup, (320) 693-2849, should be contacted regarding easements which may be necessary along the proposed transmission line route.

The bald eagle, federally listed as threatened under the Endangered Species Act of 1973, as amended, is known to occur within Big Stone, Chippewa, Kandiyohi, Sift and Yellow Medicine Counties. This species prefers to nest in mature trees, often near water. The Dakota skipper is a butterfly species that is a candidate for listing under the ESA, and is found in native prairie habitats. The Dakota skipper is known to occur in Big Stone, Chippewa, Swift and Yellow Medicine counties. We suggest you consult the explanatory comments in the Pierre ESFO comment letter, dated May 13, 2005, regarding specific habitat requirements for these species.

We also agree with and fully support the comments offered by the Pierre ESFO regarding potential impacts to fish and wildlife resources from overhead transmission lines and the need to address wetland impacts.

We appreciate the opportunity for early coordination on the proposed project. Please contact Ms. Laurie Fairchild, at (612) 725-3548, extension 214, if you have questions concerning these comments.

Sincerely,

Dan P. Stinnett
Field Supervisor

Cc: Alice Hanley, Big Stone NWR
Steve Delehanty, Morris WMD
Scott Glup, Litchfield WMD
Natalie Gates, Pierre ESFO

IN REPLY REFER TO

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Waubay National Wildlife Refuge
44401 134A St.
Waubay, South Dakota 57273-9910
PH: 605-947-4521
FAX: 605-947-4524

May 24, 2005

HDR Engineering, Inc.
ONE COMPANY/*Many Solutions*
6190 Golden Hills Drive
Minneapolis, MN 55416-1518

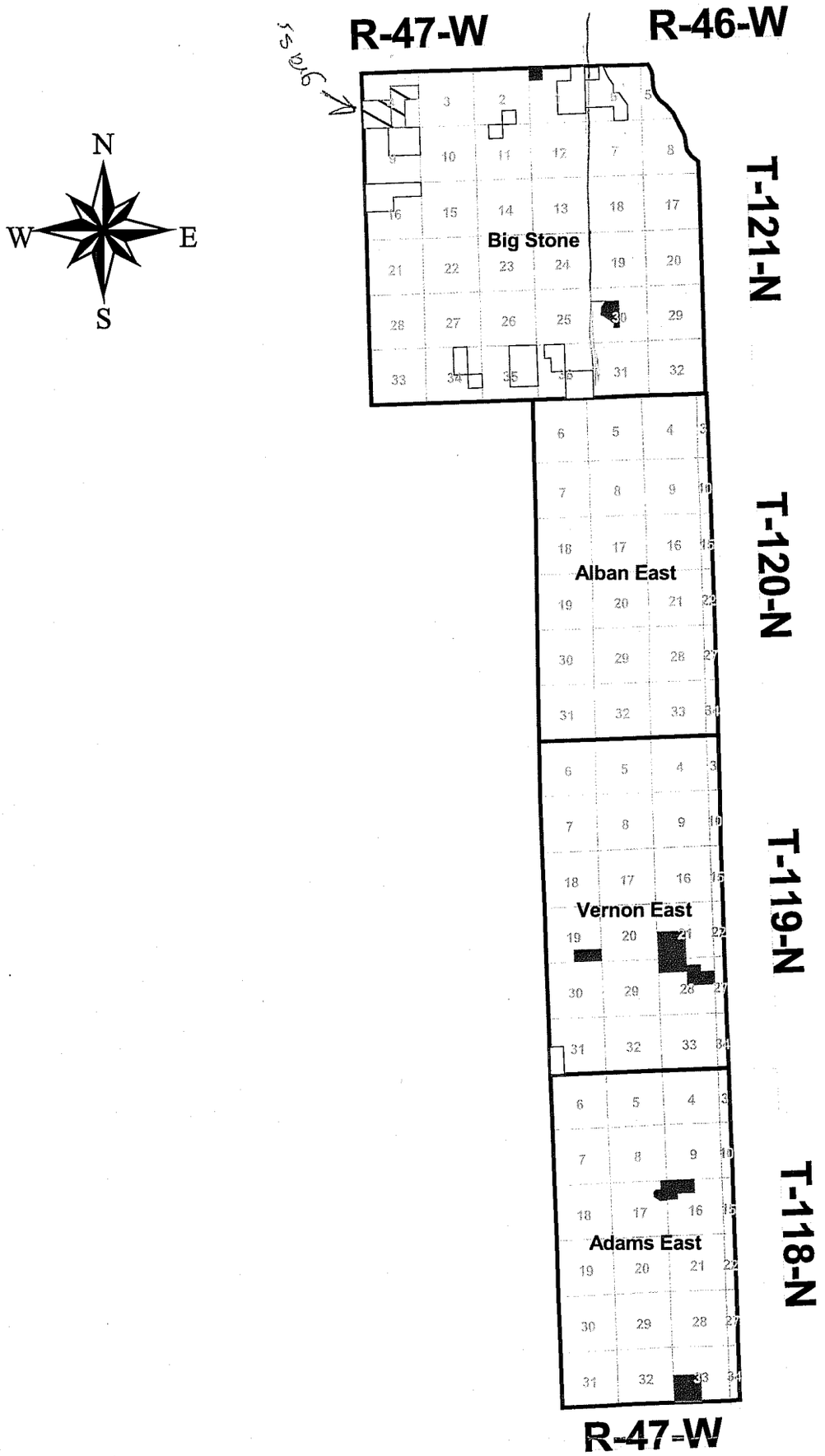
Dear Mr. Moreira,

Please see the attached map as per the information you requested. Also note the areas acquired through fee title or easement changes daily; thus, this map is current as of today, Tuesday, May 24, 2005.

Sincerely,

Jarrod B. Lee
Refuge Operations Specialist
Waubay National Wildlife Refuge

Grant County, SD
US Fish and Wildlife Service Lands



6 0 6 12 Miles

Township and Range
Waterfowl Production Areas
Grassland Easements
Wetland Easements
Township Boundary
Public Land Survey Sections

WPAS
WETGrass
-F
Both

DISCLAIMER
The USFWS makes no claim as to the accuracy or completeness of the displayed information. Shaded areas depicting USFWS NWRS fee and easement lands are for illustrative purposes only and do not represent legal boundaries. The quality of the data used to develop digital boundaries is variable, consequently, the digital representation of all boundary information is subject to change as higher quality data becomes available. All fee-title and easement arcs are attributed to allow for replacement. For more detailed information on the boundaries of fee-title land or easement areas, please contact the USFWS Realty Office, Bismarck, North Dakota.

Map Produced 5/24/05 at Waubay Wetland Management District.

DEPARTMENT OF THE ARMY
St. Paul District Corps of Engineers
190 Fifth Street East
St. Paul, Minnesota 55101-1683

June 10, 2005

REPLY TO
ATTENTION OF
Operations
Regulatory (2005-3063-TJH)

Ms. Nancy Werdel
Western Area Power Association
PO Box 281213
Lakewood, CO 80228-8213

Dear Ms. Werdel:

This letter responds to your letter of June 2, 2005, about a project of Otter Tail Power Company to construct new 230kV transmission facilities on existing and new rights-of-way in Big Stone, Swift, Yellow Medicine, Stevens, Kandiyohi, and Chippewa Counties in Minnesota, and Deuel and Grant Counties in South Dakota.

We agree to participate as a cooperating agency during the EIS scoping phase for this project. However, due to limited staff and resources, we have not reviewed the specific locations you listed, and we will not be available to attend scoping meetings. In the interim, please consider the following general information concerning our regulatory program and about regulation of utility lines.

When a proposal involves activity in navigable waters of the United States, such as the Minnesota River, it may be subject to the Corps of Engineers' jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (Section 10). Section 10 prohibits the construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, or any work that would affect the course, location, condition, or capacity of those waters, unless the work has been authorized by a Department of the Army permit.

If the proposal involves deposition of dredged or fill material into waters of the United States, including discharges associated with mechanical land clearing, it may be subject to the Corps of Engineers' jurisdiction under Section 404 of the Clean Water Act (CWA Section 404). Waters of the United States include navigable waters, their tributaries, and adjacent wetlands (33 CFR § 328.3). CWA Section 301(a) prohibits discharges of dredged or fill material into waters of the United States, unless the work has been authorized by a Department of the Army permit under Section 404. Information about the Corps permitting process can be obtained online at http://www.mvp.usace.army.mil/regulatory.

The Corps evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses, including (1) evaluating the proposal's impacts in accordance with the National Environmental Policy Act (NEPA) (33 CFR part 325), (2) determining whether the proposal is contrary to the public interest (33 CFR § 320.4), and (3) in the case of a Section 404 permit, determining whether the proposal complies with the Section 404(b)(1) Guidelines (Guidelines) (40 CFR part 230).

If the proposal requires a Section 404 permit application, the Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)). Time and money spent on the proposal prior to applying for a Section 404 permit cannot be factored into the Corps' decision whether there is a less damaging practicable alternative to the proposal.

What follows is some general information regarding utility lines and the types of Corps permits that may be required for this project

The placement of aerial lines that cross navigable waters of the U.S. requires authorization under Section 10 of the Rivers and Harbors Act.

Underground utility lines through waters of the U.S., including wetlands, as well as navigable waters of the U. S. are regulated under Section 404 of the Clean Water Act if there is a discharge of dredged or fill material. Any discharge would require authorization by a general permit or letter of permission.

Underground lines installed by vibratory plow and directional bore method through waters of the U.S., including wetlands, do not involve a discharge and a permit is not required. However, if installation of connecting points requires excavation and backfill in waters of the U.S., including wetlands, a permit would be required.

The placement of poles, overhead wiring, and/or buried wiring at upland locations is not within the jurisdiction of the Corps of Engineers, provided the work does not involve the placement of dredged or fill material into any waterbody or wetland.

Temporary placement of fill material into any waterbody or wetland for purposes such as bypass roads, temporary stream crossings, cofferdam construction, or storage sites may require a Department of the Army permit.

Without detailed construction plans, we cannot provide specific comments regarding the effects that the proposed activity would have on watercourse floodstages. It has been our experience that underground and overhead utility construction has negligible effects on flood stages, provided excess construction material is removed from the floodplain and additional care is taken not to disturb its hydraulic characteristics.

You may also need city, county, or State permits for the project. You should contact the appropriate agencies for their permit requirements. If the project includes the placement of dredged or fill material in a Federal regulated waterbody, we will notify the responsible State agency for water quality (401) certification.

You should also contact the State Historical Preservation Officer (SHPO) to determine if there are any known historic or archeological sites in the area or if any cultural resource survey would be required.

If you have any questions, contact Tom Hingsberger in our St. Paul office at (651) 290-5367. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,

Robert J. Whiting
Chief, Regulatory Branch

cc: HDR Engineering
Omaha District Regulatory Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 East 80th Street
Bloomington, Minnesota 55425-1665

JUL - 7 2005

Mr. Nicholas Stas
Department of Energy
Western Area Power Administration
Upper Great Plains Region
P.O. Box 35800
Billings, Montana 59107

Dear Mr. Stas:

This is in response to your letter dated June 2, 2005, regarding the proposed Big Stone II Power Plant and Transmission Project to be located in South Dakota and Minnesota. The interconnection of this line to a Federal transmission system owned and operated by your agency will require the preparation of an Environmental Impact Statement (EIS). Western Area Power Administration (Western) has requested Fish and Wildlife Service (Service) participation and technical assistance in the environmental review process for this project.

We appreciate the early coordination carried out thus far by Western and Otter Tail Power. Meetings held June 14 and 17, 2005, helped to inform our understanding of both the project and the processes in a manner that will aid our input and environmental review of the proposed transmission line corridors and routes. This letter is in specific response to three requests made in Western's letter.

Endangered Species Act coordination and section 7 consultation:

The Endangered Species Act (Act) of 1973, as amended, requires Federal agencies to consult with the Service on proposed actions that may affect federally-listed threatened and endangered species and listed critical habitat. The Service's South Dakota Ecological Services Field Office in Pierre previously submitted a letter that commented on threatened and endangered species that may be present in the action area in South Dakota. The following federally-listed and candidate species may be present in four of the five affected counties within Minnesota (no federally listed species occur in Stevens County).

Species	County
Bald Eagle (threatened) (*Haliaeetus leucocephalus*)	Big Stone, Chippewa, Swift, Yellow Medicine
Dakota Skipper (candidate) (*Hesperia dakotae*)	Big Stone, Chippewa, Swift, Yellow Medicine

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET- SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
http://www.epa.gov/region08

AUG - 3 2005

Ref: 8EPR-N

Nancy Werdel, A7400
Western Area Power Administration
NEPA Document Manager
P.O. Box 281213
Lakewood, CO 80228-8213

RE: Scoping Comments on the Proposed Big Stone II Power Plant and Transmission Project in South Dakota and Minnesota

Dear Ms. Werdel:

This letter is in response to the Department of Energy's request for scoping comments regarding the Environmental Impact Statement (EIS) for the Big Stone II Power Plant and Transmission Project. Western Area Power Administration (Western) is the power-marketing agency within the U.S. Department of Energy (DOE), and Western will be the lead federal agency for the EIS. The project includes the construction and operation of a 600-megawatt coal-fired power plant near Milbank, South Dakota, at the site of the existing Big Stone Plant (Unit I). The proposed project also includes the upgrade and construction of new transmission lines in eastern South Dakota and western Minnesota.

EPA recognizes the complexity of preparing an EIS on a project of this type and magnitude. We recommend that the EIS rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which are eliminated from detailed study, discuss the reasons for their having been eliminated.

EPA recommends that an additional alternative be included in the EIS that would evaluate state-of-the-art emission control technologies, and evaluate the use of alternative renewable energy resources. This is particularly important given the type of facility being proposed and the kind of issues anticipated with the construction and operation of this new facility. The new alternative could consider the following topics:

- Advanced state-of-the-art technologies for both energy efficiency and advanced pollution control systems. An example may include a technology such as the Integrated Gasification Combined Cycle (IGCC). This system produces electricity through a combination of a gas turbine and a steam

turbine. IGCC systems are cleaner and more efficient than traditional coal-fired systems. There may be other similar technologies more appropriate but in either case the EIS should disclose a range of power generating technologies and analyze the feasibility of the various technologies for the Big Stone II facility.

- An assessment of increased carbon dioxide (CO_2) emissions from the proposed facility, including CO_2 capture and sequestration. Please estimate the costs of possible future requirements to reduce CO_2 emissions, including the cost of retrofitting both Big Stone I and Big Stone II for CO_2 capture and sequestration. Analysis of the CO_2 emissions is consistent with the President's stated mission to reduce U.S. greenhouse gas emissions intensity -- the ratio of emissions to economic output by American industry -- by 18 percent over the next 10 years without sacrificing economic growth (Council on Environmental Quality's Climate VISION Web site). Addressing CO_2 emissions is also consistent with the recent decision from the 8th Circuit Court of Appeals on the proposed DM&E Railroad. (*Mid States Coalition for Progress v. Surface Transportation Board,* 345 F.3d 520 (8 Cir. 2003).

- An assessment of alternative renewable electrical generation to replace or supplement the provision of electricity generated through the use of fossil fuels. As an example, we suggest that the EIS consider the results of the Western report (due in the fall of 2005), "Dakotas Wind Transmission Study," which is studying placement of 500 MW of wind energy in North and South Dakota, in determining the viability of auxiliary wind power generation at the Big Stone II facility. This should include an analysis of wind farm networking opportunities to ensure consistent transmission delivery.

- An evaluation of the benefits of investment in "Demand Management" to increase energy efficiency in the contracted markets. Big Stone Power Plant II cannot meet all of the expected increased demand for electricity by the year 2012, i.e. an increase of 9,300 megawatts. To the extent that additional generating capacity is needed, demand can be partially met by implementing energy conservation programs in the contracted markets.

- An assessment of the possible environmental benefits of retrofitting Big Stone I with state-of-the-art emission control technologies for mercury recovery, and SO_2 and NO_x emission reductions, for overall emission reductions at the combined Big Stone facility.

- EPA also recommends that the EIS consider the environmental consequences of the downwind air quality impacts of acid rain and mercury deposition, and potential impacts to wetlands and riparian areas during the construction of new transmission lines. Prior to performing air dispersion modeling for the EIS, we suggest that a modeling protocol be developed and shared with the affected state agencies and EPA.

Enclosed are EPA's detailed scoping comments. These comments are intended to help ensure a comprehensive assessment of the project's environmental impacts, adequate public disclosure, and an informed decision-making process for alternative selection. We sincerely hope that our scoping comments

will be beneficial to the project and that they will help streamline the NEPA process. EPA's review and participation in the Big Stone II Power Plant and Transmission Line EIS will be coordinated by Robert Edgar (303 312-6669) and Jody Ostendorf (303 312-7814) of my staff. Please feel free to contact either them or me at (303) 312-6004 regarding these scoping comments.

Sincerely,

for

Larry Svoboda
Director, NEPA Program
Ecosystems Protection and Remediation

Enclosure

cc: Ken Westlake, EPA Region 5
Anna Miller, EPA Region 5

RECEIVED
OCT 25 2005
HDR Engineering, Inc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 East 80th Street
Bloomington, Minnesota 55425-1665

OCT 20 2005

Mr. John Bridges
Western Area Power Administration
12144 West Alameda Pkwy
Post Office Box 281213
Lakewood, Colorado 80228

Dear Mr. Bridges:

This letter provides information related to fish, wildlife and their habitats for the proposed Big Stone II Transmission Line project located in South Dakota and Minnesota. As you are aware, there are a number of fish and wildlife resources and federally owned lands or easements within each of the respective corridors.

Western Area Power Administration (WAPA) has been part of a collaborative data collection effort conducted by the project proponent, Otter Tail Power Company, and their consultant, HDR. Some of the information contained in this letter may already be at your disposal; however, any duplication will only emphasize the importance of fish and wildlife resources located throughout the proposed corridors. As planning progresses, close coordination between our agencies will be necessary particularly regarding specific routes within the proposed corridors. The following information is intended for incorporation in the Environmental Impact Statement (EIS) for the Big Stone II Transmission Line Project.

Threatened and Endangered Species

The bald eagle (Haliaeetus leucocephalus), a threatened species listed under the Endangered Species Act of 1973, as amended, is located within the proposed project corridors. There are documented bald eagle nests that may be affected by the proposed project in both the Ortonville to Spicer, Ortonville to Morris, and South Dakota/Minnesota line to Granite Falls corridors (see enclosed map). It is possible that additional bald eagle nests may exist that have not been recorded, as these specific corridors have not been surveyed for nesting activity. Therefore, it would be prudent to conduct a bald eagle nest survey of any proposed route prior to final design. It will also be necessary to reinitiate consultation for construction activities that do not occur within one year of the final EIS.

The western prairie fringed orchid (Platanthera praeclara), listed as threatened, is present near the eastern boundary of the Ortonville to Spicer corridor. This plant is present in wet prairie and sedge meadow habitats. Although no recent populations have been identified in or adjacent to the South Dakota corridor, suitable habitat for this species exits within the corridor.

26 but the Fish and Wildlife Service (Service) would not support this as a stand-alone measure as it only shifts the route from one high value area to another in the same habitat block.

We have examined the existing federal right-of-way (ROW) description for this area, as provided by Otter Tail Power which grants permission to site poles at certain locations but does not define a specific corridor width and location. The document is inconclusive regarding the potential need for additional ROW with the proposed project. If additional ROW is required, it would likely entail a fee-title land exchange because other alternatives in this important bird area are limited. The federal land-use compatibility law pertinent to this discussion may allow minor expansion and alteration of existing ROW on refuge lands but the proposed scope of this project makes it unlikely that it could be determined a "minor expansion or alteration".

There is a very large drained wetland in T122N R45W Sections 9, 10, 11, 14, and 15 (most of it in Section 10). The Service has an interest in restoring this wetland. The transmission line should go around this drained basin or at least be constructed with the understanding that the wetland may be restored. This would affect pole location and pole construction. It would be best to avoid the basin entirely or at least merely span a fringe of the wetland with construction appropriate for a future flooded condition.

As detailed in the maps and GIS shapefiles provided to HDR and WAPA, there are a large number of WPAs and wetland or grassland easements to avoid, particularly in the northern corridor alternatives. There are a number of Wildlife Management Areas (WMA) owned and managed by the state of Minnesota located within corridor; if these lands were purchased with Federal Aid funds, approval for a change in land use would need to be sought by the Minnesota Department of Natural Resources (MNDNR) and agreed to by our Federal Aid division prior to construction.

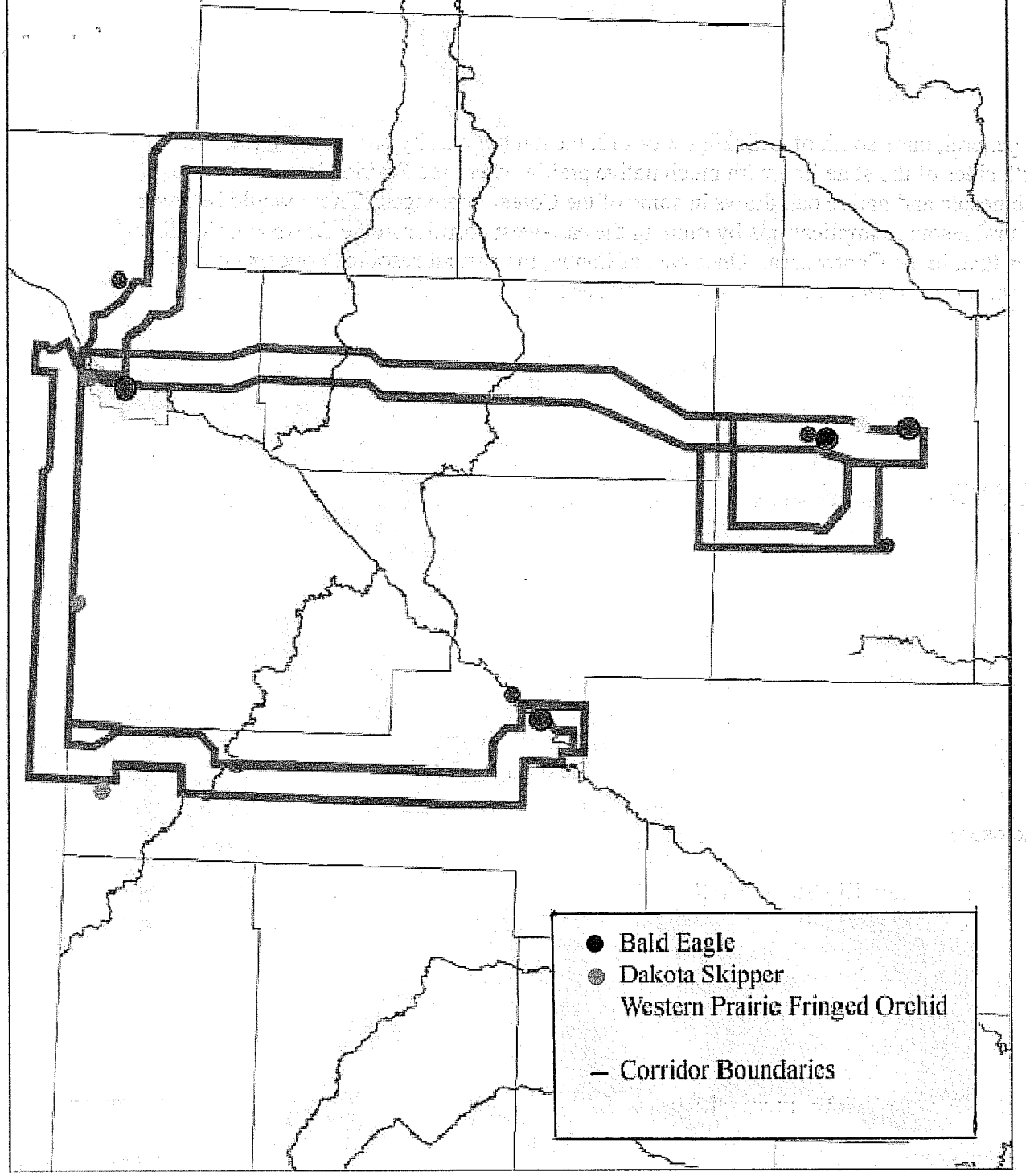
Big Stone II south to Gary, South Dakota:

It will be difficult to avoid Service lands in this corridor. Locating the route to the east in the Madison or Dawson area may be one option to avoid Service lands in South Dakota. Approximately three miles south of U.S. Highway 212, it becomes very difficult to avoid wetland and grassland easements managed by the Service. A complete map of these resources was provided to HDR in prior discussions.

South Dakota/Minnesota line east to Granite Falls:

There are a number of new Northern Tallgrass Prairie NWR easements in the Canby area. Some in the planning corridor include easements in T115N R46W Sections 2, 3, 10, 12, 13, 14, that must be avoided. Many more new easements are anticipated for this area. It is best to coordinate directly with the Morris WMD for the most up-to-date information. There are also several Farmer Home Administration (FmHA) easements close to the state Scientific and Natural Area (SNA) near Granite Falls that must be avoided.

In addition to our concerns regarding impacts to public lands, there is an important migratory bird area near the Salt Lake area on the South Dakota/Minnesota border that should be avoided.


Bald Eagle
Dakota Skipper
Western Prairie Fringed Orchid
Corridor Boundaries

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 5, 2005

Michelle F. Bissonnette
HDR Engineering Inc
6190 Golden Hills Drive
Minneapolis MN 55416-1518

Dear Ms. Bissonnette:

The South Dakota Department of Environment and Natural Resources (DENR) has reviewed the Big Stone II Transmission Line project in Deuel and Grant Counties, South Dakota dated October 26, 2005. The DENR finds that this construction should not cause violation of any statutes or regulations administered by the DENR based on the following recommendations:

1. The department does not anticipate any adverse impacts to the air quality of the state. The Air Quality Program has no objections to this project.

2. Best Management Practices (BMP) for sediment and erosion control should be incorporated into the planning, design, and construction of this project.

3. Wetlands and tributaries may be impacted by this project. These water bodies are considered waters of the state and are protected under the South Dakota Surface Water Quality Standards. The discharge of pollutants from any source, including indiscriminate use of fill material, may not cause destruction or impairment except where authorized under Sections 402 or 404 of the Federal Water Pollution Control Act. Please contact the U.S. Army Corps of Engineers concerning these permits.

4. These segments of the Monighan Creek and the South Fork Yellow Bank River are classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:

   (3) Coldwater marginal fish life propagation waters;
   (8) Limited contact recreation waters;
   (9) Fish and wildlife propagation, recreation, and stock watering waters; and
   (10) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to ensure that the total suspended solids standard of 90 mg/L is not violated.

This segment of the North Fork Yellow Bank River is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:

(4) Warmwater permanent fish life propagation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters; and
(10) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to ensure that the total suspended solids standard of 90 mg/L is not violated.

This segment of the Whetstone River is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:

(5) Warmwater semipermanent fish life propagation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters; and
(10) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to ensure that the total suspended solids standard of 90 mg/L is not violated.

If you have any questions concerning these comments, please contact me at (605) 773-3351.

Sincerely,

John Miller

John Miller
Environmental Program Scientist
Surface Water Quality Program

APPENDIX F
LAND USE PLANS AND ORDINANCES

F.1 – Grant County Comprehensive Plan

F.2 – Deuel County Comprehensive Plan

ZONING ORDINANCE

FOR

GRANT COUNTY

PREPARED BY

THE GRANT COUNTY PLANNING COMMISSION

WITH ASSISTANCE FROM
THE FIRST DISTRICT ASSOCIATION OF LOCAL GOVERNMENTS

ZONING ORDINANCE

Grant County, South Dakota

Notice of Public Hearing (Planning Commission/County Commission) Published: March 3, 2004
Public Hearing held by Planning Commission: Published: March 16, 2004
Planning Commission Adoption and Recommendation: Published: March 16, 2004
Public Hearing and First Reading held by County Commission: March 16, 2004
Public Hearing and Second Reading held by County Commission: April 20, 2004
Notice of Adoption Published: April 28, 2004 and May 5, 2004
Effective Date: Published: May 25, 2004

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ARTICLE XI

ZONING DISTRICTS

Section 1101. "A" Agricultural District

Section 1101.01 Purpose.

This district is established to maintain and promote farming and related activities within an environment which is generally free of other land use activities. Residential development will be discouraged to minimize conflicts with farming activities and reduce the demand for expanded public services and facilities.

Section 1101.02 Permitted Uses.

1. Agricultural activities and farm related buildings, including Type E Concentrated Animal Feeding Operations;
2. Farm dwelling;
3. Site-built Single family residences;
4. Type A and Type B manufactured homes;
5. Modular homes;
6. Animal husbandry service;
7. Fisheries services and game propagation areas;
8. Horticultural services;
9. Orchards, tree farms, truck gardening, nurseries and greenhouses;
10. Public parks and recreation areas;
11. Home occupations.

Section 1101.03. Conditional Uses.

1. Airports and airstrips;
2. Church or cemetery;
3. Golf course, golf driving range;

4. Sand, gravel or quarry operation; Mineral exploration and extraction; Rock crushers, concrete and asphalt mixing plants provided;

   a. The site meets the requirements of the State Department of Environment and Natural Resources.

   b. A site plan is provided indicating the following information:

      i. Present topography, soil types, depth to groundwater.

      ii. Location of existing water drainage, existing buildings, existing shelterbelts.

      iii. Identification of roads leading to the site.

      iv. Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

      v. Proposed monitoring wells, etc.

      vi. A requirement for receiving a permit for extractive/mining operations shall include a haul-road agreement between the applicant and appropriate governmental entity (Federal, State, County, Township, or Municipality).

      vii. The applicant may be required to provide information regarding how potential air, noise, and water pollution would be minimized.

      viii. A minimum of one thousand (1,000) feet from the mineral exploration and extraction; rock crushers; and concrete and asphalt mixing plants property line to the nearest residence; excluding: the residence of the above said uses operator.

5. Reserved;

6. Reserved;

7. Sanitary landfills, Rubble Sites provided:

   a. The site meets the requirements of the State Department of Water and Natural Resources.

   b. A site plan is provided indicating the following information:

      (1) Present topography, soil types, depth to groundwater.

      (2) Location of existing water drainage, existing buildings, existing shelterbelts.

      (3) Identification of roads leading to the site.

(4) Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

(5) Proposed monitoring wells, etc.

c. A minimum of one thousand (1,000) feet from the landfill property line to the nearest residence; excluding: the residence of the landfill operator.

8. Institution farms, including religious farming communities;

9. Domestic Sanitary Sewer Treatment Facility provided;

a. The site meets the requirements of the State Department of Water and Natural Resources.

b. A site plan is provided indicating the following information:

(1) Present topography, soil types, depth to groundwater.

(2) Location of existing water drainage, existing buildings, existing shelterbelts.

(3) Identification of roads leading to the site.

(4) Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

(5) Proposed monitoring wells, etc.

c. A minimum of one thousand (1,000) feet from the domestic sanitary sewer treatment facility property line to the nearest residence.

10. Class A, Class B, Class C, and Class D Concentrated Animal Feeding Operations. (See Concentrated Animal Feeding Operations, Article XIII.)

11. Stables;

12. Veterinary clinics;

13. Junkyards/salvage yards, provided that they meet the following minimum requirements and other restrictions that the Board of Adjustment may deem appropriate:

a. Storage for junkyards shall be set back a minimum of two hundred (200) feet from any adjoining road right-of-way.

b. Junkyards shall be screened on all sides by a solid wall, with construction materials and design to be approved by the Board of Adjustment, at least two (2) feet above the highest stock pile or by a shelterbelt of shrubs and trees as approved by the Board of Adjustment; screening must be maintained in good repair.

c. No junkyards will be allowed within one thousand (1,000) feet from the junkyard property line to the nearest residence; excluding: the residence of the junkyard operator.

d. All junkyards must have a minimum lot of ten (10) acres.

14. Water pumping stations, elevated tanks and similar essential public utilities and service structures;

15. Wireless Telecommunication Towers and Facilities;

16. Commercial public entertainment enterprises not normally accommodated in commercial areas, including but not limited to, the following: music concerts, rodeos, tractor pulls, and animal and vehicle races;

17. Seasonal retail stands, including fireworks stands;

18. Home extended business--see Section 1209;

19. Caretaker residences associated with public or private enterprise.

20. Game Lodge;

21. Private Shooting Preserve;

22. Wind Energy System;

23. On-Site Sign;

24. Kennel.

Section 1101.04. Area Regulations.

1. Lot Size: All residential lots shall be a minimum of two (2) acres, not counting the road right-of-way. All other permitted uses and conditional uses shall have a minimum area and setback regulations as determined by the Board of Adjustment.

2. Front Yard

The minimum depth of the front yard shall be not less than one hundred (100) feet and in no case shall an accessory building be located or extend into the front yard. In the case of a corner lot, front yards shall be provided on both streets.

2. Side Yard

There shall be a side yard on each side of building having a width of not less than fifty (50) feet.

3. Rear Yard

There shall be a rear yard having a depth of not less than fifty (50) feet or twenty percent (20%) of the depth of the buildable lot at the time of the passage of this Ordinance.

4. Intensity of Use

a. Each buildable lot must be at least two (2) acres not counting the road right-of-way.

b. All buildings shall be set back from road right-of-way lines and lot line to comply with the above yard requirements.

Section 1101.05. Height Regulations.

No main buildings shall exceed two and one-half (2 1/2) stories or thirty-five (35) feet in height. Exceptions include the following:

1. Agricultural buildings;

2. Chimneys, smokestacks, cooling towers;

3. Radio and TV towers;

4. Water tanks;

5. Elevators;

6. Others, providing that they are not used for human occupancy.

Section 1101.06. Access.

1. The drive-way serving the parcel shall be separated from adjacent driveways on the same side of the road by the following distances depending upon road types:

   a. Local road: 100 feet;

   b. Collector road: 300 feet;

   c. Arterial: 500 feet;

   d. Minimum distance from intersection of two or more of the above: 100 feet

2. For all proposed uses and structures adjacent to a State highway, an access permit from the State of South Dakota Department of Transportation shall be required prior to the filing of a plat or the issuance of a building/use permit

Section 1101.07. Easements/Waivers.

1. An Agricultural easement must be filed with Register of Deeds on all property to be used as a site for a newly constructed residence (farm and non-farm) or church prior to issuance of a building permit.

2. Applicants for residential development (farm and non-farm) are required to obtain a written waiver from the owner/operator of any existing concentrated animal feeding operation which is closer than one-half (1/2) mile from the proposed residential building site. In the event the owner/operator of the existing concentrated animal feeding operation refuses to sign the waiver, the applicant for the residential development shall sign a separate easement to be attached to the property. The easement waives the applicant's and subsequent owner's common law rights to object to the existing concentrated animal feeding operation's potential need for a variance from the setback requirements of the Grant County Zoning Ordinance. This waiver shall be filed with the Register of Deeds. (Amended Feb. 1, 2005)

Section 1102. "CI" Commercial/Industrial District

Section 1102.01. Purpose

The "CI" District is intended for commercial and industrial uses which due to their size and nature require highway access.

Section 1102.02. Permitted Uses.

1. On-Site Signs

Section 1102.03. Conditional Uses.

1. Implement sales and service;
2. Truck terminals and freight warehouses;
3. Seed sales and grain storage, fertilizer and chemical storage and sales;
4. Highway and street maintenance shops;
5. Welding and machine shops;
6. Gas, oil and liquid propane stations including bulk stations;
7. Public and private utilities;
8. Livestock sales;
9. Contractors' shops and yards;
10. Wholesale distributing companies;
11. Restaurants;
12. Motels;
13. Single family residences;
14. Adult Uses;

15. Mining operations.

16. Off-site signs

Section 1102.04. Area Regulations.

1. Lot Area. Lot area shall be determined by need, setback, side yards, rear yards, parking requirements, freight handling requirements, building site and future expansion; however, in no case shall a lot have less than two (2) acres. An applicant for a conditional use shall provide a proposed site plan which can be reviewed by the Board of Adjustment. For commercial and industrial uses, buildings shall occupy no more than twenty-five (25) percent of the lot.

2. Front Yard. There shall be a front yard on each street which a lot abuts, and which yard shall be not less than one hundred (100) feet in depth.

3. Side Yards. On lots adjacent to a residential area, all buildings and incidental areas shall be located so as to provide a minimum side yard of one hundred (100) feet, which shall be landscaped on the side adjacent to the residential area. All other side yards shall be a minimum of fifty (50) feet.

4. Rear Yards. No building shall be constructed within fifty (50) feet of the rear lot line. The rear yard shall be one hundred (100) feet if the lot abuts an interstate or major highway.

Section 1102.05. Access.

1. The drive-way serving the parcel shall be separated from adjacent driveways on the same side of the road by the following distances depending upon road types:

   a. Local road: 100 feet;

   b. Collector road: 300 feet;

   c. Arterial: 500 feet;

   d. Minimum distance from intersection of two or more of the above: 100 feet

2. For all proposed uses and structures adjacent to a State highway, an access permit from the State of South Dakota Department of Transportation shall be required prior to the filing of a plat or the issuance of a building/use permit

Section 1103. "NR" Natural Resource District

Section 1103.01. Purpose.

The purpose of the Natural Resource District is to provide for the retaining of natural vegetation of a particular area, to preserve the natural environment and resources from destructive land uses and to protect wildlife habitat. Such an area may include but is not limited to flood plains of rivers, streams, and lakes, abandoned quarries, certain wetlands, natural prairies, and historical sites.

Section 1103.02. Area Contained in "NR" District.

All lands, unless otherwise zoned, within three hundred (300) feet of wetlands that are totally or partially owned by the State or Federal governments as wildlife production or public shooting areas and meandered lakes.

Section 1103.03. Permitted Uses.

1. Wildlife production areas;
2. Game refuges;
3. Historic sites and/or monuments;
4. Designated natural prairies;
5. Public hunting and fishing access areas.
6. Horticulture uses and livestock grazing.

Section 1103.04. Uses Permitted by Conditional Use if Deemed Not Detrimental to District.

1. Transportation and utility easements and rights-of-way.
2. Utility substations;
3. Public parks and/or playgrounds;

Section 1104. "PD" Planned Development Project District

Section 1104.01. Purpose.

A Planned Development Project District may deviate from adherence to certain regulations for individual lot development, and may be permitted in those districts where it is designated as a conditional use under district regulations, or may be permitted in any district after an amendment to the Official Zoning Map of this Resolution. Projects shall contain a minimum of five (5) acres.

Section 1104.02. Procedure:

When a Planned Development Project District is proposed, a Preliminary Plat and Final Plat, both approved by the Planning Commission shall be required for every Planned Development Project District. The project shall be developed according to the approved Final Plat. Building permits shall be required for each building.

Section 1104.03. Uses:

The uses of premises in a Planned Development Project District shall conform with the permitted uses of the district in which it is located when it is permitted as a conditional use. If a proposed Planned Development Project District includes mixed uses or other uses that are not permitted in the district where it is proposed or uses not permitted in any district, the project may be permitted after an amendment to the Official Zoning Map designating the proposed location as a Planned Development Project District as provided in Article IX of this Resolution. The amendment may be made after the conditional approval of the Preliminary Plat and shall be valid only for that project as approved.

Section 1104.04. Standards:

In any Planned Development Project District, it is permissible to depart from adherence to individual lot dimensions and area regulations; provided, however, that there shall be no diminution of the total equivalent lot area, parking area, and loading and unloading area requirements that would be necessary for the equivalent amount of individual lot development. The County Planning Commission may permit reductions in said requirements; provided, however, that upon proof by the developer efficiencies of large scale are present which permit such reductions without destroying the intent of this Resolution.

Section 1104.05. Conditions.

The County Planning Commission shall attach reasonable conditions to insure that there shall be no departure from the intent of this Ordinance. The Planned Development Project District shall conform with all such conditions. Such conditions shall be flexible. The following standards define the typical conditions the County Planning Commission shall attach in addition to the standards for lot, parking, and loading and unloading area as provided above.

1. Access points to all County and State roads shall be located no more frequently than once every one-eighth (1/8) mile.

2. A buffer area of open space or protective planting which will protect each use from the undesirable effects of the other shall separate different land uses.

3. Parking, public streets, and other public areas used at night shall be adequately lighted, and residential areas shall be adequately protected from such lighting and any other lighting from such parking, public streets, and public uses.

4. Construction of all Planned Development Project Districts shall be initiated within one (1) year after approval of the Final Plat.

5. Developers of a Planned Development Project District shall provide the Planning Commission with any covenants to be placed upon the proposed District prior to the approval of a Planned Development Project District.

   a. The minimum lot requirement for a Class A, B, C, d or E, concentrated animal feeding operation(CAFO) established after September 15, 2004 shall be a minimum of (80) acres, not including the road right-of-way. (Amended December 7, 2004)

Section 1105. Aquifer Protection Overlay District

Section 1105.01. Purpose and Intent:

The Grant County Zoning Commission recognizes (1) that residents of Grant County rely exclusively on ground water for a safe drinking water supply and (2) that certain land uses in Grant County can contaminate ground water particularly in shallow/surficial aquifers.

The purpose of the Aquifer Protection Overlay District is to protect public health and safety by minimizing contamination of the shallow/surficial aquifers of Grant County.

It is the intent to accomplish aquifer protection, as much as possible, by public education and securing public cooperation. Appropriate land use regulations will be imposed, however, which are in addition to those imposed in the underlying zoning districts or in other county regulations. Any use existing at the time these regulations are adopted is grandfathered.

Section 1105.02. Definitions for Aquifer Protection Overlay District:

1. Abandoned Well: A well no longer used or intended to be used as a water source.

2. Concentrated Animal Feeding Operation: (See Concentrated Animal Feeding Operations, Article XIII.)

3. Best Management Practices: Measures contained in Soil Conservation Service South Dakota Technical Guide, either managerial or structural, that are determined to be the most effective, practical means of preventing or reducing pollution inputs from nonpoint sources to water bodies.

4. Chemigation: The process of applying agricultural chemicals (fertilizer or pesticides) through an irrigation system by injecting the chemicals into the water.

5. Class V Injection Well: A conduit through which potentially contaminated but generally non-hazardous fluids can move below land surface into or above an aquifer. The types of primary concern in Grant County are 5W20-industrial process water and waste disposal wells and 5X28-automobile service station disposal wells. Typically 5W20 types are commercial/ industrial facility septic tanks used to dispose of more than domestic wastewater. 5X28 types are dry wells for wastes from repair bay drains at facilities servicing internal combustion vehicles and equipment.

6. Contamination: The process of making impure, unclean, inferior or unfit for use by introduction of undesirable elements.

7. Contingency Plans: Detailed plans for control, containment, recovery and clean up of hazardous materials released during floods, fires, equipment failures, leaks and spills.

8. Development: The carrying out of any surface or structure construction, reconstruction or alteration of land use or intensity of use.

9. Facility: Something built, installed or established for a particular purpose.

10. Hazardous Materials: A material which is defined in one or more of the following categories:

    a. Ignitable: A gas, liquid or solid which may cause fires through friction, absorption of moisture, or which has low flash points. Examples: white phosphorous and gasoline.

    b. Carcinogenic: A gas, liquid or solid which is normally considered to be cancer causing or mutagenic. Examples: PCBs in some waste oils.

    c. Explosive: A reactive gas, liquid or solid which will vigorously and energetically react uncontrollably if exposed to heat, shock, pressure or combinations thereof. Examples: dynamite, organic peroxides and ammonium nitrate.

    d. Highly Toxic: A gas, liquid or solid so dangerous to man as to afford an unusual hazard to life. Examples: parathion and chlorine gas.

    e. Moderately Toxic: A gas, liquid or solid which through repeated exposure or in a single large dose can be hazardous to man. Example: atrazine.

    f. Corrosive: Any material, whether acid or alkaline, which will cause severe damage to human tissue, or in case of leakage might damage or destroy other containers of hazardous materials and cause the release of their contents. Examples: battery acid and phosphoric acid.

11. Manure Storage Area: An area separate from pens or buildings where animal manure is stored for more than one year.

12. Leaks and Spills: Any unplanned or improper discharge of a potential contaminant including any discharge of a hazardous material.

13. Pasture: A field that provides continuous forage to animals and where the concentration of animals is such that a vegetative cover is maintained during the growing season.

14. Primary Containment Facility: A tank, pit, container, pipe or vessel of first containment of a liquid or chemical.

15. Secondary Containment Facility: A second tank, catchment pit, pipe or vessel that limits and contains a liquid or chemical leaking or leaching from a primary containment area; monitoring and recovery systems are required.

16. Shallow Aquifer: An aquifer vulnerable to contamination because the permeable material making up the aquifer (1) extends to the land surface so percolation water can easily transport contaminants from land surface to the aquifer, or (b) extends to near the land surface and lacks a sufficiently thick layer of impermeable material on the land or near the land surface to limit percolation water from transporting contaminants from the land surface to the aquifer.

17. Ten Year Time of Travel Distance: The distance that ground water will travel in ten years. This distance is a function of aquifer permeability and water table slope.

18. Zone of Contribution: The entire area around a well or wellfield that contributes water to the well or wellfield.

Section 1105.03. Delineation and Regulation of Aquifer Protection Overlay Zones

Boundaries for the aquifer protection zones for the Aquifer Protection Overlay District are shown on maps prepared by the East Dakota Water Development District (EDWDD), Brookings, South Dakota. Said maps are hereby adopted by reference as part of these regulations as if the maps were fully described herein.

The Aquifer Protection Overlay District is divided into two zones. The critical impact zone, Zone A, was mapped by the East Dakota Water Development District with South Dakota Geological Survey (SDGS) technical assistance using techniques outlined in the U.S. Environmental Protection Agency publication "Guidelines for Delineation of Wellhead Protection Areas", June, 1987. The shallow/surficial aquifer boundary for Zone B was mapped by the South Dakota Geological Survey.

Section 1105.04. Zone A -- Aquifer Critical Impact Zones

Zone A, the wellhead protection area, is the mapped zone of contribution around all public water supply wells or wellfields in shallow/surficial aquifers and includes land upgradient from the well or wellfield to the ten year time of travel boundary.

Section 1105.05. Permitted Uses in Zone A:

The following uses are permitted provided they meet appropriate performance standards outlined for aquifer protection overlay zones:

1. Agriculture;

    a. Application of manure is permitted with approved nutrient management plan.

2. Horticulture;

3. Parks, greenways or publicly owned recreational areas;

4. Necessary public utilities/facilities designed so as to prevent contamination of groundwater.

5. Single family residences on lots of five (5) acres or more.

Section 1105.06. Conditional Uses in Zone A:

The following uses are permitted only under the terms of a conditional use and must conform to provisions of the underlying zoning district and meet Performance Standards outlined for Aquifer Protection Overlay Zones.

1. Expansion of existing uses to the extent they remain or become nonconforming and to the extent allowed by the underlying district. The Board of Adjustment shall not grant approval unless it finds the proposed expansion does not pose greater potential for groundwater contamination than the existing use.

2. All uses not permitted or not prohibited in Zone A may be approved by the Board of Adjustment provided they can meet Performance Standards outlined for the Aquifer Protection Overlay Zones.

Section 1105.07. Prohibited Uses in Zone A:

The following uses are expressly prohibited in Zone A:

1. New Concentrated Animal Feeding Operations, including Class A, Class B, Class C, Class D, and Class E.

2. Manure storage areas except above ground tanks;

3. Disposal of solid waste except spreading of manure;

4. Outside unenclosed storage of road salt;

5. Disposal of snow containing de-icing chemicals;

6. Processing and storage of PCB contaminated oil;

7. Car washes;

8. Auto service, repair or painting facilities and junk or salvage yards;

9. Disposal of radioactive waste;

10. Graveyards or animal burial sites;

11. Detonation sites;

12. Open burning except ditches, fields and non-hazardous yard and household wastes such as paper, wood and leaves.

13. Fall application of nitrogen fertilizer except spreading of manure;

14. Land spreading of petroleum contaminated soil;

15. Land spreading or dumping of waste oil;

16. Industrial process water and waste disposal wells-5W20 type Class V injection wells;.

17. Automobile service station disposal wells-5X28 type Class V injection wells;.

18. All other facilities involving the collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or waste having a potentially harmful impact on ground water quality.

19. Existing Concentrated Animal Feeding Operations will not be able to expand beyond a total of 99 animal units.

Section 1105.08. Zone B -- Aquifer Secondary Impact Zones

Zone B is the remainder of the mapped shallow/surficial aquifer in the County not included in Zone A. Zone B also includes any delineated lands adjacent to Zone A not underlain by the shallow aquifer but with sufficient slope that contaminated surface water could flow directly onto Zone A.

Zone B is being protected because (1) the aquifer is a valuable natural resource for future development, (2) the aquifer provides drinking water supply for individual domestic users, (3) contamination is not justified just because this area is not currently used for public water supply and (4) contaminants from this area could eventually enter Zone A.

Section 1105.09. Permitted Uses in Zone B:

1. All uses permitted in the underlying zoning districts provided that they can meet the Performance Standards as outlined for the Aquifer Protection Overlay Zones.

Section 1105.10. Conditional Uses in Zone B:

1. All conditional uses allowed in underlying districts, with the exception of those expressly prohibited in Zone B, may be approved by the Board of Adjustment provided they can meet Performance Standards outlined for the Aquifer Protection Overlay Zone.

2. Earthen storage basins and lagoons may be approved by the Board of Adjustment after site specific review. The Board reserves the right to require an impermeable liner to prevent ground water contamination.

3. New Concentrated Animal Feeding Operations over 99 animal units.

Section 1105.11. Prohibited Uses in Zone B:

The following uses are expressly prohibited in Zone B:

a. Fall application of nitrogen fertilizer on the following soil types: Arvilla, Divide, Estelline, Fordville, Renshaw, and Sioux;

b. Land spreading of petroleum contaminated soil;

c. Land spreading or dumping of waste oil;

d. Industrial process water and waste disposal wells-5W20 type Class V injection wells;

e. Automobile service station disposal wells-5X28 type Class V injection wells.

Section 1105.12. Performance Standards For Aquifer Protection Overlay Zones:

The following standards shall apply to land uses in Zones A and B of the Aquifer Protection Overlay Districts:

1. New or replacement septic tanks and associated drain fields for containment of human wastes must conform with regulations established by the State Department of Environment and Natural Resources.

2. Commercial or industrial liquid waste ponds containing any solid or liquid material or waste will not be permitted without a secondary containment system except for community wastewater lagoons.

3. Manure storage areas are permitted in Zone B but must be constructed in conformance with State regulations.

4. Petroleum products stored at one locality in a tank or series of tanks must be elevated; such tanks must have a secondary containment system where it is deemed necessary by the County Zoning Office.

5. Reserved.

6. New feedlots in Zone B shall meet the Concentrated Animal Feeding Operation regulations in Article VIII.

7. Discharge of industrial process water is prohibited without County Zoning Office approval.

8. Auto service, repair or painting facilities and junk or salvage yards shall meet all State and Federal standards for storage, handling and disposal of petroleum products and shall properly dispose of all other potentially hazardous waste materials.

9. Any facility required to file material safety data sheets as part of SARA Title III must prepare and have on file in the County Zoning Office an acceptable contingency plan for preventing hazardous chemicals from contaminating the shallow/surficial aquifer. Agricultural operations are exempt unless than have more than 10 employees.

10. Any commercial or industrial facility involving collection, handling, manufacture, use, storage, transfer or disposal of hazardous materials, in excess of 1000 pounds or 100 gallons, must be constructed to prevent hazardous materials from contaminating the shallow/surficial aquifer should equipment failure, floods, fire or other natural catastrophes occur. Stored petroleum products are exempt from this performance standard. Facilities must meet the following minimum specifications:

    a. For flood control, all underground facilities shall include a monitoring system and a secondary standpipe above the 100 year frequency flood level. All above ground facilities, an impervious dike, above the 100 year flood level and capable of containing 120 percent of the largest storage volume, with an overflow recovery catchment area (sump).

    b. b For fire control, all facilities shall include a fire retardant system and provision for dealing safely with both health and technical hazards that may be encountered by disaster control personnel in combating fire. Hazards to be considered are overhead and buried electrical lines, pipes, other buried objects and other hazardous liquids, chemicals or open flames in the immediate vicinity.

    c. For equipment failures, a secondary containment system must be installed to intercept any leak or discharge from the primary containment. A leak detection system and overfill protection system must also be installed. Underground tanks or buried pipes for handling hazardous materials must have double walls and accessible sumps.

11. The County Zoning Office and Department of Environment and Natural Resources shall be informed within 24 hours of any leak, spill or release of materials that might potentially contaminate groundwater.

12. Since it is known that improperly abandoned wells can become a direct conduit for contamination of groundwater by surface water, all abandoned wells should be plugged in conformance with South Dakota Well Construction Standards, Chapter 74:02:04:67-70.

Section 1105.13. Grant of Permit, Alteration of Use:

Before a permit is granted, the County Zoning Officer must examine an application and determine that the proposed use, activity or development meets the provisions of this ordinance.

When securing a use permit, the owner/developer agrees to comply with performance standards in relationship to the applied for permit.

Whenever any person has an existing use, activity or development and thereafter desires alteration or expansion of the authorized use, such persons shall apply for a permit except for the normal upkeep, replacement and repair of existing facilities.

Exceptions:

1. Storage of liquids, chemicals and fertilizers used by an individual or corporation in their agricultural operations during planting and crop cultivation are exempt from the requirements of this ordinance January 1 to October 1. However, Best Management Practices are encouraged.

2. Tanks used for chemigation are exempt from secondary containment regulations but secondary containment is encouraged.

3. Storage of liquid or dry fertilizer in amounts equal to or less than 1,000 pounds or 100 gallons, stored indoors by each farm operator is exempt from the requirements of this ordinance.

Section 1105.14. Limitation of County Liability:

Nothing in this ordinance shall be construed to imply that Grant County, by issuing a permit, has accepted any of an owner's or developer's liability if a permitted development contaminates water in shallow/surficial aquifers.

Section 1105.15. Underlying Zones:

Underlying zoning restrictions apply along with restrictions set forth in the Aquifer Protection Overlay District.

Section 1105.16. Saving Clause:

Should any section or provision of this ordinance be declared invalid, such decision shall not affect the validity of the ordinance as a whole or any other part thereof.

ORDINANCE B2004-01, AN ORDINANCE ESTABLISHING ZONING REGULATIONS FOR DEUEL COUNTY, SOUTH DAKOTA, AND PROVIDING FOR THE ADMINISTRATION, ENFORCEMENT, AND AMENDMENT THEREOF, IN ACCORDANCE WITH THE PROVISIONS OF CHAPTERS 11-2, 1967 SDCL, AND AMENDMENTS THEREOF, AND FOR THE REPEAL OF ALL RESOLUTIONS AND ORDINANCES IN CONFLICT THEREWITH.

WHEREAS, the Deuel County, South Dakota, Board of County Commissioners, hereinafter referred to as the Board of County Commissioners, deems it necessary, for the purpose of promoting the health, safety, and the general welfare of the County, to enact a zoning regulation and to provide for its administration, and

WHEREAS, the Board of County Commissioners have appointed a County Planning Commission, hereinafter referred to as the Planning Commission, to recommend the district boundaries and to recommend appropriate regulations to be enforced therein, and

WHEREAS, the Planning Commission has divided Deuel County into districts, and has established by reference to maps the boundaries of said districts for administration and interpretation; has provided for definitions and for amendments to this regulation; has provided for the enforcement; prescribed penalties for violation of provisions; has provided for building permits within the districts; has provided for invalidity of a part and for repeal of regulation in conflict herewith; and has prepared regulations pertaining to such districts in accordance with the county comprehensive plan and with the purpose to protect the tax base, to guide the physical development of the county, to encourage the distribution of population or mode of land utilization that will facilitate the economical and adequate provisions of transportation, roads, water supply, drainage, sanitation, education, recreation, or other public requirements, to conserve and develop natural resources, and

WHEREAS, the Planning Commission has given reasonable consideration, among other things, to the character of the districts and their peculiar suitability for particular uses, and

WHEREAS, the Planning Commission has given due public notice to a hearing and has held such public hearing and has made a preliminary report and submitted it to the Board of County Commissioners, and

WHEREAS, the Board of County Commissioners has given due public notice to a hearing relating to zoning districts, regulations, and restrictions, and has held such public hearings, and

WHEREAS, all requirements of SDCL 11-2, 1967, with regard to the preparation of this ordinance and subsequent action of the Board of County Commissioners, has been met, and

WHEREAS, copies of said zoning ordinance and zoning map have been filed with the Deuel County Auditor for public inspection and review during regular business hours, and

WHEREAS, all ordinances or parts of ordinances in conflict herewith are hereby expressly repealed;

THEREFORE BE IT RESOLVED that the Deuel County Zoning Ordinance is hereby adopted by the Board of County Commissioners, Deuel County, South Dakota.

Adopted this 6th day of July, 2004.

_____
Chairman
Deuel County Board of County Commissioners

ATTEST:

_____
Deuel County Auditor

ARTICLE XI

ZONING DISTRICTS

Section 1101. "A" Agricultural District

Section 1101.01. Purpose.

This district is established to maintain and promote farming and related activities within an environment which is generally free of other land use activities. Residential development will be discouraged to minimize conflicts with farming activities and reduce the demand for expanded public services and facilities.

Section 1101.02 Permitted Uses

1. Agricultural activities and farm related buildings, including Type E Concentrated Animal Feeding Operations;
2. Farm dwelling;
3. Site-built single-family residences;
4. Type A and Type B manufactured homes;
5. Modular homes;
6. Fisheries services and game propagation areas;
7. Horticultural services;
8. Orchards, tree farms, truck gardening, nurseries and greenhouses;
9. Public parks and recreation areas;
10. Home occupations;
11. Accessory uses and buildings.

Section 1101.03 Special exceptions

1. Airports and airstrips;
2. Church or cemetery;
3. Golf course, golf driving range;

4. Sand, gravel or quarry operation, mineral exploration and extraction, Rock crushers, concrete and asphalt mixing plants provided;

    a. The site meets the requirements of the State Department of Environment and Natural Resources.

    b. A site plan is provided indicating the following information:

        i. Present topography, soil types, depth to groundwater.

        ii. Location of existing water drainage, existing buildings, existing shelterbelts.

        iii. Identification of roads leading to the site.

        iv. Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

        v. Proposed monitoring wells, etc.

        vi. A requirement for receiving a permit for extractive/mining operations shall include a haul-road agreement between the applicant and appropriate governmental entity (Federal, State, County, Township, or Municipality).

        vii. The applicant may be required to provide information regarding how potential air, noise, and water pollution would be minimized.

        viii. A minimum of one thousand (1,000) feet from the mineral exploration and extraction; rock crushers; and concrete and asphalt mixing plants property line to the nearest residence; excluding: the residence of the above said uses operator.

5.Sanitary landfills, Rubble Sites provided:

    a. The site meets the requirements of the State Department of Water and Natural Resources.

    b. A site plan is provided indicating the following information:

        i. Present topography, soil types, depth to groundwater.

        ii. Location of existing water drainage, existing buildings, existing shelterbelts.

        iii. Identification of roads leading to the site.

        Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

v. Proposed monitoring wells, etc.

c. A minimum of one thousand (1,000) feet from the landfill property line to the nearest residence; excluding: the residence of the landfill operator.

6. Institution farms, including religious farming communities;

7. Domestic Sanitary Sewer Treatment Facility provided;

   a. The site meets the requirements of the State Department of Water and Natural Resources.

   b. A site plan is provided indicating the following information:

      (1) Present topography, soil types, depth to groundwater.

      (2) Location of existing water drainage, existing buildings, existing shelterbelts.

      (3) Identification of roads leading to the site.

      (4) Proposed changes at the site such as new shelterbelts, new buildings, changes in topography, new fence lines.

      (5) Proposed monitoring wells, etc.

   c. A minimum of one thousand (1,000) feet from the domestic sanitary sewer treatment facility property line to the nearest residence.

8. Class A, Class B, Class C, and Class D Concentrated Animal Feeding Operations. (See Concentrated Animal Feeding Operations, Article XIII.)

9. Stables, dog/cat kennels;

10. Veterinary clinics;

11. Junkyards/salvage yards, provided that they meet the following minimum requirements and other restrictions that the Board of Adjustment may deem appropriate:

   a. Storage for junkyards shall be set back a minimum of two hundred (200) feet from any adjoining road right-of-way.

   b. Junkyards shall be screened on all sides by a solid wall, with construction materials and design to be approved by the Board of Adjustment, at least two (2) feet above the highest stock pile or by a shelterbelt of shrubs and trees as approved by the Board of Adjustment; screening must be maintained in good repair.

c. No junkyards will be allowed within one thousand (1,000) feet from the junkyard property line to the nearest residence; excluding: the residence of the junkyard operator.

d. All junkyards must have a minimum lot of ten (10) acres.

12. Essential services – Overhead or underground electrical, gas, steam or water transmission or distribution systems and structures, or collection, communication, supply or disposal systems and structures used by public for protection of the public health, safety or general welfare, including towers, poles, wires, mains drains, sewers, pipes, conduits, cables satellite dishes, and accessories in connection therewith.

13. Wireless Telecommunication Towers and Facilities;

14.Commercial public entertainment enterprises not normally accommodated in commercial areas, including but not limited to, the following: music concerts, rodeos, tractor pulls, and animal and vehicle races;

15.Seasonal retail stands, including fireworks stands;

16. Extended Home Occupation--see Section 1210;

17.Caretaker residences associated with public or private enterprise.

18. Bed and breakfast

19. Game Lodge;

20.Private Shooting Preserve;

21.Group Home;

22. Wind Energy System;

23. On and Off-Site Sign;

Section 1101.04 Area Regulations

All buildings be set back from road right-of-way lines and lot line to comply with the following yard requirements.

1. Lot Size: All residential lots shall be a minimum of three (3) acres, except as provided in item 7 below. All other permitted uses and special exceptions shall have a minimum area and setback regulations as determined by the Board of Adjustment.

2. Front Yard

   The minimum depth of the front yard shall be not less than one hundred fifty (150) feet and in no case shall an accessory building be located or extend into the front yard. In the case of a corner lot, front yards shall be provided on both streets.

3. Side Yard

   The minimum width of a side yard shall be twenty-five (25) feet.

4. Rear Yard

   The minimum depth of a side yard shall be fifty (50) feet.

5. Maximum Lot Coverage: Dwellings and buildings accessory thereto shall cover not more than twenty-five (25) percent of the lot area.

6. Shelterbelts. (See Section 1208.)

7. The Board of Adjustment may allow a minimum residential lot size for the "A" Agricultural District under the following condition:

   a. Where single family home is requested on an established farmstead, so long as it is immediately connected to the existing farming operation.

8. Building additions that are no closer to the right-of-way or other property lines

Section 1101.05 Height Regulations

No main buildings shall exceed two and one-half (2 1/2) stories or thirty-five (35) feet in height. Exceptions include the following:

1. Agricultural buildings;

2. Chimneys, smokestacks, cooling towers;

3. Radio and TV towers;

4. Water tanks;

5. Elevators;

6. Others, providing that they are not used for human occupancy.

Section 1101.06 Access

1. The drive-way serving the parcel shall be separated from adjacent driveways on the same side of the road by the following distances depending upon road types:

   a. Local road: 100 feet;

   b. Collector road: 300 feet;

   c. Arterial: 500 feet;

   d. Minimum distance from intersection of two or more of the above: 100 feet

2. For all proposed uses and structures adjacent to a State highway, an access permit from the State of South Dakota Department of Transportation shall be required prior to the filing of a plat or the issuance of a building/use permit

Section 1101.07 Easements/Waivers

1. An Agricultural easement must be filed with Register of Deeds on all property to be used as a site for a newly constructed residence (farm and non-farm) or church prior to issuance of a building permit.

2. Applicants for residential development (farm and non-farm) are required to obtain a written waiver from the owner/operator of any existing concentrated animal feeding operation which is closer than one-half (1/2) mile from the proposed residential building site. This waiver shall be filed with the Register of Deeds.

Section 1102. "CI" Commercial/Industrial District

Section 1102.01 Purpose

The "CI" District is intended for commercial and industrial uses which due to their size and nature require highway access.

Section 1102.02 Permitted Use

1. On-Site Signs

Section 1102.03 Special exceptions

1. Implement sales and service;
2. Truck terminals and freight warehouses;
3. Seed sales and grain storage, fertilizer and chemical storage and sales;
4. Highway and street maintenance shops;
5. Welding and machine shops;
6. Gas, oil and liquid propane stations including bulk stations;
7. Public and private utilities;
8. Livestock sales;
9. Contractors' shops and yards;
10. Wholesale distributing companies;
11. Restaurants, taverns;
12. Motels;
13. Single family residences;
14. Adult Uses
15. Off-site signs;
16. Auto Sales;
17. Agricultural-based industries such as ethanol plants and corn/soybean processing.

Section 1102.04 Area Regulations

1. Lot Area. Lot area shall be determined by need, setback, side yards, rear yards, parking requirements, freight handling requirements, building site and future expansion; however, in no case shall a lot have less than three (3) acres. An applicant for a special exception shall provide a proposed site plan which can be reviewed by the Board of Adjustment. For commercial and industrial uses, buildings shall occupy no more than twenty-five (25) percent of the lot.

2. Front Yard. There shall be a front yard on each street which a lot abuts, and which yard shall be not less than one hundred fifty (150) feet in depth.

3. Side Yards. On lots adjacent to a residential area, all buildings and incidental areas shall be located so as to provide a minimum side yard of one hundred (100) feet, which shall be landscaped on the side adjacent to the residential area. All other side yards shall be a minimum of fifty (50) feet.

4. Rear Yards. No building shall be constructed within fifty (50) feet of the rear lot line. The rear yard shall be one hundred (100) feet if the lot abuts an interstate or major highway.

Section 1102.05 Access

1. All property in the "CI" District must have access to a County, State, or Federal Road.

2. The drive-way serving the parcel shall be separated from adjacent driveways on the same side of the road by the following distances depending upon road types:

    a. Local road: 100 feet;

    b. Collector road: 300 feet;

    c. Arterial: 500 feet;

    d. Minimum distance from intersection of two or more of the above: 100 feet

3. For all proposed uses and structures adjacent to a State highway, an access permit from the State of South Dakota Department of Transportation shall be required prior to the filing of a plat or the issuance of a building/use permit

Section 1103. “LP" Lake-Park District

Section 1103.1 Purpose

The Lake-Park District is established to provide for orderly residential and recreational development, together with certain public facilities, customary home occupations, and certain recreation oriented commercial establishments, along lakeshores.

Section 1103.2 Area Contained in “LP” District

All land, unless otherwise zoned, within one thousand (1,000) feet of the established normal high water line of a designated lake shall be contained in the Lake-Park District and usage shall conform to the regulations for this District.

Section 1103.3 Permitted Uses

1. Site-built Single-family residential usage;

2. Public parks and recreation areas;

3. Agriculture and horticulture uses;

4. Type A Manufactured Homes;

5. Modular Homes;

Section 1103.4 Special exceptions

1. Private parks and campgrounds;

2. Resorts;

3. Restaurants;

4. Home occupations;

5. Shoreline alterations, filling, grading, lagooning, dredging, and retaining walls, in a strip paralleling the shoreline and extending thirty-five (35) feet inland from all points along the high water mark of the shoreline.

6. Multiple family dwellings;

7. Type B and C manufactured homes that are older than ten (10) years, if the owner intends to upgrade or modify.

8. Accessory structures located on a lot adjacent to a lot with principle structure which is separated by a public or private road.

9. Storage

10. Commercial campground

Section 1103.5 Area Regulations:

1. Each lot shall have a lot depth of not less than one hundred and fifty (150) feet.

2. Each lot shall have a shoreline frontage of not less than seventy-five (75) feet in width.

3. Each lot shall have a road frontage of not less than fifty (50) feet in width.

4. Each building shall be set back not less than fifty (50) feet from the established normal high water mark and or have a rear yard of fifty (50) feet.

5. Each building shall be set back not less than fifty (50) feet from State or Federal highways and must be set back a minimum of thirty (30) feet for all other roads and ten (10) feet from the side yard property line. Exception: On those lots platted prior to June 8, 1976, which have a lot width of less than seventy-five (75) feet, each building shall have a side yard of not less than a distance equal to ten (10) percent of the lot width. Under no circumstances shall a building have a side yard of less than five (5) feet. Roof overhangs may infringe upon the side yard requirements no more than one and one-half (1.5) feet.

6. For lakes and ponds: No structure except piers and docks shall be placed at an elevation such that the lowest floor, including basement, is less than three (3) feet above the established normal high water mark. In those instances where sufficient data on known high water levels are not available, the elevation line of permanent terrestrial vegetation shall be used as the estimated high water elevation. When fill is required to meet this elevation, the fill shall be required to stabilize or be tamped down before construction is begun.

7. Sealed holding tanks for individual cabins and homes are required for all lots containing less than twenty thousand (20,000) square feet and not within the Lake Cochrane Sanitary District.

8. There shall be no more than one primary residential building on any parcel of land.

9. Where two parcels of land are purchased and joined together by one common boundary, the setbacks established above shall pertain to the perimeter of the combined lots.

Section 1103.6 Shoreline Alterations

These regulations are deemed necessary along the shores of natural waters to protect scenic beauty, control erosion and reduce effluent and nutrient flow from the shoreland.

1. Removal of Shore Cover
   Tree and shrub cutting in a strip paralleling the shoreline and extending thirty-five (35) feet inland from all points along the established normal high water mark of the shoreline shall be limited in accordance with the following provisions:

   a. Cutting shall leave sufficient cover to screen cars, dwellings, and accessory structures, except boathouses, as seen from the water, to preserve natural beauty and to control erosion.

   b. Natural shrubbery shall be preserved as far as practicable, and where removed it shall be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion and preserving natural beauty.

   c. The removal of natural shrubbery and its replacement shall require the granting of a permit by the Zoning Officer. Petition for such permit shall be accompanied by a plan showing the work to be accomplished. The granting of such permit shall be conditional upon a contract requiring the petitioner to give to the Zoning Officer, within one (1) year after the date of grant, satisfactory evidence of compliance with such plan or pay for the cost of such compliance by the County.

2. Shoreline Stabilization

   Shoreline stabilization, including but not limited to riprapping and retaining walls, shall require the granting of a permit by the Board of Adjustment.

Section 1103.7 Filling, Grading, Lagooning and Dredging

1. Filling, grading, lagooning or dredging which would result in substantial detriment to natural waters by reason of erosion, sedimentation or impairment of fish and aquatic life is prohibited.

2. A permit shall be required for any filling or grading. This requirement does not apply to soil conservation practices such as terraces, runoff diversions and grassed waterways which are used for sediment retardation.

3. Building permits shall be required for all retaining walls or structures.

4. Small filling and grading projects and small shoreline repair or stabilization projects limited to one hundred (100) square feet shall require a Permit. The Zoning Officer can give the above permit without the approval of the Board of Adjustment, all other permits must be approved by the Board of Adjustment.

Section 1103.8 Fence Requirements

All fences, walls, and hedges shall be set back not less than fifty (50) feet from the high water mark and not less than thirty (30) feet from the road right-of-way and shall have a maximum height of eight (8) feet. All fences shall require the granting of a permit by the Zoning Officer.

Section 1104. "NR" Natural Resource District

Section 1104.01 Purpose

The purpose of the Natural Resource District is to provide for the retaining of natural vegetation of a particular area, to preserve the natural environment and resources from destructive land uses and to protect wildlife habitat. Such an area may include but is not limited to flood plains of rivers, streams, and lakes, abandoned quarries, certain wetlands, natural prairies, and historical sites.

Section 1104.02 Area Contained in "NR" District

All lands, unless otherwise zoned, within three hundred (300) feet of wetlands that are totally or partially owned by the State or Federal governments as wildlife production or public shooting areas and meandered lakes.

Section 1104.03 Permitted Uses

1. Wildlife production areas;
2. Game refuges;
3. Historic sites and/or monuments;
4. Designated natural prairies;
5. Public hunting and fishing access areas.
6. Horticulture uses and livestock grazing.

Section 1104.04 Uses Permitted by Special exception if Deemed Not Detrimental to District

1. Transportation and utility easements and rights-of-way.
2. Utility substations;
3. Public parks and/or playgrounds;

Section 1105. Aquifer Protection Overlay District

Section 1105.01 Purpose and Intent:

The Deuel County Zoning Commission recognizes (1) that residents of Deuel County rely exclusively on ground water for a safe drinking water supply and (2) that certain land uses in Deuel County can contaminate ground water particularly in shallow/surficial aquifers.

The purpose of the Aquifer Protection Overlay District is to protect public health and safety by minimizing contamination of the shallow/surficial aquifers of Deuel County. It is the intent to accomplish this, as much as possible, by public education and securing public cooperation.

Appropriate land use regulations will be imposed, however, which are in addition to those imposed in the underlying zoning districts or in other county regulations. It is not the intent to grandfather in existing land uses which pose a serious threat to public health through potential contamination of public water supply wellhead areas.

Section 1105.02 Definitions for Aquifer Protection Overlay District:

1. Abandoned Well: A well no longer used or intended to be used as a water source.

2. Concentrated Animal Feeding Operation: (See Concentrated Animal Feeding Operations, Article XIII.)

3. Best Management Practices: Measures contained in Soil Conservation Service South Dakota Technical Guide, either managerial or structural, that are determined to be the most effective, practical means of preventing or reducing pollution inputs from non-point sources to water bodies.

4. Chemigation: The process of applying agricultural chemicals (fertilizer or pesticides) through an irrigation system by injecting the chemicals into the water.

5. Class V Injection Well: A conduit through which potentially contaminated but generally non-hazardous fluids can move below land surface to the subsurface. The types of primary concern in Deuel County are (1) commercial/industrial facility septic tanks used to dispose of more than domestic wastewater, and (2) dry wells for repair/service bay drains at facilities servicing motorized vehicles/equipment.

6. Contamination: The process of making impure, unclean, inferior or unfit for use by introduction of undesirable elements.

7. Contingency Plans: Detailed plans for control, containment, recovery and clean up of hazardous materials released during floods, fires, equipment failures, leaks and spills.

8. Development: The carrying out of any surface or structure construction, reconstruction or alteration of land use or intensity of use.

9. Facility: Something built, installed or established for a particular purpose.

10. Grey Water: All domestic wastewater except toilet discharge water.

11. Hazardous Materials: A material which is defined in one or more of the following categories:

    a. Ignitable: A gas, liquid or solid which may cause fires through friction, absorption of moisture, or which has low flash points. Examples: white phosphorous and gasoline.

    b. Carcinogenic: A gas, liquid or solid which is normally considered to be cancer causing or mutagenic. Examples: PCBs in some waste oils.

    c. Explosive: A reactive gas, liquid or solid which will vigorously and energetically react uncontrollably if exposed to heat, shock, pressure or combinations thereof. Examples: dynamite, organic peroxides and ammonium nitrate.

    d. Highly Toxic: A gas, liquid or solid so dangerous to man as to afford an unusual hazard to life. Examples: parathion and chlorine gas.

    e. Moderately Toxic: A gas, liquid or solid which through repeated exposure or in a single large dose can be hazardous to man. Example: atrazine.

    f. Corrosive: Any material, whether acid or alkaline, which will cause severe damage to human tissue, or in case of leakage might damage or destroy other containers of hazardous materials and cause the release of their contents. Examples: battery acid and phosphoric acid.

12. Manure Storage Area: An area for the containment of animal manure in excess of 8,000 pounds or 1,000 gallons.

13. Leaks and Spills: Any unplanned or improper discharge of a potential contaminant including any discharge of a hazardous material.

14. Pasture: A field that provides continuous forage to animals and where the concentration of animals is such that a vegetative cover is maintained during the growing season.

15. Primary Containment Facility: A tank, pit, container, pipe or vessel of first containment of a liquid or chemical.

16. Secondary Containment Facility: A second tank, catchment pit, pipe or vessel that limits and contains a liquid or chemical leaking or leaching from a primary containment area; monitoring and recovery systems are required.

17. Shallow Aquifer: An aquifer vulnerable to contamination because the permeable material making up the aquifer (1) extends to the land surface so percolation water can easily transport contaminants from land surface to the aquifer, or (b) extends to near the land surface and lacks a sufficiently thick layer of impermeable material on the land or near the land surface to limit percolation water from transporting contaminants from the land surface to the aquifer.

18. Ten Year Time of Travel Distance: The distance that ground water will travel in ten years. This distance is a function of aquifer permeability and water table slope.

19. Zone of Contribution: The entire area around a well or wellfield that contributes water to the well or wellfield.

Section 1105.03 Delineation and Regulation of Aquifer Protection Overlay Zones

Boundaries for the aquifer protection zones for the Aquifer Protection Overlay District are shown on maps prepared by the East Dakota Water Development District (EDWDD), Brookings, South Dakota and by the South Dakota Geologic Survey, Vermillion, South Dakota. Said maps are hereby adopted by reference as part of these regulations as if the maps were fully described herein.

The Aquifer Protection Overlay District is divided into two zones. The zone of contribution for Zone A, was mapped by the (EDWDD) with South Dakota Geological Survey (SDGS) technical assistance using techniques outlined in the U.S. Environmental Protection Agency publication "Guidelines for Delineation of Wellhead Protection Areas", June, 1987. The shallow/surficial aquifer boundary for Zone B was mapped by the SDGS as Task 3 of EDWDD's comprehensive ground water project.

Section 1105.04 Zone A -- Aquifer Critical Impact Zones

Zone A, the wellhead protection area, is the mapped zone of contribution around all public water supply wells or wellfields in shallow/surficial aquifers and includes land upgradient from the well or wellfield to the ten year time of travel boundary.

Section 1105.05 Permitted Uses in Zone A:

The following uses are permitted provided they meet appropriate performance standards outlined for aquifer protection overlay zones:

1. Agriculture;

    a. Application of manure is permitted with approved nutrient management plan.

2. Horticulture;

3. Parks, greenways or publicly owned recreational areas;

4. Necessary public utilities/facilities designed so as to prevent contamination of groundwater.

Section 1105.06 Special exceptions in Zone A:

The following uses are permitted only under the terms of a special exception and must conform to provisions of the underlying zoning district and meet Performance Standards outlined for Aquifer Protection Overlay Zones.

1. Expansion of existing uses to the extent they remain or become nonconforming and to the extent allowed by the underlying district. The Board of Adjustment shall not grant approval unless it finds the proposed expansion does not pose greater potential for groundwater contamination than the existing use.

2. All uses not permitted or not prohibited in Zone A may be approved by the Board of Adjustment provided they can meet Performance Standards outlined for the Aquifer Protection Overlay Zones.

Section 1105.07 Prohibited Uses in Zone A:

The following uses are expressly prohibited in Zone A:

1. New Concentrated Animal Feeding Operations, including Class A, Class B, Class C, Class D, and Class E.

2. Manure storage areas;

3. Disposal of solid waste except spreading of manure;

4. Outside unenclosed storage of road salt;

5. Disposal of snow containing de-icing chemicals;

6. Processing and storage of PCB contaminated oil;

7. Car washes;

8. Auto service, repair or painting facilities and junk or salvage yards;

9. Disposal of radioactive waste;

10. Graveyards or animal burial sites;

11. Detonation sites;

12. Open burning except ditches, fields and non-hazardous yard and household wastes such as paper, wood and leaves.

13. All other facilities involving the collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or waste having a potentially harmful impact on ground water quality.

14. Fall application of nitrogen fertilizer except spreading of manure;

15. Land spreading of petroleum contaminated soil;

16. Land spreading or dumping of waste oil;

17. Class V injection wells;.

18. Existing Concentrated Animal Feeding Operations will not be able to expand beyond a total of three hundred (300) animal units.

19. Earthen storage basins and lagoons;

20. Stockpiling of solid waste;

21. Chemigation with liquid fertilizer, pesticides and/or herbicides

22. Storage of liquid fertilizer, pesticides and/or herbicides without an approved permanent secondary storage system.

Section 1105.08 Zone B -- Aquifer Secondary Impact Zones

Zone B is the remainder of the mapped shallow/surficial aquifer in the County not included in Zone A. Zone B is being protected because (1) the aquifer is a valuable natural resource for future development, (2) the aquifer provides drinking water supply for individual domestic users, (3) contamination is not justified just because this area is not currently used for public water supply and (4) contaminants from this area could eventually enter Zone A.

Section 1105.09 Permitted Uses in Zone B:

1. All uses permitted in the underlying zoning districts provided that they can meet the Performance Standards as outlined for the Aquifer Protection Overlay Zones.

Section 1105.10 Special exceptions in Zone B:

1. All special exceptions allowed in underlying districts, with the exception of those expressly prohibited in Zone B, may be approved by the Board of Adjustment provided they can meet Performance Standards outlined for the Aquifer Protection Overlay Zone.

2. All new and expansion of existing concentrated animal feeding operations may be required to conduct shall require soil borings to determine impermeable material between land surface and the aquifer.

3. Earthen storage basins and lagoons may be approved by the Board of Adjustment after site-specific review. Earthen storage basins and lagoons shall require soil borings to determine impermeable material between land surface and the aquifer. The Board reserves the right to require an impermeable liner to prevent ground water contamination.

Section 1105.11 Prohibited Uses in Zone B:

The following uses are expressly prohibited in Zone B:

a. Fall application of nitrogen fertilizer except spreading of manure

b. Land spreading of petroleum contaminated soil;

c. Land spreading or dumping of waste oil;

d. Class V injection wells;

Section 1105.12 Performance Standards For Aquifer Protection Overlay Zones:

The following standards shall apply to land uses in Zones A and B of the Aquifer Protection Overlay Districts:

1. New or replacement septic tanks and associated drain fields for containment of human wastes must conform with regulations established by the State Department of Environment and Natural Resources.

2. (Reserved)

3. Storage of petroleum products in quantities exceeding (100) gallons at one locality in one tank or series of tanks must be in elevated tanks; such tanks larger than one thousand (1,000) gallons must have secondary containment system where it is deemed necessary by the County Zoning Office.

4. Any commercial or industrial facility, not addressed by (2) or (3) above, involving collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or waste, except for spreading of manure, in excess of one thousand (1,000) pounds and/or one hundred (100) gallons which has the potential to contaminate ground water must have a secondary containment system which is easily inspected and whose purpose is to intercept any leak or discharge from the primary containment vessel or structure. Underground tanks or buried pipes carrying such materials must have double walls and inspectable sumps.

5. When pastured animals are concentrated for winter feeding and the number of animal units exceeds two hundred (200), measures shall be employed to prevent runoff of manure

6. Owners/operators of active or abandoned feedlots shall handle and dispose of manure in accordance with Soil Conservation Service South Dakota engineering Standard, Nutrient Management System (680)

7. Discharge of industrial process water is prohibited without County Zoning Office approval.

8. Auto service, repair or painting facilities and junk or salvage yards shall meet all State and Federal standards for storage, handling and disposal of petroleum products and shall properly dispose of all other potentially hazardous waste materials.

9. Any facility involving collection, handling, manufacture, use, storage, transfer or disposal of hazardous materials must prepare and have on file in the County Zoning Office an acceptable contingency plan for preventing hazardous chemicals from contaminating the shallow/surficial aquifer should floods, fire, other natural catastrophes or equipment failure occur:

    a. For flood control, all underground facilities shall include a monitoring system and a secondary standpipe above the 100 year frequency flood level. All above ground facilities, an impervious dike, above the 100 year flood level and capable of containing 120 percent of the largest storage volume, with an overflow recovery catchment area (sump).

    b. For fire control, all facilities shall include a fire retardant system and provision for dealing safely with both health and technical hazards that may be encountered by disaster control personnel in combating fire. Hazards to be considered are overhead and buried electrical lines, pipes, other buried objects and other hazardous liquids, chemicals or open flames in the immediate vicinity.

    c. For equipment failures, plans shall include but not limited to:

        i. Below ground level, provision for removal and replacement of leaking parts, a leak detection system with monitoring, and overfill protection system.

ii. Above ground level, provision for monitoring, replacement, repair, and cleanup of primary containment systems.

d. For other natural or man-caused disasters occurring, the owner and/or operator shall report all incidents involving liquid or chemical material which may endanger health and/or of disaster personnel and/or the general public.

e. Agricultural operations are exempted from performance standard (9) unless chemicals are stored which are on the Superfund and Reauthorization Act of 1986 (SARA Title III) extremely hazardous substance list in quantities exceeding the threshold planning quantity at any one time.

f. The County Zoning Office, Public Water Supplies, and Department of Environment and Natural Resources shall be informed within 24 hours of any leak, spill or release of materials that might potentially contaminate groundwater.

10. Since it is known that improperly abandoned wells can become a direct conduit for contamination of groundwater by surface water, all abandoned wells should be plugged in conformance with South Dakota Well Construction Standards, Chapter 74:02:04:67-70.

Section 1105.13 Grant of Permit, Alteration of Use:

Before a permit is granted, the County Zoning Officer must examine an application and determine that the proposed use, activity or development meets the provisions of this ordinance.

When securing a use permit, the owner/developer agrees to make future improvements which become necessary to prevent contamination of shallow/surficial aquifers and the owner/developer must allow County personnel to inspect any improvements to verify they meet the performance standards.

Whenever any person has an existing use, activity or development and thereafter desires alteration or expansion of the authorized use, such persons shall apply for a permit. The owner/developer may appeal a County Zoning Officer's decision to modify or deny a requested permit to the ~~County Planning~~/Board of Adjustment

Any lawful use in existence on the effective date of this ordinance shall be permitted to continue provided it can be shown such use does not threaten public health and safety by potential contamination of water in the shallow/surficial aquifers.

Exceptions:

1. Storage of liquids, chemicals and fertilizers used by an individual or corporation in their agricultural operations during planting and crop cultivation are exempt from the requirements of this ordinance March 1 to October 1. However, Best Management Practices are encouraged, particularly in Zone A. Tanks used for chemigation are exempt from secondary containment regulations but secondary containment is encouraged.

2. Storage of liquid or dry fertilizer in amounts equal to or less than 1,000 pounds or 100 gallons, stored indoors by each farm operator is exempt from the requirements of this ordinance.

Section 1105.14 Limitation of County Liability:

Nothing in this ordinance shall be construed to imply that Deuel County, by issuing a permit, has accepted any of an owner's or developer's liability if a permitted development contaminates water in shallow/surficial aquifers.

Section 1105.15 Underlying Zones:

Underlying zoning restrictions apply along with restrictions set forth in the Aquifer Protection Overlay District.

Section 1106. "TD" Town District

Section 1106.01 Purpose

The Town District is established to provide for orderly low-density residential development, together with certain public facilities, and commercial/industrial uses which are not detrimental in the unincorporated town of Bemis.

Section 1106.02 Permitted Uses

1. Single-family residential usage, including Type A and Type B Manufactured Homes.
2. Public parks.
3. Agriculture and horticulture uses, excluding feedlots.
4. Home occupations.

Section 1106.03 Special Exceptions

1. Retail and service businesses.
2. Light manufacturing.
3. Bar or tavern.
4. Warehouse.
5. Multi-family housing.
6. Contractors' offices, shops, and yards.
7. Manufactured Home Court

Section 1106.04 Area Regulations

Residential

Minimum Yard Requirements: Front----------Twenty-five (25) feet
Side----------Fifteen (6) feet
Rear----------Twenty-five (25) feet

Minimum Lot Size:

Public Water Supply/Septic Tank----------20,000 Sq. Ft.
Well/Septic Tank----------43,560 Sq. Ft.
Public Water Supply/Public Sewer----------9,600 Sq. Ft.

Commercial

Lot size shall be determined by off-street parking needs; availability of water and sewage disposal systems; adjacent land uses; need for screening; and type of business. Front, side and rear yards shall be determined by the Board of Adjustment.

Industrial

Lot size shall be determined by off-street parking needs; impact on adjoining land uses and need for screening or buffering from residential areas; availability of water and sewage disposal systems; type of manufacturing or storage facilities.

APPENDIX G
CULTURAL RESOURCES

Standing structures within Palmer et al. (2005) study area.

SHPO Inventory Number	County	Township/City	Property Name	Date constructed, property info	Twp	Range	Sec.	Within 1 mile of Proposed Route?	NRHP Status
DE00000018	Deuel	Antelope Valley	Building	N/A	117	47	33		Not Eligible
DE00000019	Deuel	Antelope Valley	Zoar Lutheran Church	1901	117	47	10		Not Eligible
DE00000020	Deuel	Antelope Valley	Antelope Valley Reformed Church	1907	117	47	17		Not Eligible
DE00000021	Deuel	Antelope Valley	Bridge	N/A	117	47	20	Yes	Not Eligible
DE00000026	Deuel	Gary	Building	N/A	115	47	3	Yes	Eligible
DE00000036	Deuel	Gary	Building	1900	115	47	3	Yes	Not Eligible
DE00000038	Deuel	Gary	Building	N/A	115	47	3	Yes	Not Eligible
DE00000041	Deuel	Gary	Structure	1906	115	47	4	Yes	Eligible
DE00000081	Deuel	Gary	Building	N/A	115	47	3	Yes	Eligible
DE00000103	Deuel	Gary	Building	1909	115	47	3	Yes	Not Eligible
DE00000113	Deuel	Gary	Building	1913	115	47	3	Yes	Eligible
DE00000131	Deuel	Gary	First National Bank	1917	115	47	3	Yes	Listed
DE00000137	Deuel	Gary	SD School for the Blind Historic District	1899	115	47	3	Yes	Listed
DE00000138	Deuel	Gary	Odd Fellows Hall	1898	115	47	3	Yes	Listed

SHPO Inventory Number	County	Township Name	Site Name	Township	Range	Section	Site Information	Comments	NRHP Status	Within 500 feet of Proposed Route
39DE0016	Deuel	Herrick	N/A	115	47	28	Foundation and depression	Partial, 8 x 6.75m stacked rock foundation with no evidence of mortar, a 5 x 5m x 2ft. Deep depression		
39DE0021	Deuel	Antalope Valley	N/A	117	47	32	Stone circle	Four stone circles on a terrace overlooking a small, unnamed stream valley that leads to Lost Creek. Rings in E-W line along fence, last one 500ft. E of ditch. Two most visible rings are 6.45m x 7.45m and 5.35m x 7.10m.		
39DE0053	Deuel	Herrick	N/A	115	47	28	Burial (Native American)	Historic Native American burial site. Looting depressions have been observed		
39DE0054	Deuel	Herrick	N/A	115	47	27	Small prehistoric occupation site	One of the few known prehistoric sites along the minor tributaties in Deuel County. The site has never been cultivated.		
39DE0055	Deuel	Herrick	N/A	115	47	27	Depression, artifact scatter	Remains of three historic dugouts, along with a lithic scatter.		
39DE0056	Deuel	Herrick	N/A	115	47	28	Occupation (Late Archaic)	Buried Late Archaic occupation. Hearth and charcoal from test pit dated. Hearth - 655 B.C. and charcoal 1145 B.C.		
39DE0065	Deuel	Glenwood	N/A	116	48	1	Rock pile, cairn	unknown cultural affiliation		
39DE0079	Deuel	Glenwood	N/A	116	47	33	Artifact scatter	Lithic scatter including flakes and shatter		
39DE2003	Deuel	N/A	Chicago Northwestern Railroad	N/A	N/A	N/A	Railroad		Eligible	Yes
39GT0006	Grant	Big Stone	N/A	121	46	17	Earthlodge Village	Probably the fortified site recorded by T.H. Lewis in 1883. All traces of earthworks have been destroyed by cultivation.		
39GT0024	Grant	Big Stone	N/A	121	47	13	Multicomponent artifact scatter	Sparse multicomponent artfiact scatter on terrace overlooking Whetstone River. Observed lithic tool and debitage, bottle finish and parts of straight razor handle		
39GT0032	Grant	Vernon	N/A	119	48	36	Farmstead		Potentially Eligible	
39GT2000	Grant	N/A	Burlington Northern Railroad	N/A	N/A	N/A	Railroad		Eligible	Yes
39GT2007	Grant	N/A	Chicago, Milwaukee, St. Paul & Pacific Railroad	N/A	N/A	N/A	Railroad		Eligible	Yes
39GT2015	Grant	N/A	Minneapolis & St. Louis Railroad	N/A	N/A	N/A	Railroad		Eligible	Yes