Application to the South Dakota Public Utilities Commission for a Facility Permit

PowerOn Midwest: Big Stone South to Brookings County to South Dakota/Minnesota Border

Northern States Power Company, doing business as Xcel Energy, and Otter Tail Power Company

PowerOn Midwest™
Big Stone South to Brookings

September 2026

Table of Contents

1 Introduction 1

2 PowerOn Midwest Overview 4

2.1 Big Stone South to Brookings to South Dakota/Minnesota Border Project 4

2.2 PowerOn Midwest in Minnesota 5

2.3 Purpose and Benefits 5

3 Project Development 9

3.1 Outreach: Public, Tribal, and Regulatory Agencies 9

3.2 Environmental Analysis 9

3.3 Routing Development Process 10

3.4 Land Rights Acquisition 12

3.5 County Permitting Requirements 13

3.5.1 Grant County 14

3.5.2 Deuel County 15

3.5.3 Brookings County 15

4 Facility Permit Application Compliance 17

5 Names of Participants (ARSD 20:10:22:06) 19

6 Names of owner and manager (ARSD 20:10:22:07) 20

7 Purpose of and demand for transmission facility (ARSD 20:10:22:08; 20:10:22:10) 21

7.1 Regional Drivers 21

7.2 Local South Dakota Drivers 23

7.2.1 Generation Changes 24

7.2.2 Increasing Demand 25

7.3 How the Project Addresses Multiple Needs 25

7.3.1 Reliability 25

7.3.2 Cost Effectiveness/Economic Benefits 28

7.3.3 Enabling Generation Transition 28

7.3.4 Consequences of Delay 28

8 Estimated Cost of Facility (ARSD 20:10:22:09) 30

9 Site Location and Overview 32

9.1 Transmission Facility 34

9.1.1 Transmission Right-of-way 34
9.1.2 Configuration of Structures and Conductors 35
9.2 Substations 38
9.2.1 Big Stone South Substation Expansion 38
9.2.2 Brookings County Substation Expansion 38
9.3 Temporary Use Areas 39
9.4 Construction and Operations 40
9.4.1 Engineering Design and Regulatory Approvals 40
9.4.2 Land Rights Acquisition 40
9.4.3 Transmission Construction Procedures 40
9.4.4 Substation Construction Procedures 42
9.4.5 Best Management Practices During Construction 43
9.4.6 Restoration Procedures 44
9.4.7 Maintenance Procedures 45
9.4.8 Storm and Emergency Response and Restoration 45
10 Alternative Sites and Siting Criteria (ARSD 20:10:22:12) 47
10.1 General Project Location and Route Selection 47
10.2 Route Alternatives Considered 48
10.2.1 Grant County 48
10.2.2 Deuel County 49
10.2.3 Brookings County 50
10.2.4 Advantages of the Proposed Route 51
10.3 Substation Expansion Sites Considered 52
10.4 Reliance on Eminent Domain 53
11 Effect on Physical Environment (ARSD 20:10:22:14) 54
11.1 Geological Resources 54
11.1.1 Existing Geological Resources 54
11.1.2 Geological Resource Impacts and Avoidance, Minimization, and Mitigation Measures 56
11.2 Soils 57
11.2.1 Existing Soil Resources 57
11.2.2 Soil Resource Impacts and Avoidance, Minimization, and Mitigation Measures 59

12 Effect on Hydrology (ARSD 20:10:22:15) 61
12.1 Groundwater Resources 61
12.1.1 Existing Groundwater Resources 61
12.1.2 Groundwater Resource Impacts and Avoidance, Minimization, and Mitigation Measures 62
12.2 Surface Water Resources 63
12.2.1 Existing Surface Water Resources 63
12.2.2 Surface Resource Impacts and Avoidance, Minimization, and Mitigation Measures 66
12.3 Current and Planned Water Use 67
12.3.1 Effect on Current and Planned Water Use 67
12.4 Wetlands 67
12.4.1 Existing Wetlands 67
12.4.2 Wetland Impacts and Avoidance, Minimization, and Mitigation Measures 69
13 Effect on Terrestrial Ecosystems (ARSD 20:10:22:16) 70
13.1 Vegetation 70
13.1.1 Existing Vegetation 70
13.1.2 Vegetation Impacts and Avoidance, Minimization, and Mitigation Measures 74
13.2 Wildlife 76
13.2.1 Existing Wildlife 76
13.2.2 Wildlife Impacts and Avoidance, Minimization, and Mitigation Measures 83
14 Effect on Aquatic Ecosystems (ARSD 20:10:22:17) 87
14.1 Existing Aquatic Ecosystems 87
14.1.1 Federally Listed Aquatic Species 87
14.1.2 South Dakota Natural Heritage Database Aquatic Species 87
14.2 Aquatic Ecosystems Impacts and Avoidance, Minimization, and Mitigation Measures 89
14.2.1 Federally Listed Aquatic Species 89
14.2.2 South Dakota Natural Heritage Database Aquatic Species 89
15 Effect on Land Use (ARSD 20:10:22:18) 90
15.1 Land Use 90
15.1.1 Existing Land Use 90
15.1.2 Land Use Impacts and Avoidance, Minimization, and Mitigation Measures 93

15.2 Public Lands and Facilities 95
15.2.1 Existing Public Lands and Facilities 95
15.2.2 Public Lands and Facilities Impacts and Avoidance, Minimization, and Mitigation Measures 96
15.3 Noise 97
15.3.1 Existing Sound 97
15.3.2 Noise Level Impacts and Avoidance, Minimization, and Mitigation Measures 98
15.4 Visual Resources 100
15.4.1 Existing Visual Resources 100
15.4.2 Visual Resource Impacts and Avoidance, Minimization, and Mitigation Measures 101
15.5 Satellite, Cellular, Radio, TV, and GPS Reception 102
15.5.1 Existing Satellite, Cellular, Radio, TV, and GPS Reception 102
15.5.2 Satellite, Cellular, Radio, TV, and GPS Reception Impacts and Avoidance, Minimization, and Mitigation Measures 104
16 Effect on Local Land Use Controls (ARSD 20:10:22:19) 106
16.1 Grant County 106
16.2 Deuel County 107
16.3 Brookings County 107
17 Effect on Water Quality (ARSD 20:10:22:20) 108
17.1 Existing Water Quality 108
17.2 Water Quality Impacts and Avoidance, Minimization, and Mitigation Measures 108
18 Effect on Air Quality (ARSD 20:10:22:21) 110
18.1 Existing Air Quality 110
18.2 Air Quality Impacts and Avoidance, Minimization, and Mitigation Measures 110
19 Time Schedule (ARSD 20:10:22:22) 111
20 Community Impact (ARSD 20:10:22:23) 112
20.1 Socioeconomic and Community Resources 112
20.1.1 Existing Socioeconomic and Community Resources 112
20.1.2 Socioeconomic and Community Resource Impacts and Avoidance, Minimization, and Mitigation Measures 114
20.2 Commercial, Industrial, and Agricultural Sectors 116
20.2.1 Commercial and Industrial Sectors 116

20.2.2 Agricultural Industry 116
20.3 Community Facilities and Services 118
20.3.1 Existing Community Facilities and Services 118
20.3.2 Community Facilities and Services Impacts and Avoidance, Minimization, and Mitigation Measures 120
20.4 Transportation 121
20.4.1 Existing Ground Transportation 121
20.4.2 Existing Air Transportation 122
20.4.3 Transportation Impacts and Avoidance, Minimization, and Mitigation Measures. 122
20.5 Cultural Resources 123
20.5.1 Existing Cultural Resources 124
20.5.2 Cultural Resources Impacts and Avoidance, Minimization, and Mitigation Measures 138
21 Summary of Potential Impacts and Avoidance, Minimization, and Mitigation Measures 139
22 Environmental Information (ARSD 20:10:22:13) 176
22.1 Physical Environment 179
22.2 Hydrology 180
22.3 Terrestrial Ecosystems 180
22.4 Aquatic Ecosystems 180
22.5 Land Use 180
22.6 Local Land Use Controls 181
22.7 Water Quality 182
22.8 Air Quality 182
22.9 Community Impact 182
23 Employment Estimates (ARSD 20:10:22:24) 183
24 Future Additions and Modifications (ARSD 20:10:22:25) 187
25 Reliability and Safety (ARSD 20:10:22:35) 188
25.1 Reliability 188
25.2 Safety 189
25.2.1 Design 189
25.2.2 Electric and Magnetic Fields 189
25.2.3 Stray and Induced Voltage 191

25.2.4 Farming Operations, Vehicle Use, and Metal Buildings Near Transmission Lines 191
26 List of Potential Permits and Approvals (ARSD 20:10:22:05) 193
27 Additional Information in the Application (ARSD 20:10:22:36) 183
27.1 Agency Coordination 183
27.2 Testimony and Exhibits (ARSD 20:10:22:39) 183
27.3 Applicants' Verifications 184
28 Literature Cited 185

Tables

Table 2-1 Xcel Energy South Dakota Load Served by Energy from Minnesota 7
Table 2-2 Otter Tail Power South Dakota Load Served by Energy from Minnesota 8
Table 3-1 Summary of Studies/Surveys 10
Table 3-2 Land Rights Acquisition Status Summary 13
Table 6-1 Owner/Operator by Project Component 20
Table 8-1 Project Cost Estimate by Project Component 31
Table 9-1 Project Location 33
Table 9-2 765 kV Transmission Line Structure Characteristics 36
Table 9-3 345 kV Transmission Line Structure Characteristics 37
Table 10-1 Site Evaluation Rejection Reasons 53
Table 11-1 Soils Mapped within the Proposed Route and Substation Siting Areas 58
Table 11-2 Prime Farmland Classifications within the Proposed Route and Substation Siting Areas 59
Table 12-1 Water Wells within Right-of-Way 62
Table 12-2 Watercourses Crossed by Proposed Route 64
Table 12-3 Impaired Waters Crossed by the Proposed Route 65
Table 12-4 Desktop Delineated Wetlands within the 765 kV Route 68
Table 12-5 Desktop Delineated Wetlands within the 345 kV Route 68
Table 12-6 Desktop Delineated Wetlands within the Substation Siting Areas 69
Table 13-1 National Landcover Database Landcover Types in Proposed Route 71
Table 13-2 National Landcover Database Landcover Types in Substation Siting Areas 71
Table 13-3 Potentially Undisturbed Grassland in Proposed Route 72
Table 13-4 Potentially Undisturbed Grassland in Substation Siting Area 72
Table 13-5 South Dakota Natural Heritage Database Plant Species Documented within One-half Mile of the Project 73
Table 13-6 State and County Noxious Weeds 74
Table 13-7 Common Wildlife Species in the Northern Glaciated Plains Level III Ecoregion 77
Table 13-8 Sharp-Tailed Grouse Priority Habitat Areas in Proposed Route 78
Table 13-9 Federal and State Listed Terrestrial Wildlife Species Potentially Occurring in Project Vicinity 80
Table 13-10 South Dakota Natural Heritage Database Terrestrial Wildlife Species Documented within One-Half Mile of the Project 83
Table 14-1 South Dakota Natural Heritage Database Aquatic Species Documented within One-Half Mile of the Project 88
Table 15-1 Land Use within the 765 kV Route 91
Table 15-2 Land Use within the 345 kV Route 91

Table 15-3 Land Use within the Substation Siting Areas 92
Table 15-4 Number of Residential and Non-Residential Structures within Specified Distances of the 765 kV Route 93
Table 15-5 Number of Residential and Non-Residential Structures within Specified Distances of the 345 kV Route 93
Table 15-6 Number of Residential and Non-Residential Structures within Specified Distances of the Substation Siting Areas 93
Table 15-7 Calculated Audible Noise L50 for the Operation of 765 kV Transmission Line Design 99
Table 15-8 Calculated Audible Noise L50 for the Operation of 345 kV Transmission Line Design 99
Table 19-1 Estimated Permitting and Construction Schedule 111
Table 20-1 Population, Employment and Income 113
Table 20-2 Population Demographics 114
Table 20-3 Community Facilities within 5 Miles of the Project Route 118
Table 20-4 Highway Traffic Near the Project 121
Table 20-5 County Road Traffic Range Near the Project 121
Table 20-6 Archaeological Resources in the Survey Area 125
Table 20-7 Historic Architectural Resources in the Survey Area 127
Table 20-8 NRHP-Eligible Historic Architectural Resources in the 1-Mile Buffer 129
Table 20-9 Cultural Resource Surveys in the Survey Area 131
Table 21-1 Summary of Potential Impacts and Proposed Avoidance/Minimization/Mitigation Measures 148
Table 22-1 Estimate of Temporary and Permanent Project Impacts 177
Table 22-2 Existing or Planned Energy Conversion Facilities in the vicinity of the Project 178
Table 23-1 Anticipated Construction Jobs and Employment Expenditures for the Proposed Route 184
Table 23-2 Anticipated Construction Jobs and Employment Expenditures for the Substations 184
Table 23-3 Anticipated Operations Jobs and Employment Expenditures for the Proposed Route 185
Table 23-4 Anticipated Operations Jobs and Employment Expenditures for the Substations 186
Table 26-1 Potential Permits, Consultations, Approvals 193

Figures

Figure 7-1 Energy Adequacy Provided by the Studied Projects: Typical Winter Day (2042) 27
Figure 15-1 Common Activity Noise Levels 97

Maps

Map 1 Project Location
Map 2 Route Alternatives Considered in Grant County
Map 3 Route Alternatives Considered in Deuel County
Map 4 Route Alternatives Considered in Brookings County
Map 5 Brookings County 765 kV Substation Expansion Alternatives
Map 6 Topography
Map 7 Surficial Geology with Elevation and Bedrock Depth Cross-Sections
Map 8 Bedrock Geology with Elevation and Bedrock Depth Cross-Sections
Map 9 Land Use
Map 10 Soils
Map 11 First Occurrence of Aquifer Materials
Map 12 Surface Waters and Groundwater Supply
Map 13 Surface Hydrology
Map 14 Land Cover
Map 15 Potentially Undisturbed Grasslands
Map 16 Public Lands and Facilities
Map 17 Agricultural Lands
Map 18 Proposed Project Overlaid on Aerial Imagery
Map 19 Cumulative Effects

Appendices

Appendix A Completeness Checklist Table
Appendix B Agency and Stakeholder Correspondence
Appendix C Desktop Aquatic Resource Delineation Report
Appendix D Level I Cultural Resource Records Search Report
Appendix E Planning Analysis
Appendix F Technical Diagrams
Appendix G Soil Data
Appendix H Protected Species
Appendix I Communication Systems Interference Analysis

Abbreviations

AM	amplitude modulation
amps	amperes
AMSL	above mean sea level
APLIC	Avian Power Line Interaction Committee
Application	Application for a Facility Permit for the PowerOn: Big Stone South to Brookings County to South Dakota/Minnesota Border Project.
ARSD	Administrative Rules for South Dakota
BCC	birds of conservation concern
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
CO_2	carbon dioxide
Commission or SDPUC	South Dakota Public Utilities Commission
CUP	conditional use permit
CVTs	capacitive voltage transformers
CWA	Clean Water Act
dB	decibel
dBA	decibel scale
EMF	electromagnetic field
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
ft	feet
G	Gauss
GPAs	Game Production Areas
GPS	Global Positioning System
GW	gigawatts
IPaC	Information for Planning and Consultation
Kcmil	circular mil
kV	kilovolt
kV/m	kilovolt per meter
LMR	land mobile radio
LRTP	Long-Range Transmission Planning
mA	milliamperes
MBTA	Migratory Bird Treaty Act
mG	milliGauss

MISO	Midcontinent Independent System Operator, Inc.
MW	megawatts
MWh	megawatt hours
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	National Hydrology Dataset
NHLs	National Historic Landmarks
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSP	Northern States Power
NSP Companies	Xcel Energy and Northern States Power Company, a Wisconsin corporation
O&M	operations and maintenance
OPGW	optical ground wire
Otter Tail	Otter Tail Power Company
Project	South Dakota/Minnesota Border Project
RTO	regional transmission organization
SDCL	South Dakota Codified Laws
SDDANR	South Dakota Department of Agriculture and Natural Resources
SDGS	South Dakota Geological Survey
SDNHD	South Dakota Natural Heritage Database
SDSHS	South Dakota State Historical Society
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SIL	surge impedance loading
SSA	sole source aquifer
SSURGO	Soil Survey Geographic
SWPPP	stormwater pollution prevention plan
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WAPA	Western Area Power Administration
WMAs	Wildlife Management Areas
WPAs	Waterfowl Production Areas
Xcel Energy	Northern States Power Company, doing business as Xcel Energy

1 Introduction

Northern States Power Company, doing business as Xcel Energy, and Otter Tail Power Company (Otter Tail), collectively referred to throughout this Application as "the Applicants", submit to the South Dakota Public Utilities Commission (Commission or SDPUC) this Application for a Facility Permit (Application) for the PowerOn: Big Stone South to Brookings County to South Dakota/Minnesota Border Project (Project).

The Project consists of:

- **765 kV Transmission Line**: An approximately 90-mile-long 765 kilovolt (kV) transmission line in Grant, Deuel, and Brookings counties;
- **Substation Expansions:** Both the Big Stone South Substation and the Brookings County Substation will undergo expansions.
    - Electrical expansion of the existing Big Stone South Substation in Grant County (referred to in this Application as the Big Stone South Substation Expansion);
    - Electrical expansion of the existing Brookings County Substation in Brookings County. Due to site constraints, the Brookings County Substation will be expanded in two areas. An area north of the substation will be expanded for 345 kV facilities (referred to in this Application as the Brookings County 345 kV Substation Expansion). An expansion area to enable the 765 kV connection will be located about five miles away from the existing Brookings County Substation (referred to in this Application as the Brookings County 765 kV Substation Expansion); and
- **345 kV Transmission Line:** An approximately five-mile-long, single-circuit 345 kV transmission line in Brookings County connecting the Brookings County 345 kV Substation Expansion to the Brookings County 765 kV Substation Expansion.

For purposes of this Application, the term Proposed Route refers collectively to the transmission facilities comprising the Project, including the proposed 765 kV transmission line and the proposed 345 kV connector transmission line, together with their associated rights-of-way. The Proposed Route includes a 250-foot-wide right-of-way for the 765 kV transmission line and a 150-foot-wide right-of-way for the 345 kV connector transmission line. Where differentiation is necessary, the terms 765 kV Route and 345 kV Route are used to identify the respective transmission line segments. The term Substation Siting Area refers to the areas within which the associated expansions of the Big Stone South Substation and Brookings Substation will be located. Unless otherwise specified, references to the Proposed Route include both transmission line facilities and their associated rights-of-way.

The Project would be constructed using steel lattice structures for the 765 kV Route and tubular single poles for the 345 kV Route. All Project facilities, including substations, are

expected to be in service in 2034 and are estimated to cost $1.3 billion ($2024) (base cost) to $1.7 billion ($2024) (base plus contingency).[1]

As described in more detail in Section 2, the Project is part of PowerOn Midwest, and was studied, reviewed, and approved as part of the Midcontinent Independent System Operator, Inc. (MISO) Long-Range Transmission Planning (LRTP) Tranche 2.1 Portfolio. The Project, as part of the overall MISO LRTP Tranche 2.1 Portfolio, is needed to maintain reliability as South Dakota and the Midwest energy industry landscape evolves to include new generation resources, decentralized generation, and changing and growing demands for electricity.

Xcel Energy is an investor-owned public utility that generates electrical power and transmits, distributes, and sells power to residential and business customers within service territories assigned by state regulators in parts of South Dakota, North Dakota, Minnesota, Wisconsin, and Michigan's Upper Peninsula. Xcel Energy and Northern States Power Company, a Wisconsin corporation (collectively, the NSP Companies), own and operate the five-state integrated NSP System pursuant to the terms of the Federal Energy Regulatory Commission (FERC)-approved Interchange Agreement. The NSP Companies have about 1.8 million electricity customers in the upper Midwest.

Otter Tail is an investor-owned electric utility company headquartered in Fergus Falls, Minnesota, that provides electricity and energy services to over 133,000 customers, spanning 70,000 square miles in western Minnesota, eastern North Dakota, and northeastern South Dakota. Otter Tail wholly or jointly owns approximately 6,000 miles of transmission lines and approximately 1,100 megawatts (MW) of generation capacity in these three states and is a transmission-owning member of MISO.

Together, the Applicants have extensive track records of developing high-voltage transmission line projects in South Dakota and the region.

The Applicants submit this Application for the Project to the Commission pursuant to South Dakota Codified Laws (SDCL) Chapter 49-41B and the Administrative Rules for South Dakota (ARSD) Chapter 20:10:22.

Regarding Otter Tail's existing Big Stone South Substation, the Commission issued a permit authorizing construction of the substation in its Decision and Order Approving Stipulation and Granting Permit to Construct Transmission Facilities, dated January 16, 2007 (EL06-002). Additionally, on May 10, 2013, the Commission accepted a certification submitted pursuant to SDCL §49-41B-27 for the Big Stone South Substation in its Order Granting Withdrawal; Order Approving the Joint Motion for Approval of Stipulation; Order Granting Certification (EL12-063). Further, on January 30, 2025, the Commission issued an Order Granting Joint Motion for

[1] Additional cost information is contained in Section 8 of the Application.

Approval of Settlement Stipulation; Order Granting Permit to Construct Facility (EL24-015), authorizing Otter Tail to construct certain modifications to the Big Stone South Substation.

With respect to Xcel Energy's existing Brookings Substation, the Commission issued a permit authorizing construction of the substation in its Decision and Order Approving Stipulation and Granting Permit to Construct Transmission Facilities, dated November 17, 2006 (EL05-028). Additionally, on February 5, 2009, the Commission authorized Xcel Energy to undertake modifications to the Brookings County Substation in its Decision and Order Approving Stipulation and Granting Permit to Construct Transmission Facilities (EL08-001), and authorized additional modifications to the Brookings Substation on June 17, 2011, in its Order Granting Joint Motion for Approval of Settlement Stipulation and Granting Permit to Construct Facilities (EL10-016). Further, on February 20, 2014, the Commission issued an Order Granting Motion for Approval of Settlement Stipulation and Granting Permit to Construct Facilities (EL13-020), to allow Xcel Energy to construct additional modifications to the Brookings County Substation.

In this Application, the Applicants request approval to construct the expansions of the existing Big Stone South and Brookings County Substations described here, including any required approvals of modifications to authorizations issued in prior dockets. Appendix A provides a Completeness Checklist that identifies where the information required by statute and/or rule is addressed in the Application.

2 PowerOn Midwest Overview

The Project is part of PowerOn Midwest, which is a series of primarily 765 kV transmission lines that will create a path connecting South Dakota, Minnesota, Iowa, and Wisconsin, and the broader region. Collectively, PowerOn Midwest will enhance grid reliability, reduce transmission congestion, and increase access to low-cost energy. Because the Project is a key component of PowerOn Midwest and broader system upgrades, Chapter 2 provides a brief overview of the demand for the Project, the PowerOn Midwest lines in Minnesota, and related purpose and benefits.

2.1 Big Stone South to Brookings to South Dakota/Minnesota Border Project

The Project is a 765 kV transmission line and associated facilities that would connect the existing Big Stone South Substation to the Brookings County Substation and then cross the South Dakota/Minnesota border. The Project includes the following components:

- **765 kV Transmission Line**: An approximately 90-mile-long 765 kV transmission line in Grant, Deuel, and Brookings counties;
- **Substation Expansions:** Both the Big Stone South Substation and the Brookings County Substation will undergo expansions.
    - Electrical expansion of the existing Big Stone South Substation in Grant County (referred to in this Application as the Big Stone South Substation Expansion);
    - Electrical expansion of the existing Brookings County Substation in Brookings County. Due to site constraints, the Brookings County Substation will be expanded in two areas. An area north of the substation will be expanded for 345 kV facilities (referred to in this Application as the Brookings County 345 kV Substation Expansion). An expansion area to enable the 765 kV connection will be located about five miles away from the existing Brookings County Substation (referred to in this Application as the Brookings County 765 kV Substation Expansion); and
- **345 kV Transmission Line:** An approximately five-mile-long, single-circuit 345 kV transmission line in Brookings County connecting the Brookings County 345 kV Substation Expansion to the Brookings County 765 kV Substation Expansion.

2.2 PowerOn Midwest in Minnesota

In Minnesota, PowerOn Midwest is being developed by Xcel Energy, Great River Energy, and ITC Midwest LLC, and includes:[2]

- **South Dakota/Minnesota state line to Lakefield Junction 765 kV transmission line:** Construction of a new 92-mile-long 765 kV transmission line from the South Dakota/Minnesota state line to near the existing Lakefield Junction Substation in Jackson County, Minnesota.
- **Lakefield Junction to Iowa/Minnesota state line 765 kV transmission line:** Construction of a new 18-mile-long 765 kV transmission line from the Iowa/Minnesota state line to near the existing Lakefield Junction Substation in Jackson County, Minnesota.
- **Lakefield Junction to Pleasant Valley 765 kV transmission line:** Construction of a new 130-mile-long 765 kV transmission line from near the existing Lakefield Junction Substation in Jackson County, Minnesota, to near the existing Pleasant Valley Substation in Mower County, Minnesota.
- **Pleasant Valley to North Rochester 765 kV transmission line:** Construction of a new 31-mile-long 765 kV transmission line from near the existing Pleasant Valley Substation in Mower County, Minnesota, to near the existing North Rochester Substation in Goodhue County, Minnesota.
- **Pleasant Valley to North Rochester to Hampton 345 kV line**: A new 69-mile-long 345 kV circuit from the Pleasant Valley Substation in Mower County, Minnesota, to the existing North Rochester Substation in Goodhue County, Minnesota (31 miles) and from the North Rochester Substation to the Hampton Substation in Dakota County, Minnesota (38 miles).

In Minnesota, PowerOn Midwest also includes expansions of the Lakefield Junction, Pleasant Valley, and North Rochester substations with related 345 kV connections, as well as certain 345 kV facility upgrades.

2.3 Purpose and Benefits

The Project was studied, reviewed, and approved as part of the MISO LRTP Tranche 2.1 Portfolio. In MISO's review, the Project is identified as the South Dakota portion of LRTP 22. MISO is a federally registered regional planning authority and regional transmission organization (RTO). MISO is responsible for planning and operating the transmission system and energy market in parts of 15 states, including parts of eastern and northern South Dakota, and the

[2] Routes in Minnesota have not been finalized. The mileage below reflects the mileage in the MTEP24 Transmission Portfolio Report, Appendix A. (MISO. MTEP24 Transmission Portfolio Report, Appendix A. The full report is Available at: https://www.misoenergy.org/planning/transmission-planning/mtep/#nt=%2Fmtepstudytypenew%3AMTEP%20Reports&t=10&p=0&s=FileName&sd=desc. See "MTEP24.zip)."

Canadian province of Manitoba. MISO is an independent not-for-profit entity that has a responsibility, established by the FERC, to identify needed transmission and mandate transmission owners to develop necessary transmission projects to address reliability issues.

The Project is needed to maintain system reliability amid fundamental changes in demand for electricity, as well as the type and amount of generation that is interconnected to the grid within the MISO Midwest subregion.[3] In the late 2000s, the level of new generation needing to be connected to MISO was 25 gigawatts (GW). Today, 116 GW of new generation must be connected – a fourfold increase from the 2000s. Energy demand is trending up, and the type and location of generation resources to serve this demand have fundamentally transformed over the past two decades. The amount of renewable generation interconnecting to the system has dramatically increased, while the amount of fossil-fueled generation on the grid has decreased.

As generation types and demands for electricity evolve, so too must the transmission grid, which moves electricity from its point of generation to where it is consumed. The Project is necessary to continue to serve customer demand every minute of every day and to ensure the resiliency of the grid.

The Project and the MISO LRTP Tranche 2.1 Portfolio of 24 projects[4] will create a new "transmission backbone" network throughout the Midwest that will ultimately be interconnected with an existing 2,400-mile 765 kV network in the eastern United States. This new transmission backbone network will make South Dakota's connection to the broader Midwest and eastern United States more robust and resilient, enabling South Dakota and the region to meet its electrical demands in a more reliable and cost-effective manner.

The Project will enhance the ability of the transmission system to move energy into and out of South Dakota and the surrounding areas. This geographic diversity and "reach" to access generation across multiple states (i.e., where the wind is blowing and/or the sun is shining) will allow for a steady flow of electricity to serve communities, so long as the transmission system can efficiently move the energy from where it is produced to where it is consumed.

In addition, these new transmission connections will help ensure reliability 24 hours a day, 7 days a week, and 365 days a year during extreme weather events. During these times, South Dakota may have to rely on neighboring states to provide power to maintain the system. For example, in February 2021, during Winter Storm Uri, it was necessary for MISO to import an unprecedented level of power from the eastern United States to maintain reliability for the MISO region. The Project will enable utilities to reliably serve existing and additional future demands for electricity.

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[3] The MISO Midwest subregion includes MISO transmission customers in South Dakota, North Dakota, Iowa, Minnesota, Montana, Wisconsin, Missouri, Illinois, Indiana, Michigan, and Kentucky.

[4] The MISO Board of Directors approved the LRTP 2.1. Portfolio on Dec. 12, 2024.

The ability to import energy from other states is essential to serving South Dakota customers. Xcel Energy, which serves approximately 109,000 customers in its service territory, including Sioux Falls, relies on power from Minnesota to meet energy requirements. An analysis of 2025 power flows showed that around 73 percent of the energy used to serve South Dakota retail load came from Minnesota. During half of the year, all of Xcel Energy's South Dakota load was served by Minnesota. There are also times when total flow from Minnesota exceeds Xcel Energy's load and is used by other load-serving entities. Table 2-1 summarizes the result of that analysis.

Table 2-1 Xcel Energy South Dakota Load Served by Energy from Minnesota

2025 Xcel Energy South Dakota Load Served by Minnesota-Based Energy Estimate							
100% + of XEL SD Load		99%-50% of XEL SD Load		50%-25% of XEL SD Load		<25% of XEL SD Load	
Hours per year	% of time	Hours per year	% of time	Hours per year	% of time	Hours per year	% of time
4390	50%	1952	22%	1159	13%	1259	14%

Otter Tail also relies on power from outside South Dakota to serve its customers. The company compared its South Dakota load to South Dakota generation output. That analysis showed that Otter Tail imports an estimated 10.71 percent of its energy from outside South Dakota to serve South Dakota customers. See Table 2-2.

Table 2-2 Otter Tail Power South Dakota Load Served by Energy from Minnesota

2025 OTP South Dakota Load Served by Non-South Dakota Based Energy Estimate							
100% + of OTP SD Load		99%-50% of OTP SD Load		50%-25% of OTP SD Load		<25% of OTP SD Load	
Hours	% of time	Hours	% of time	Hours	% of time	Hours	% of time
928	11%	48	1%	11	0%	7773	89%

3 Project Development

3.1 Outreach: Public, Tribal, and Regulatory Agencies

The Applicants hosted multiple rounds of public outreach to introduce the Project, provide updates, and collect input from landowners and stakeholders. The first round of in-person open houses was held on October 28, 2025, in the City of Big Stone at the Big Stone Community Center and in the City of Milbank at the Speedway Grill and Event Center, and on October 29, 2025, at the Clear Lake Community Center in the City of Clear Lake and at the Brookings Inn and Convention Center in the City of Brookings, during which the Applicants introduced the Project, answered questions, and gathered early input. A second round of open houses was held January 13–14, 2026, at the same four locations (Big Stone City Community Center, Speedway Grill and Event Center, Clear Lake Community Center, and Brookings Inn and Convention Center), with both morning and afternoon sessions offered, and was supplemented by a self-guided virtual open house available from January 12 through January 19, 2026, to provide additional opportunity for public engagement. A third round of outreach was conducted on April 8, 2026, at the Clear Lake Community Center to provide further Project information and continue stakeholder engagement.

During this timeframe, the Applicants also conducted extensive coordination and outreach with Grant, Deuel, and Brookings Counties. This outreach is outlined in Appendix B. In addition, the Applicants have coordinated with tribal and regulatory agencies. Appendix B includes agency, tribal, and stakeholder correspondence for the Project to date.

The Project route selection process described in this Application was a multifaceted approach that included identifying and following state and federal requirements and an extensive public engagement campaign. The Applicants considered the information gathered from public engagement in developing the Proposed Route that is included in this Application.

3.2 Environmental Analysis

The environmental and resource studies and field surveys conducted (or ongoing/planned) for the Project are summarized in Table 3-1.

Table 3-1 Summary of Studies/Surveys

Resource Study	Timeframe in which the Study was Conducted	Summary of Finding/Status
Desktop Aquatic Resource Delineation	May – July 2026	Appendix C presents the findings of the desktop aquatic resource delineation, which was incorporated into Section 12.2 and Section 12.4 of this Application.
Level I Cultural Resource Records Search	March-July 2026	Appendix D presents the findings of the Level I Cultural Resource Records Search
Level III Cultural Resource Survey	Planned for late in 2026 survey season if reasonable based on status of landowner permissions. In the event that it cannot be initiated in 2026, would occur in 2027.	Not yet initiated.
Tribal Cultural Resource Survey	Planned for late in 2026 survey season if reasonable based on status of landowner permissions. In the event that it cannot be initiated in 2026, would occur in 2027.	Not yet initiated.

3.3 Routing Development Process

The Applicants selected the Proposed Route through an iterative, multi-step routing process informed by technical analysis, engineering considerations, and stakeholder engagement conducted over the course of months. The routing analysis was constrained by the required interconnection points at the Big Stone South Substation and near the existing Brookings County 345 kV Substation. The location of the Minnesota–South Dakota state crossing was also evaluated as part of the routing process. Based on these constraints, the Applicants identified an initial study area that extended approximately 76 miles from the Big Stone South Substation to the Brookings County and Moody County border and approximately 8 miles west of the Minnesota border.

Within the study area, the Applicants identified multiple route corridors. These route corridors included 2,000 to 10,000-foot-wide areas developed using established routing considerations and stakeholder input as areas that could accommodate a potential route. Route corridors were shared with stakeholders through open houses and written communications. The Applicants then developed and refined preliminary routes within the route corridors using additional technical data and stakeholder input. The preliminary routes were evaluated using the criteria described below, and one route was identified as the Proposed Route. The weight

of balancing the greatest distance from homes, and existing constraints, including wind turbines, conservation easements, and sensitive resources (cultural and natural), while keeping the line as straight as possible (shortest distance), was the Applicants' highest priority.

- Route selection emphasized relatively direct and linear routes between endpoints where possible to reduce overall route length and limit the number of specialized structures (e.g., angle and dead-end structures) while considering the necessary right-of-way width, regulatory requirements, and existing topography.
- Existing infrastructure corridors were considered during routing, with consideration given to site safety, access, and constructability.
- Cross-country routes following field lines or parcel boundaries were generally considered where feasible, as these routes tend to limit disruption to agricultural operations while being straighter, reducing the number of angle structures.
- Residential structures were avoided with routing considerations focused on reducing the number of residential displacements and maintaining appropriate separation distances to address safety, land use compatibility, zoning setbacks, and visual/noise considerations.
- Businesses and active agricultural operations were evaluated on a case-by-case basis, with preference given to routes that avoid displacement, avoid interference with center-pivot irrigation and ongoing operations, and limit access, grounding, or safety constraints.
- Existing energy infrastructure, including wind, solar, and battery facilities, was treated as an avoidance consideration due to operational, safety, and land-use compatibility factors.
- Airports, telecommunications facilities, and other height- or signal-sensitive facilities were avoided or buffered where practicable, recognizing aviation safety requirements and potential signal interference that could affect operations or permitting feasibility.
- Tribal lands and identified tribal interests were treated as avoidance areas, with routing decisions focused on limiting potential impacts to culturally important lands and reducing jurisdictional or permitting conflicts.
- Federal, state, and private conservation easements were avoided where practicable due to permanent land-use restrictions and the potential for additional approvals that could affect routing feasibility.
- Parks, wildlife areas, public recreation lands, and other managed natural areas were considered avoidance or minimization constraints, with routing focused on existing corridors, spanning resource crossings where feasible, and limiting new permanent ground disturbance.

- Water resources were evaluated to avoid permanent structure placement within waterbodies or wetlands, with preference given to perpendicular crossings, existing crossing locations, and spanning crossings where feasible.
- Historic and cultural resources, including known cemeteries and documented cultural sites, were avoided where practicable, with site-specific review applied where avoidance was not feasible.

3.4 Land Rights Acquisition

The Applicants initiated outreach with landowners regarding land rights acquisition in 2025, including some discussions with landowners at open houses and some direct outreach, and continued into 2026. It is necessary for Applicants to have access to landowners' properties to complete the surveys necessary to understand the existing conditions and inform the Project's design. At the time of this application, the Applicants had access rights via voluntary agreements to approximately 30 percent of the properties along the Proposed Route.

The Applicants are working with landowners regarding options for easements for a 250-foot-wide corridor for the 765 kV transmission line and a 150-foot-wide corridor for the 345 kV transmission line. As part of the discussions with landowners, the Applicants describe their intended survey, construction, and access plans, as well as potential impacts on the land, mitigation opportunities, and restoration.

The land rights acquisition process includes multidisciplinary efforts, including, among other things, title searches, contacts with the landowners, land rights document preparation, discussions and negotiations with landowners, and completion of land rights agreements, including options for easements, and/or other agreements as necessary to support the initial survey needs of the Project and construction, operation, and maintenance of the Project. The Applicants will continue to attempt to acquire easements in good faith and intend to use eminent domain only as necessary, where efforts are unsuccessful. While the Applicants intend to acquire as much right-of-way as reasonably practicable on a negotiated basis, it is not practical to route the Project so that it impacts only landowners who are willing to grant easements voluntarily. Additional discussion regarding eminent domain is included in Section 10.4.

The Big Stone South Substation will be expanded on property owned by Otter Tail. At the time of this Application, the Applicants have secured site control for the Brookings County 765 kV Substation Expansion. Applicants are in negotiations with Basin Electric Power Cooperative for land rights for the Brookings County 345 kV Substation Expansion lands and are acquiring options for electric transmission easements for the right-of-way for the Project.

Table 3-2 summarizes the status of land rights acquisition through August 31, 2026.

Table 3-2 Land Rights Acquisition Status Summary

Project Component	Count of parcels with land rights acquired/needed	Percentage of required land rights acquired
765 kV transmission	81/274	30%
345 kV transmission	7/19	37%
Big Stone South Substation Expansion	1/1	100%
Brookings County 345 kV Substation Expansion	0/2	0%
Brookings County 765 kV Substation Expansion	2/2	100%

3.5 County Permitting Requirements

The Project crosses portions of Grant County, Deuel County, and Brookings County, South Dakota. The Applicants have been coordinating extensively with each county regarding the Project, including potential local permitting requirements. This coordination is reflected in Appendix B.

When the Applicants began public outreach and route development for the Project, none of the counties had specific setback requirements for transmission lines. In early 2026, Deuel County adopted amendments to its zoning ordinance, Zoning Ordinance B2022-01, establishing setback requirements for high-voltage transmission lines greater than 345 kV. The ordinance requires that these transmission lines meet or exceed the standards and regulations of the South Dakota State Statutes and any other agency of federal or state government regulatory authority. The ordinance also establishes a setback of 2,000 feet from inhabited residences from the structure foundation in all zoning districts. Landowners can waive the setback requirement so long as a minimum setback of 1.25 times the structure height is maintained. These requirements may influence final route siting and structure placement.

As of the time of this Application, Brookings County and Grant County are also considering, but have not enacted, setbacks that may affect the Project.

The Applicants aim to meet all local setback requirements for the Project and are continuing outreach and coordination with each county to meet that goal. However, given the need for waivers in Deuel County to construct the Project along the Proposed Route and the pending setback reviews in Grant County and Brookings County, it is not known if all local requirements can be satisfied. The Applicants expressly reserve the ability to seek a finding by the Commission that such rules, or regulation, or ordinances, as applied to the proposed

route, are unreasonably restrictive in view of existing technology, factors of cost, or economics, or needs of parties where located in or out of the county or municipality, to supersede or preempt local ordinances in accordance with SDCL 49-41B-28.

Each of the current county's permitting requirements is described below.

3.5.1 Grant County

Project components in Grant County include the Big Stone South Substation Expansion and the northern portion of the 765 kV transmission line. The Big Stone South Substation is located west of Big Stone City and is in Big Stone, Alban, and Vernon townships. Grant County zoning data is not publicly available; therefore, the precise zoning districts crossed by the Project are currently unknown. At the time of submittal, Grant County zoning data had not been received from the County (requested on July 8, 2026). However, as discussed in Sections 13.1.1 and 15.1.1, the Project generally crosses agricultural and rural land.

Land use in Grant County is regulated by the Grant County Zoning Ordinance. Pursuant to the Grant County Zoning Ordinance and coordination between the Applicants and Grant County officials, the Applicants are required to obtain a conditional use permit (CUP) for the Proposed Route. The Grant County Ordinance does not currently impose setbacks for the transmission line. To obtain a CUP in Grant County, the Applicants will file a CUP application, along with other information requested by Grant County. Upon receipt of a CUP application, Grant County holds a public hearing, and the Grant County Board of Adjustment then votes to approve or deny the CUP application. The Board of Adjustment issues written findings, and if it approves the CUP application, it must find that satisfactory provision and arrangement have been made concerning, where applicable, the Project's effects on access, parking and internal traffic, utilities and refuse, screening, buffering, and open space, lighting, and general compatibility with adjacent properties and other properties in the district. In granting a CUP, the Board of Adjustment may prescribe appropriate conditions and safeguards in conformity with the Grant County Zoning Ordinance.

The Grant County Zoning Ordinance provides, "Unless otherwise specified by the Board of Adjustment, a conditional use permit shall expire one (1) year from the date upon which it becomes effective if no actual construction has commenced at the time of the conditional use permit's expiration date Upon written request to the Board of Adjustment and prior to the conditional use permit expiration date, a one (1) year time extension for the conditional use may be granted by the Board of Adjustment."

Depending on the final Project route, design, and engineering, the Applicants may need to obtain additional permits and approvals from Grant County.

3.5.2 Deuel County

The 765 kV transmission line crosses portions of Deuel County, including Antelope Valley, Lowe, Glenwood, Herrick, Norden, and Scandinavia townships. The Deuel County portion of the Project is located in primarily agricultural and natural resource zoning districts.

Land use in Deuel County is regulated by the Deuel County Zoning Ordinance. Pursuant to the Deuel County Zoning Ordinance and coordination between the Applicants and Deuel County officials, the Applicants are required to obtain a CUP for the Project. To obtain a CUP in Deuel County, the Applicants will file a CUP application, along with other information requested by Deuel County. Upon receipt of a CUP application, Deuel County holds a public hearing, and the Deuel County Board of Adjustment then votes to approve or deny the CUP application. The Board of Adjustment issues written findings, and if it approves the CUP application, it must find that satisfactory provision and arrangement have been made concerning, where applicable, the Project's effects on access, parking and internal traffic, utilities and refuse, screening, buffering, and open space, lighting, and general compatibility with adjacent properties and other properties in the district. In granting a CUP, the Board of Adjustment may prescribe appropriate conditions and safeguards in conformity with the Deuel County Zoning Ordinance.

Unless otherwise specified by the Board of Adjustment, a CUP granted by the Deuel County Board of Adjustment expires one year from the date upon which it becomes effective if no actual construction has commenced at the time of the CUP's expiration date and may be extended one year upon written request to the Board of Adjustment and prior to the CUP expiration date.

Depending on the final Project route, design, and engineering, the Applicants may need to obtain other permits and approvals from Deuel County.

3.5.3 Brookings County

The 765 kV transmission line crosses portions of Brookings County, including Lake Hendricks, Oak Lake, Sherman, and Alton townships. Land use in Brookings County is regulated by the Brookings County Zoning Ordinance. Pursuant to the Brookings County Zoning Ordinance and coordination between the Applicants and Brookings County officials, the Applicants are required to obtain a CUP for construction of the substations. To obtain a CUP in Brookings County, an applicant must submit a written application and site plan to the Brookings County Zoning Official, who then makes a recommendation to the Brookings County Board of Adjustment. The Board of Adjustment then holds a public hearing and votes on the CUP application, examining the Project's effects on access, parking, effects of the conditional use on adjoining properties and properties generally in the district, utilities and refuse, screening, buffering, and open space, required yards, and general compatibility with adjacent properties and other properties in the district.

Unless otherwise specified by the Board of Adjustment, a CUP granted by the Brookings County Board of Adjustment expires three years from the date upon which it becomes effective if no actual construction has commenced.

4 Facility Permit Application Compliance

In accordance with SDCL Chapter 49-41B and ARSD Chapter 20:10:22, this Application provides information on the existing environment, potential Project impacts, and proposed avoidance, minimization, and/or mitigation measures for the following resources:

- Physical environment (geology, economic deposits, soils, seismic risks);
- Hydrology (surface water, groundwater, and wetlands);
- Terrestrial ecosystems (vegetation, wildlife, threatened and endangered species);
- Aquatic ecosystems;
- Land use (agriculture, residential, displacement, sound, aesthetics, electromagnetic interference, safety and health, real estate values);
- Water quality;
- Air quality; and
- Communities (socioeconomics, transportation, emergency response, and cultural resources).

In this Application, the Applicants address each matter set forth in SDCL Chapter 49-41B and in ARSD Chapter 20:10:22 (Energy Facility Siting Rules) related to transmission facilities. Included with this Application is a Completeness Checklist that sets forth where in the Application each requirement is addressed (Appendix A).

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

- The proposed facility will comply with applicable laws and rules;
- The facility will not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area. An applicant for an electric transmission line that holds a conditional use permit from the applicable local units of government is determined not to threaten the social and economic condition of inhabitants or expected inhabitants in the siting area;
- The facility will not substantially impair the health, safety, or welfare of the inhabitants; and
- The facility will not unduly interfere with the orderly development of the region, with due consideration having been given to the views of governing bodies of affected local units of government. An applicant for an electric transmission line that holds a conditional use permit from the applicable local units of government is in compliance with this subdivision.

SDCL § 49-41B-5.2 requires that, within 30 days after filing an application, an applicant must notify "in writing, the owner of record of any land that is located within one-half mile of the proposed site where the facility is to be constructed." The Applicants will comply with that requirement. In addition, to support route adjustments that may be required, including because of ongoing zoning discussions in Grant and Brookings counties, the Applicants plan to provide broader notice than that required by the statute. Specifically, the Applicants plan to provide notice to landowners within approximately one mile of the edge of the right-of-way for the Proposed Route.

5 Names of Participants (ARSD 20:10:22:06)

ARSD 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.

The Applicants' full names, business address, and business telephone number are shown below:

Xcel Energy Company Jody Londo Regional Vice President, Planning and Policy 414 Nicollet Mall Minneapolis, MN 55401 (612) 216-7954 Jody.l.londo@xcelenergy.com	Otter Tail Power Company JoAnn M. Thompson Vice President, Asset Management 215 South Cascade Street Fergus Falls MN 56537 (218) 739-8594 jthompson@otpco.com Robert M. Endris Associate General Counsel 215 South Cascade Street Fergus Falls MN 56537 (218) 739-8234 rendris@otpco.com

The individuals authorized to receive communication relating to this Application on behalf of Xcel Energy and Otter Tail are shown below:

Lisa Agrimonti Fredrikson & Byron, P.A. 60 South Sixth Street, Suite 1500 Minneapolis, MN (612) 492-7000 lagrimonti@fredlaw.com	Haley Waller Pitts Fredrikson & Byron, P.A. 60 South Sixth Street, Suite 1500 Minneapolis, MN (612) 492-7000 hwallerpitts@fredlaw.com

6 Names of owner and manager (ARSD 20:10:22:07)

ARSD 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.

Table 6-1 identifies the ownership and operation (management) of the Project facilities.

Table 6-1 Owner/Operator by Project Component

Project Component	Owner / Operator (Manager)
765 kV transmission line between Big Stone South Substation and Brookings County Substation	Xcel Energy Company and Otter Tail Power/Xcel Energy Company
765 kV transmission line from Brookings County Substation to South Dakota/Minnesota border	Xcel Energy Company/Xcel Energy Company
Big Stone South Substation Expansion and related 345 kV facilities	Otter Tail Power/Otter Tail Power
Brookings Substation Expansion and related 345 kV facilities	Xcel Energy Company/Xcel Energy Company

7 Purpose of and demand for transmission facility (ARSD 20:10:22:08; 20:10:22:10)

ARSD 20:10:22:08. Purpose of facility. The applicant shall describe the purpose of the proposed facility.

ARSD 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.

The Project is needed to 1) mitigate system overloads to maintain system reliability to meet existing and future energy needs; 2) meet growing electrical demand in a cost-effective manner; and 3) support the energy transition. For the purposes of the need analysis in this Application, Applicants studied the entirety of LRTP numbers 22 through 26 (including the portions of those lines outside of South Dakota). This group of projects is referred to as the "Studied Projects."

The following sections provide a summary of the regional and local South Dakota drivers for the Studied Projects, considering MISO's LRTP efforts and South Dakota-specific factors.

7.1 Regional Drivers

The MISO region is facing fundamental shifts in how electricity is produced and consumed. The grid must respond reliably to moving electricity from the point of generation to where it is consumed. The Project, as part of the overall MISO LRTP Tranche 2.1 Portfolio, is needed to maintain reliability as South Dakota and the Midwest region evolves its energy industry landscape, including new generation resources, consumer demand for cost competitive resources, decentralization of generation, and changing and growing demands for electricity.

Recognizing the complex challenges to electric reliability in the region from the transformational changes in the generation fleet, extreme weather events, and other factors, MISO initiated the LRTP in 2019. The LRTP is a multi-year, multi-phase effort to identify necessary regional transmission grid expansions required to cost-effectively maintain system reliability in the face of greater uncertainty and variability in supply (e.g., greater reliance on wind and solar generation). In short, the LRTP is designed to enable the transmission grid to move more cost-effective electricity, farther distances, and from

different generation sources to continue to serve electrical needs 24 hours a day, 7 days a week, 365 days a year.

In 2022, MISO approved the first phase, or "tranche," of the LRTP (LRTP Tranche 1) as the initial step to address South Dakota and the broader Midwest region's evolving reliability needs. The MISO LRTP Tranche 1 consists of 18 transmission projects, which will result in approximately 2,000 miles of new and upgraded high voltage transmission lines across nine states. The LRTP Tranche 1 includes one project in South Dakota: the Big Stone South to Alexandria Transmission Project, Commission Docket Number EL24-015.

In 2024, MISO approved the next phase of the LRTP (LRTP Tranche 2.1) to establish a new 765 kV transmission backbone across the Midwest. The LRTP Tranche 2.1 includes 24 projects totaling approximately 3,600 miles of new and upgraded transmission in MISO's Midwest subregion (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin). The LRTP Tranche 2.1 builds upon and is enabled by the LRTP Tranche 1 and the existing transmission grid, which serve as "entry and exit ramps" for the new LRTP Tranche 2.1 765 kV transmission backbone network. Combined, the existing 765 kV and 345 kV networks work together to move electricity across multiple states to each local community where it is consumed.

MISO followed an extensive stakeholder process, spending more than 40,000 staff hours, facilitating more than 300 meetings, and capturing feedback to arrive at the LRTP Tranche 2.1 Portfolio. MISO concluded that the LRTP Tranche 2.1 Portfolio is needed for:

- **Reliability:** The LRTP Tranche 2.1 Portfolio addresses reliability issues (i.e., points on the transmission grid that require solutions to meet North American Electric Reliability Corporation [NERC] national reliability standards) across the MISO region.[5] The LRTP Tranche 2.1 Portfolio supports energy adequacy so that energy can be delivered. The LRTP Tranche 2.1 Portfolio will also maintain system reliability through enabled demand and system stability.
- **Cost Effectiveness/Economic Benefits:** The $21.8 billion LRTP Tranche 2.1 Portfolio has a benefit-to-cost ratio of 1.8 to 3.5 (based on MISO's 2024 analysis). This means that every $1.0 invested in transmission will result in economic benefits of $1.8 to $3.5.[6] For an average electrical consumer, MISO estimates that the LRTP Tranche 2.1 Portfolio is

[5] The Applicants and MISO are required to ensure the transmission grid meets NERC national reliability standards (i.e., prevent a "violation" of reliability standards). To ensure the transmission grid meets reliability standards, MISO, and the Applicants model how changes in both the production and use of electricity will impact the transmission grid and identify any inadequacies of the existing transmission grid. The Applicants and MISO must identify mitigation plans ("fixes") to each reliability issue as required by NERC. The reliability issues addressed by the MISO LRTP Tranche 2.1 Portfolio are summarized in pages 63 to 69 and detailed in pages 77 through 123 of **Appendix E.1., MTEP24 Chapter 2: Regional/Long Range Transmission Planning.** The NERC reliability standards are available at: https://www.nerc/globalassets/standards/reliability/tpl/tpl-001-5.1.pdf.

[6] Net savings are 20-year net present value (NPV) in $-2024 (Id., Page 125, Figure 2.137).

estimated to cost about $5 per 1,000 kWh of energy used while providing $10 to $18 of value over that same amount of usage per month.[7]

- **Enabling Generation Transition:** The LRTP Tranche 2.1 Portfolio alleviates congestion and enables interconnection of approximately 116,000 MW of new generation resources by 2042. [8] MISO noted that these resources will include carbon-free resources to reduce Midwest carbon dioxide (CO_2) emissions by 127 million to 199 million metric tons over 20 to 40 years and help states comply with decarbonization laws.[9]

The Project serves a key role in the MISO LRTP Tranche 2.1 Portfolio by addressing reliability issues specific to eastern South Dakota, southern Minnesota, eastern North Dakota, northern and central Iowa, and western Wisconsin.[10]

MISO's analyses are documented in MTEP24. Appendix E.1 is the MTEP24, Chapter 2: Regional/Long Range Transmission Planning. Appendix E.2 is the MTEP24 Series 1A Futures Report.

7.2 Local South Dakota Drivers

The region's transmission grid has evolved since the Rural Electrification Act of the 1930s, which initially brought electricity to most of the state. Several key inflection points - step-changes, or significant buildouts driven by fundamental changes in how electricity was generated and/or consumed – have shaped the grid to its present state. The last inflection point in the late 2000s was driven by at least two transformational factors:

- FERC established RTOs, including MISO, with orders to operate and plan the transmission grid on a multi-state regional basis to improve reliability and cost-efficiency, transforming how the transmission system is used.
- Demand for electricity reached new peaks and was forecasted to grow at upwards of 2.49 percentage points annually.[11]

The Project, along with the Studied Projects, will facilitate the delivery of energy into South Dakota, which at times, depends on resources from other states to serve load. In addition, the Project, along with the Studied Projects, will provide outlet capability for generation in South Dakota. The Project, along with the Studied Projects, forms a 765 kV network that offloads the

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[7] MISO. Fact Sheet - Long Range Transmission Planning Tranche 2.1. Available at: https://cdn.misoenergy.org/LRTP%20Tranche%202.1666573.pdf.

[8] See **Appendix E.1, MTEP24 Chapter 2: Regional/Long Range Transmission Planning,** Page 75.

[9] Id., Page 142.

[10] Id., Pages 84 and 92.

[11] Transmission Planning and CapX2020. Humphrey School of Public Affairs University of Minnesota. Page 21 Table 2. Available at: https://gridnorthpartners.com/wp-content/uploads/2021/03/uofm-humphrey_capx2020_final_report.pdf.

underlying transmission system and provides contingency support. The sections below discuss local South Dakota drivers for the Project in more detail – in particular, generation changes and increasing demand.

7.2.1 Generation Changes

Driven by a combination of economics, consumer preferences, age of existing generation, and regulatory policies, 72,000 MW of new generation is expected to be added, and 16,000 MW of existing generation is expected to be retired over the next 20 years in the region (within MISO's Local Resource Zone 1).[12] These are baseload generators that have provided round-the-clock energy production for many decades. The retired generators provide more than just energy production; they also provide essential reliability services, which keep electricity safe and stable. As these generators are retired, both the "baseload" nature and essential reliability services of these sources must be replaced.

For Xcel Energy, few changes are anticipated to the generation resources located in South Dakota or to purchased power resources serving load within the state. The Angus C. Anson Generating Station and Crowned Ridge Wind facility are long-term components of the electric supply portfolio serving NSP load in eastern South Dakota and are expected to remain in operation through at least the 2040s. These resources provide essential generation capability necessary to support the reliable supply of electricity to customers in the region. Their continued operation demonstrates an ongoing need for existing electric infrastructure and generation resources, as they remain important contributors to system reliability and the provision of safe, reliable, and dependable electric service. In addition, Crowned Ridge Battery Storage and the Grant Solar project were selected through Xcel Energy's 2024 resource acquisition process and are expected to begin serving Xcel Energy load in late 2027. These resources are anticipated to provide additional local capacity and energy to help meet growing demand in eastern South Dakota while supporting the continued reliable operation of the regional electric system.

Otter Tail does not anticipate significant changes to its generation fleet located in South Dakota. Otter Tail's ownership interest in Big Stone Plant and its wholly owned Astoria Station are expected to remain important components of the company's electric supply portfolio. These facilities provide essential generation capability that supports the reliable supply of electricity to customers across Otter Tail's service territory and contribute to maintaining system reliability during periods of peak demand and changing system conditions. The continued operation of these resources demonstrates an ongoing need for existing electric infrastructure and generation assets as part of a balanced and diverse resource portfolio.

[12] See Appendix E.2, MISO Futures Report Series 1A. Pages 87 and 88. MISO Local Resource Zone 1 includes the portions of MISO in Minnesota, North Dakota, South Dakota, and western Wisconsin.

At this time, Otter Tail does not have plans to add any new utility-scale generation facilities located in South Dakota. The company will continue to evaluate future resource needs through its resource planning process and other long-term planning efforts to ensure customers receive safe, reliable, and cost-effective electric service while maintaining flexibility to respond to changing market conditions, customer demand, and regulatory requirements.

7.2.2 Increasing Demand

Since 2007, demand growth in the Midwest has remained relatively flat, initially due to the Great Recession from 2007 to 2009, and then due to demand efficiency programs absorbing growth. Current forecasts, however, indicate a 1.14 percent annual demand growth rate for South Dakota and the surrounding area, adding approximately 5,000 MW over the next 20 years.[13] Demand forecasts do not include the potential for growth attributed to data centers and other industrial demands beyond what is currently firmly committed, which MISO predicts could increase growth rates by upwards of three times the current forecasts.[14]

Electric demand in the Sioux Falls region is expected to continue growing over the coming decades because of population growth, economic development, industrial expansion, and increasing electrification of residential, commercial, and industrial end uses. Xcel Energy has identified eastern South Dakota as an area of continued load growth and has emphasized the need for additional energy and transmission infrastructure to maintain reliable electric service and accommodate future customer demand.

In the recent past, Otter Tail has experienced substantial industrial growth in the Big Stone City, Milbank, and Lake Norden areas of South Dakota. In comparing Otter Tail's South Dakota load in 2010 to 2025, electric demand has increased nearly 39 percent with energy consumption increasing approximately 92 percent over this period. It is expected that electrical demand will continue to rise for growing industrial and agricultural needs as well as residential, commercial, and industrial electrification.

7.3 How the Project Addresses Multiple Needs

7.3.1 Reliability

The Project along with the other Studied Projects will maintain system reliability for current and future demands. How the Project supports reliability is measured by NERC compliance, energy adequacy, enabled demand, and system stability.

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[13] MISO. Futures Report, Series 1A. See **Appendix E.2**. Page 32 - MISO Local Resource Zone 1.

[14] MISO. December 2024 Demand Forecast Whitepaper. Available at: https://cdn.misoenergy.org/MISO%20Long-Term%20Load%20Forecast%20Whitepaper_December%202024667166.pdf.

- **NERC compliance** means the regional transmission system will meet the planning requirements NERC has established.
- **Energy adequacy** [15] means the transmission system will be able to move energy to where it is needed to avoid interruption in service.
- **Enabled demand** measures how much additional customer demand can be served.
- **System stability** measures how well the transmission system can transfer large amounts of power between geographic areas.

7.3.1.1 NERC Criteria

NERC defines the reliability standards for which the electrical grid is planned. The Project, along with the other Studied Projects, will offload the existing transmission system and fully eliminate expected reliability overloads of 102 different facilities, 27 of which are 200 kV or higher. In addition, the Project, along with the other Studied Projects, addresses 1,313 reliability issues as defined by NERC.[16] Specifically addressing reliability issues in South Dakota on the transmission system near the Big Stone, Astoria, Brookings County, White, and Split Rock substations.

7.3.1.2 Energy Adequacy

The Studied Projects provide the ability to transfer bulk energy to, within, and out of South Dakota to continue to serve the load 24 hours a day, 7 days a week, 365 days a year. The Project along with the Studied Projects help enable the transmission grid to take on the role currently served by baseload generation, essentially allowing the transmission grid to function as a super-sized battery, as illustrated on Figure 7-1.

Figure 7-1 shows projected available resources and general power flows across the system in 2042. It displays three different hours of expected generation output and electrical demands under typical and actual weather patterns in winter. It also shows how, as the weather front moves from east to west, the Studied Projects facilitate moving energy from where it is produced to where it is needed, which changes by the hour. Without the Studied Projects, during these hours, over 2,000 MW of load would not be served, and a similar magnitude of energy generation would be wasted (or curtailed) because there is inadequate transmission to move it where it is needed. On an annual basis, approximately 1,300,000 megawatt hours (MWh) of load in the region is at expected risk of not being served without the Studied Projects by 2042. This equates to about 148 MW every hour of the year. 148 MW is sufficient to serve approximately 30,000 to 50,000 homes at peak demand, or roughly 110,000 average U.S.

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[15] Energy adequacy is distinct from resource adequacy which measures the supply of energy available to meet demand.

[16] MISO

households based on annual energy consumption.[17] This equates to roughly half the metro of Sioux Falls. Risk levels are highest at times when electricity demand is highest and during atypical weather conditions (e.g., extreme weather events).

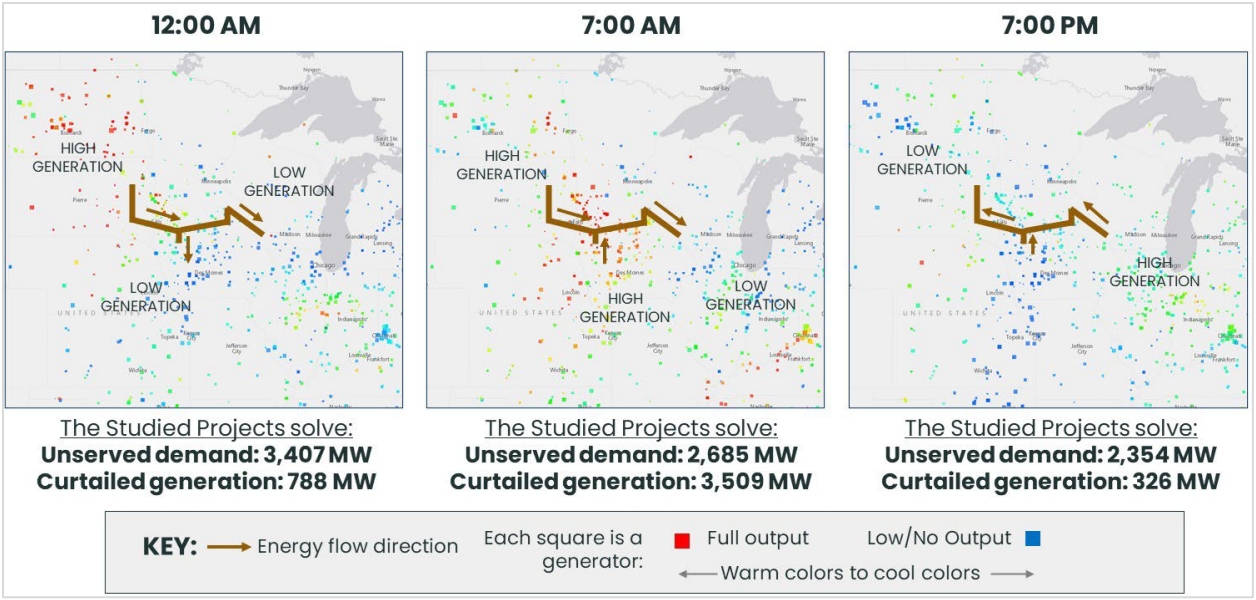

Figure 7-1 Energy Adequacy Provided by the Studied Projects: Typical Winter Day (2042)

Transfer capability into South Dakota is necessary to serve South Dakota load. To evaluate this need, Xcel Energy analyzed load flows in 2025 from the sources into its load serving service territory in South Dakota. The results showed that, in 2025, 73.16 percent of the energy served to South Dakota for Xcel Energy retail load came from Minnesota. Half of the year, the load in SD is 100 percent served by Minnesota. There are also times when total flow from Minnesota exceeds our load, so that extra energy would be passed to either Western Area Power Administration (WAPA), Otter Tail or Missouri River Energy Services. For Otter Tail, its customers in 2025 were served with energy from outside South Dakota an estimated 10.17 percent of the time.

7.3.1.3 Enabled Demand

The Studied Projects are needed to serve forecasted demands for electricity. The Studied Projects are also sized appropriately to reliably serve future increases in residential, commercial, and industrial energy demands totaling approximately 6,000 MW over the next 20 years. In addition, the Studied Projects make accommodating approximately 1,600 MW of additional load growth less expensive.

[17] This assumes 1.3kW average US home demand and 3-5kW peak demand.

7.3.1.4 System Stability

The Studied Projects will improve system transfer capability and address system instability issues. As the power plants historically relied upon for system stability are retired and are increasingly replaced with inverter-based resources (e.g., wind and solar generators) and demands for electricity become more dynamic, backbone transmission upgrades, like the Studied Projects, are critical to networking the grid to maintain stability.

7.3.2 Cost Effectiveness/Economic Benefits

The Studied Projects are expected to provide $7.7 billion to $25.3 billion in economic benefits to customers and members over the first 20 years of service by reducing congestion and providing access to lower-cost generation resources. The Studied Projects are the most cost-effective alternative to meet South Dakota's growing electrical needs. MISO estimates that the Studied Projects, when coupled with the broader MISO LRTP Tranche 2.1 Portfolio, are expected to provide economic savings of over two times the costs.

7.3.3 Enabling Generation Transition

The Studied Projects enable aging and/or cost-inefficient generation to retire and be replaced by new generation to satisfy customer demand. The Studied Projects also contribute to more efficient use of existing generation resources. The Studied Projects help enable approximately 24,000 MW of new generation to be reliably connected to the transmission grid. While generation is typically interconnected at 345 kV and lower voltages, the Studied Projects enable new generation to interconnect by pulling electricity off the existing lower voltage transmission lines to create transmission capacity to add new generation.

The Studied Projects will enable better/full utilization of resources, reducing curtailment by 5.6 million to 7.2 million MWh on an annual basis. Curtailment refers to a condition where a generator can, and economically should, provide power to the grid, but there is insufficient transmission capacity to move the energy generation from the generator to where it is needed to serve demand, or where there is not enough demand or storage resources to use all available generation.

7.3.4 Consequences of Delay

If the Project is delayed, there will be both regional and local reliability consequences. The MISO LRTP Tranche 2.1 Portfolio assumes the Project, as well as proposed 765 kV lines in Minnesota, will be in service in 2034. Delay of the Project would degrade the performance of the broader portfolio, which was optimized to work together to maintain reliability across the Midwest. In addition, as the NERC standards require MISO and the Applicants to plan and implement solutions to meet reliability standards, MISO and the Applicants would have to implement temporary solutions until the Project is in service. Given the volume, magnitude,

and reliability needs addressed by this Project, a temporary solution would be expensive at best and infeasible at worst, depending on the length of the delay.

In addition to the regional impacts, a delay in the Project will also have local impacts. The Project is needed to support reliability in South Dakota and the region. In addition, the economic benefits provided by the Tranche 2.1 portfolio would be deferred if the Project were delayed.

8 Estimated Cost of Facility (ARSD 20:10:22:09)

ARSD 20:10:22:09. Estimated cost of facility. The applicant shall describe the estimated construction cost of the proposed facility.

Project costs are broken down by the individual Project components in Table 8-1. All costs are presented in 2024 dollars and include permitting, engineering, materials, land rights and right-of-way, and construction costs, including AFUDC (or allowance for funds used during construction). Estimated costs for the Project are approximately $1.284 ($2024) (base)to $1.666 billion ($2024) (high-range: base plus contingency). With the exception of the cost estimate for the Big Stone South Substation Expansion,[18] these estimates were developed by the Applicants based upon the scope of the Project presented in this Application. The cost estimates are based on design, analysis, and bids from contractors, engineering firms, and independent consultants. The final cost of the Project will be impacted by materials and labor costs that may increase due to multiple factors, including but not limited to shortages, price escalation, and tariffs.

The Applicants' high-range (base plus contingency) cost estimate includes a 30 percent contingency adder from the base cost estimate to account for a reasonable level of potential factors which could impact the final cost of the Project. A 30 percent contingency is consistent with industry practices, Applicants' experiences, and MISO guidelines for this stage of project development. The contingency is generic (i.e., a total pool) which accounts for a reasonable level of potential changes attributed but not limited to:

- materials and labor costs (e.g., raw material pricing, substation and transmission line equipment pricing, shortages, taxes and tariffs, etc.);
- routing (e.g., length of the transmission lines, crossings, specialty structures, easement and land costs, etc.); and• detailed survey, design, and engineering (e.g., topology, soil conditions; and
- final structure designs, final substation designs, etc.

[18] Otter Tail is in the process of preparing an updated cost estimate for the Big Stone South Substation Expansion. The cost estimate provided in this Application reflects MISO's Appendix A cost estimate.

Table 8-1 Project Cost Estimate by Project Component

Project Component	Base ($2024)	High Range (Base Plus Contingency) ($2024)
765 kV Transmission Line	$635 million	$823 million
Big Stone South Substation Expansion	$155 million	$201 million
Brookings County 345 kV Substation Expansion	$52 million	$68 million
Brookings County 765 kV Substation Expansion	$410 million	$533 million
345 kV Transmission Line	$32 million	$41 million

9 Site Location and Overview

ARSD 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.

The Project is in eastern South Dakota (Map 1) and traverses through the following counties: Brookings, Deuel, and Grant. The location is described in terms of county, civil township, and Public Land Survey System location information in Table 9-1.

The Project includes the following components:

- **765 kV Transmission Line**: An approximately 90-mile-long 765 kV transmission line in Grant, Deuel, and Brookings counties;
- **Substation Expansions:** Both the Big Stone South Substation and the Brookings County Substation will undergo expansions.
    - Electrical expansion of the existing Big Stone South Substation in Grant County (referred to in this Application as the Big Stone South Substation Expansion);
    - Electrical expansion of the existing Brookings County Substation in Brookings County. Due to site constraints, the Brookings County Substation will be expanded in two areas. An area north of the substation will be expanded for 345 kV facilities (referred to in this Application as the Brookings County 345 kV Substation Expansion). An expansion area to enable the 765 kV connection will be located about five miles away from the existing Brookings County Substation (referred to in this Application as the Brookings County 765 kV Substation Expansion); and
- **345 kV Transmission Line:** An approximately five-mile-long, single-circuit 345 kV transmission line in Brookings County connecting the Brookings County 345 kV Substation Expansion to the Brookings County 765 kV Substation Expansion.

Table 9-1 Project Location

County	Township	TWP	RNG	SEC	Project Components Present
Grant	Big Stone	12N	47W	24,25	Big Stone South Substation Expansion; 3.67 miles of 765 kV transmission line
			48W	30, 31	
	Alban	120N	48W	12, 13, 23, 24, 26, 35	8.99 miles of 765 kV transmission line
			47W	5, 7, 8	
	Vernon	119N	48W	1, 2, 12, 13, 24, 25, 36	6.81 miles of 765 kV transmission line
	Adams	118N	48W	1, 12, 13, 24, 25, 36	6.01 miles of 765 kV transmission line
Deuel	Lowe	117N	48W	1, 12, 13, 24	3.94 miles of 765 kV transmission line
	Antelope Valley	117N	47W	19, 30, 31	3.21 miles of 765 kV transmission line
	Glenwood	116N	47W	4, 5, 9, 16, 21, 28, 29, 30, 31	8.86 miles of 765 kV transmission line
	Herrick	115N	47W	6, 7, 17, 18, 20, 29, 30, 31	6.66 miles of 765 kV transmission line
	Norden	114N	48W	25, 36	8.25 miles of 765 kV transmission line
			47W	6, 7, 17, 18, 20, 29, 30	
	Scandinavia	113N	48W	1, 2, 11, 14, 23, 26, 27, 34	7.38 miles of 765 kV transmission line
Brookings	Oak Lake	112N	48W	2, 3, 11, 14, 23, 26, 35	6.54 miles of 765 kV transmission line
	Sherman	111N	48W	2, 11, 12, 13, 14, 23, 24, 25, 26, 27, 34, 36	1.45 miles of 345 kV transmission line and 7.90 miles of 765 kV transmission line Brookings County 345 kV Substation
	Alton	110N	48W	1, 2, 3, 10, 11, 14, 15, 22, 25, 26, 27	3.92 miles of 345 kV transmission line and 8.33 miles of 765 kV transmission line Brookings County 765 kV Substation Expansion
	Richland	110N	47W	31, 32, 33, 34	3.69 miles of 765 kV transmission line

9.1 Transmission Facility

20:10:22:35. Information concerning transmission facilities. If a transmission facility is proposed, the applicant shall provide the following information:

(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.

9.1.1 Transmission Right-of-way

The proposed right-of-way is the physical area required for the construction, operation, and maintenance of the transmission line. It is the area from which the permittees obtain agreement from landowners (typically in the form of a permanent easement) to construct and operate the transmission line.

For the 765 kV transmission line, the right-of-way for the Project will be 250 feet wide, 125 feet from each side of the centerline of the Proposed Route. For the 345 kV transmission line, the right-of-way for the Project will be 150 feet wide, 75 feet from each side of the centerline of the facility.

Where the Project parallels road right-of-way, the Applicants plan for the Project right-of-way to overlap road right-of-way, depending on the type of road being paralleled, to the extent there are no other conditions necessitating other placement (e.g., buried utilities, landowner preferences, safety/engineering requirements). A typical 765 Route right-of-way centerline would be located approximately 100 feet from the edge of the road right-of-way, creating approximately 25 feet of overlap with the road right-of-way. None of the Project structures or conductors are sited to permanently overhang the road right-of-way. Survey and title work will be completed, typically after issuance of a facility permit, that will identify the size (i.e., width) and location of existing road right-of-way and the easement that must be obtained from the private landowner.

9.1.2 Configuration of Structures and Conductors

9.1.2.1 Structures

The Applicants propose to use four-legged self-supporting lattice structures for the Project's 765 kV facilities. Other specialty structures may also be used depending on site-specific needs and/or conditions. The Applicants selected a self-supporting lattice tower design from among multiple 765 kV structure types considered for the Project. Lattice structures are the most common structure type for existing 765 kV transmission lines across the United States. The self-supporting lattice tower design best meets the Project requirements based on considerations of cost, engineering, resiliency (can better withstand extreme weather events), and land use impacts (e.g., agricultural use). Lattice towers also provide an optimal strength to weight ratio as compared to other, non-lattice structure types, thereby providing for more efficient material utilization while achieving equivalent structural capacity.

Applicants evaluated and rejected other alternative structures for the Project. For example, the Applicants rejected guyed structures for the Project based on land use types (agriculture) in the Project area, as guyed structures generally require a larger overall footprint than a self-supporting structure. Monopole structures would often be required to be significantly taller than self-supporting lattice towers. Tubular H-frame structures would result in a significantly greater Project cost due to structure weight and constructability. The self-supporting lattice structures were determined to best meet the Project requirements.

The proposed 765 kV transmission line structures will typically range in height from approximately 150 to 175 feet tall. However, where existing transmission lines are crossed, or where topography, environmental constraints, or design needs necessitate, structure heights may be up to 195 feet tall, or greater. If structure heights exceeding 200 feet are necessary, the Applicants anticipate the Federal Aviation Administration (FAA) would issue determinations of no hazard with the recommendation that structures be marked and lit. Appendix F contains a drawing of a typical 765 kV structure.

The typical span length between 765 kV transmission line structures will be approximately 1,200 to 1,400 feet, with shorter or longer spans used as needed. The Applicants will generally install the 765 kV transmission line structures on four drilled pier concrete foundations 25 to 80 feet in depth, forming a square base for the structure. The structure base will range in size from approximately 35 x 35 feet to 50 x 50 feet for tangent and angle structures to 45 x 45 feet to 75 x 75 feet for dead-end structures. Actual foundation size will be based on site-specific conditions and detailed engineering design. The 765 kV transmission line structures may also require specialty foundations due to geotechnical (soil) conditions or design needs.

Table 9-2 summarizes the typical structure designs for the 765 kV transmission line structures.

Table 9-2 765 kV Transmission Line Structure Characteristics

Type	Material	Right-of-way Width (feet)	Approx. Height (feet)	Structure Max Width (feet)	Approx. Structure Base Dimensions (feet)	Approx. Foundation Depth (feet)	Typical Span[1] (feet)
Horizontal 765kV Single Circuit Tangent	Steel Lattice	250	150-195	135-145	35X35 to 50x50	25-65	1,200-1,400
Horizontal 765 kV Single Circuit Angle	Steel Lattice	250	150-195	130-140	35X35 to 50x50	25-65	1,200-1,400
Horizontal 765 kV Single Circuit Dead-end	Steel Lattice	250	150-195	150-160	45x45 to 75x75	40-80	1,200-1,400

The typical span length between 345 kV structures will be approximately 800 to 1,200 feet. The Applicants will generally install the 345 kV structures on drilled pier concrete foundations, usually approximately 5 feet to 12 feet in diameter and 35 to 53 feet in depth. Actual foundation size will be based on site-specific conditions and detailed engineering design. The 345kV structures may also require specialty foundations due to geotechnical (soil) conditions or design needs. Table 9-3 summarizes the typical structure designs for the 345 kV structures.

Table 9-3 345 kV Transmission Line Structure Characteristics

Type	Material	Right-of-way Width (feet)	Approx. Height (feet)	Structure Max Width (feet)	Approx. Structure Base Dimensions (feet)	Approx. Foundation Depth (feet)	Typical Span (feet)
345kV Single Pole Tangent	Tubular	150	90-160	50	5	35	800-1,200
345kV Single Pole Angle	Tubular	150	90-160	50	6	40	800-1,200
345kV Single Pole Dead-end	Tubular	150	100-180	15	12	53	800-1,200

The actual diameter and depth of a foundation and associated excavation will depend on the structure and foundation design and the soil conditions that are determined during geotechnical exploration.

9.1.2.2 Conductors

The 765 kV transmission line will utilize a six-conductor bundle per phase of 954 thousand circular mil (kcmil) 54/7 aluminum conductor steel reinforced Cardinal conductor, or similar performing conductor, with 15-inch sub conductor spacing and have a total capacity equal to or greater than 4,000 amperes (amps). The Applicants identified the 954 54/7 Cardinal as appropriate for the Project based on a study of 17 conductors. This type of conductor provides the requisite capacity for the Project, including meeting MISO's ampacity and surge impedance loading (SIL) requirements of 4,000 amps and of 2,400 MW, respectively.

The 765 kV transmission line will utilize two shield wires to provide adequate shielding from lightning strikes, thereby providing electrical protection for the lines. The Applicants intend to install optical ground wire (OPGW) as the shield wire type for the Project. The OPGW will not only provide shielding protection, but it will also provide telecommunications capacity for the Applicants. The OPGW will be installed above the phase conductors, near the top of the 765 kV structures.

The 345 kV line will utilize a two bundle per phase of 1272 kcmil 45/7 aluminum conductor steel supported Bittern, or a similar performing conductor, with 18-inch sub conductor spacing and have a total capacity equal to or greater than 4,000 amp.

9.2 Substations

Two existing substations will be expanded as part of the Project: Big Stone South and Brookings County.

9.2.1 Big Stone South Substation Expansion

Otter Tail owns and operates the existing Big Stone South Substation located west of Big Stone City, which serves as the northern endpoint of the proposed single-circuit 765 kV transmission line between the Big Stone South and Brookings Substations. To accommodate the Project, the existing Big Stone South Substation's 345 kV facilities will be expanded to the south and will include installation of additional equipment such as breakers, switches, capacitive voltage transformers (CVTs), arresters, and bus work. The Big Stone South Substation will also be expanded to accommodate 765 kV facilities, which will include equipment such as breakers, switches, transformers, reactors, CVTs, arresters, and bus work. The expanded 765 kV area will be connected to the expanded 345 kV area via a short 345 kV substation interconnection line located entirely within the Big Stone South Substation Siting Area. Construction and operation of the Big Stone South Substation Expansion will occur within the area described throughout this Application as the Big Stone South Substation Siting Area.

9.2.2 Brookings County Substation Expansion

Xcel Energy owns and operates the Brookings Substation located east of the City of White. It is the southern endpoint of the proposed single circuit 765kV transmission line between the Big Stone South and Brookings Substations. It is also the western endpoint of the proposed single circuit 765kV transmission line between the Brookings Substation and the Lakefield Junction Substation in Minnesota. To accommodate this Project, the Brookings Substation will require expansion to the north for 345 kV facilities and installation of additional substation equipment such as breakers, switches, CVTs, arresters, bus work, and associated linework.[19]

The associated linework required for the Brookings County 345 kV Substation Expansion will include:

- Rerouting the existing 345kV line to Seep Bank, which will enter the substation on its east side and will require one new structure across the road and re-termination.
- Rerouting the existing 345kV line to Astoria, which will be rerouted a few hundred feet from its current position to the north and will require one new structure and re-termination.

[19] Separate from the Project, the Brookings Substation will also be modified in coordination with Basin Electric who owns a facility directly to the north. At a future date, Basin Electric intends to interconnect a 345 kV line from its existing facility to the Brookings County 345 kV Substation. This future line is not included in this Application.

- Rerouting the existing 115kV Coyote Ridge Collector line.

Construction and operation of the Brookings County 345 kV Substation Expansion will occur within the area described throughout this application as the Brookings County 345 kV Substation Siting Area.

As part of the Project, the Brookings Substation will also include an expansion for 765 kV facilities. The Brookings County 765 kV Substation Expansion will include the installation of additional substation equipment such as breakers, switches, CVTs, arresters, and bus work. The Brookings County 765 kV Substation Expansion will be connected to the Brookings County 345 kV Substation Expansion via a single circuit 345 kV transmission line, which is part of this Application.

Construction and operation of the Brookings County 765 kV Substation Expansion will occur within the area described throughout this application as the Brookings County 765 kV Substation Siting Area.

9.3 Temporary Use Areas

Temporary use areas are land occupied only during construction. Temporary use areas are distinct from the permanent transmission right-of-way improvements. The transmission line construction process will include the following temporary use areas that will be restored following construction, unless the landowner requests that they remain after construction is complete:

- **Stringing Sites**: Stringing and tensioning sites are temporary work areas where crews set up pullers, tensioners, and reel stands to install phase conductors and the OPGW. Activities at these sites typically include threading a pilot line through travelers, pulling and tensioning the conductor, and installing line accessories before moving to the next section. Stringing setup areas are dependent on the line design and configuration. However, it is anticipated that stringing sites will typically be located at approximately 16,000-foot (3.0-mile) intervals. Stringing sites may extend outside of the right-of-way.
- **Temporary Access Roads**: Short-term routes used during construction. New access routes, or improvements to existing access roads, may be required to accommodate construction equipment. The Applicants will obtain permits for new access from local road authorities when needed. Where feasible, contractors use or upgrade existing access/approaches or utility access to minimize new disturbance; new temporary access is added only where necessary.
- **Laydown Yards / Staging Areas**: These are typically outside the right-of-way and are established only for the construction phase so crews can consolidate materials, equipment, and parking to support foundation work, structure erection, and conductor/OPGW installation logistics. Uses of these areas include staging of personnel and equipment and storage of materials necessary to construct the new transmission

line facilities. The Applicants estimate that construction of the Project will likely include staging areas/laydown yards every 40 to 80 miles, ranging from 20 to 60 acres in size per site.

9.4 Construction and Operations

9.4.1 Engineering Design and Regulatory Approvals

After a facility permit is issued by the Commission, Applicants will refine the design of the transmission lines as more site-specific information is gathered for properties along the approved route. Throughout the process, the Applicants will work with landowners and confirm that all permit conditions are satisfied.

9.4.2 Land Rights Acquisition

Land rights acquisition is discussed in Section 3.4.

9.4.3 Transmission Construction Procedures

Work on each construction spread[20] will begin after all required federal, state, and local approvals are obtained, property and necessary land rights are acquired, and the final design is completed. The precise timing of construction will be determined by various requirements, including permit conditions, system loading issues, and available workforce.

The first phase of construction activities for the new structures will involve survey staking of the transmission line centerline, easement boundaries, and/or structure locations, then removal of woody vegetation from the easement area. Prior to the arrival of construction crews, surveyors will stake the limits of disturbance for the construction corridor. The construction contractor will also request utility locates prior to the start of right-of-way clearing.

To maintain compliance with NERC reliability standards, the right-of-way will be cleared of vegetation for construction, along with temporary construction access roads. As a general practice, low-growing brush may be allowed to reestablish at the outer limits of the easement area after necessary vegetation has initially been cleared. The National Electrical Safety Code (NESC) states that "vegetation that may damage ungrounded supply conductors should be pruned or removed" (reference (1)). Trees beyond the easement area that are in danger of falling into the energized transmission line will be removed or trimmed to eliminate the hazard as allowed under the terms of the given easement. Danger trees generally are those that are dead, weak, diseased, or leaning towards the energized

[20] Construction spreads refer to a specific area under construction. Construction spreads are determined by the utility based on multiple factors, such as engineering, labor, materials, and permitting needs.

conductors. While clearing typically occurs immediately prior to the installation of structures and their associated foundations, there are instances where clearing must occur before the overall line design and structure placements are finalized.

All material resulting from the clearing operations will either be chipped on site and spread on the easement area, stacked in the easement area for use by the property owner, or removed and disposed of as otherwise agreed to with the property owner during easement negotiations. The Applicants will design the transmission line structures for installation at the existing ground elevations. Where terrain requires (typically on slopes exceeding 10 percent), construction work areas may be graded or leveled with fill. If acceptable to the landowner, the Applicants will leave these areas as they are modified after construction for use during future maintenance activities. If not acceptable to the landowner, the Applicants will, to the extent practicable, return the grade of the site to its original condition. Construction will require the use of many different types of equipment, including tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, drill rigs, dump trucks, front-end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, helicopters, and various trailers or other hauling equipment.

The Applicants will use construction staging areas/laydown yards for the staging of personnel and equipment and the storage of materials necessary to construct the new transmission line facilities. The Applicants estimate that construction of the Project will likely include staging areas/laydown yards every 40 to 80 miles, ranging from 20 to 60 acres, as defined in Section 9.3. The Applicants will evaluate construction access opportunities by identifying existing transmission line easements, roads, or trails that run near the approved route. When feasible, the Applicants will limit construction activities to the easement area. In certain circumstances, additional off-easement access or workspace may be required. New access routes, or improvements to existing access roads, may be required to accommodate construction equipment. The Applicants will obtain permits for new access from local road authorities when needed.

Structure and foundation installation will begin after clearing and access route preparation are complete. The actual diameter and depth of a foundation and associated excavation will depend on the structure and foundation design and the soil conditions that are determined during geotechnical exploration. Once the excavation is prepared, the Applicants will place a steel rebar cage in the excavation, along with an anchor bolt cage or stub angle, depending on the design of the structures. Concrete is then brought to the site from a local concrete batch plant or portable, on-site batch plant and is placed in the excavation.

Structure components will then be transported from staging areas and delivered to the appropriate foundation locations once the concrete has fully cured. The Applicants will assemble and erect the structures in sections. The structure base will be bolted to the foundation via anchor bolts or stub angles, and then insulators and associated hardware will be attached to the structure.

Conductor and shield wire stringing is the last major component of transmission line construction. Where the Project crosses streets, roads, highways, or other energized conductors or obstructions, the Applicants may install temporary guard structures before conductor stringing. The temporary guard structures prevent conductors from obstructing traffic or contacting existing energized conductors or other cables during stringing operations and also protect the conductors from damage. Stringing setup areas are dependent on the line design and configuration. However, it is anticipated that stringing sites will typically be located at approximately 16,000-foot (3.0-mile) intervals as described in Section 9.3. These sites are located within the Applicants' transmission easement areas when possible. When necessary, the Applicants will acquire temporary construction easements. Stringing operations require access to each structure to secure the conductor and shield wire to the insulators and clamps, respectively, once the final conductor sag compliant with the Applicant's procedures and minimum code clearances is established. This access may be conducted via crane or helicopter.

Conductor accessories will be installed as required after conductor installation is complete. These accessories may include vibration dampers, spacer-dampers, bird flight diverters, or aerial navigation markers. The Applicants will work with the appropriate agencies to identify locations where marking devices will be installed.

9.4.4 Substation Construction Procedures

Substation construction will be performed in compliance with the NESC, Occupational Safety and Health Act, and applicable federal, state, and local requirements. Designs will be completed by South Dakota-licensed professional engineers, as required, and will account for site-specific conditions. Final designs will also incorporate the applicants' standards, provide appropriate clearances from energized equipment, and facilitate future maintenance with minimal disruption to substation operations. Contractors will be committed to safe working practices throughout construction.

Construction activities will include the installation of concrete foundations and associated equipment embedment. This work will require the use of concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Disturbance associated with these activities will be limited to the defined substation footprint, including areas required for foundation construction and equipment access.

Prior to construction, topsoil within the substation footprints will be stripped and stockpiled at a designated location near the site. Stockpile areas will be clearly delineated (e.g., via Global Positioning System (GPS) boundaries), managed to maintain soil integrity (including documentation of soil depth), and graded as necessary to support stabilization and revegetation. Subsoil will be excavated as needed and placed in an approved and appropriately managed storage area.

Standard construction methods and best management practices (BMPs), based on industry standards and prior project experience, will be implemented to manage erosion, sedimentation, and other potential environmental impacts. BMPs will be tailored to the specific design and site conditions and may be modified as needed to minimize impacts to sensitive environmental resources.

Following completion of construction, areas outside of the permanent substation footprint will be restored in accordance with the restoration procedures described in this Application, including regrading, replacement of topsoil, and revegetation as appropriate.

9.4.5 Best Management Practices During Construction

The Applicants will employ standard construction practices that were developed from experiences with past projects, in addition to industry-specific BMPs. BMPs for the Project will be based on the specific construction design, prohibitions, maintenance guidelines, inspection procedures, and other activities involved in constructing the line. In some instances, these activities, such as schedules, are modified to incorporate a BMP for construction that will assist with minimizing impacts on sensitive environments. For example, in areas where construction occurs within a wetland, BMPs such as matting or winter construction may be used to minimize impacts.

To the extent practicable, construction crews will attempt to use equipment that minimizes impacts to the land. Certain soil conditions and environmentally sensitive areas may require special construction techniques. To the extent possible, the Applicants will attempt to place structures outside of such areas, so as to minimize any environmental impacts. When it is not feasible to avoid traversing sensitive areas, one or more of the following options will be used to minimize impacts, in consultation with the appropriate agencies:

- When practicable, construction in wetlands and other sensitive areas will be scheduled during frozen ground conditions.
- When construction during frozen conditions is not practicable, construction mats will be used where wetlands and other sensitive areas will be impacted.
- Equipment fueling and other maintenance will occur away from environmentally sensitive areas and waterways. These construction practices help prevent soil erosion and prevent fuel and lubricants from entering waterways or impacting environmentally sensitive areas.
- Various BMPs will be identified in the Project's Stormwater Pollution Prevention Plan, including the use of silt fences, bio logs, erosion control blankets with embedded seeds, hydromulch, and other sound water and soil conservation practices to protect topsoil and adjacent water resources and to minimize soil erosion.

These techniques are also used to reduce impacts to private property, including driveways, yards, and agricultural drain tile.

9.4.6 Restoration Procedures

Once construction is completed in an area, the Applicants will restore disturbed areas to their original conditions to the maximum extent feasible. Some areas may require temporary restoration before the completion of construction, per construction stormwater permit requirements.

A Project representative will monitor and document project related damages during the construction phase. The representative will contact property owners to discuss any damage that has occurred on their property as a result of the Project after construction activities are complete. This contact may not occur until after the start of restoration activities. The Applicants will repair (or reimburse the landowner to repair) damage to fences, drain tile, or other property damaged by construction of the Project. The Applicants will work with landowners to relocate spoils in a reasonable manner.

The Applicants will compensate farmers for crops damaged during construction. The Applicants will measure the damaged area, determine the yield estimate in consultation with the farmer, and pay compensation at current market rates or other appropriate rates (i.e., contract prices). The Applicants will also make a payment for future crop loss due to potential or assumed soil compaction. In addition, farmers will be compensated for their expenses if they choose to deep rip compacted areas to correct soil compaction. The Applicants will provide this service if a landowner requests.

The ground-level vegetation disturbed or removed during construction will typically reestablish naturally to pre-construction conditions. The Applicants may need to provide additional assistance in reestablishing vegetation and controlling soil erosion in areas where significant soil compaction or other disturbance from construction activities occurred. In these areas, the Applicants will use seed that is noxious-weed-free to reestablish vegetation.

The Applicants will ensure that township, city, and county roads used for purposes of access during construction are restored to their prior condition after construction activities are complete. The Applicants will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction to ensure the roads are adequately restored, if necessary.

9.4.7 Maintenance Procedures

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.

The Applicants will design and maintain the transmission lines in accordance with the NESC and the Applicants' standards. In general, transmission lines are highly reliable, with unplanned outages typically being limited. The average annual availability of transmission infrastructure is very high, in excess of 99 percent. Transmission facilities have decades-long estimated service lives, but practically speaking, HVTLs are seldom retired. Regular maintenance and asset renewal of transmission line components is necessary for longer-term reliable operation. The Applicants will require access to the transmission lines to periodically conduct inspections, perform maintenance, and repair damage that may occur. Generally, the Applicants will inspect the Project at least once by air and once by ground annually. These inspections will be limited to the defined easement areas and through other access easement areas where obstructions or terrain dictate. If maintenance concerns are identified during inspection, repairs will be performed as necessary. Should any damage occur during this work, the Applicants will restore the affected area and/or compensate the landowner for damages pursuant to the terms of the easements. The annual inspections are a fixed annual cost for maintaining and operating transmission facilities. The aerial inspections cost approximately $35 to $55 per mile, and the ground inspections cost approximately $200 to $400 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

The Applicants will manage their easement areas to control any encroachments that may interfere with the operation of the transmission lines, including the removal of vegetation that interferes with the operation and maintenance of the transmission lines. Shrubs that will not interfere with the safe operation and maintenance of or access to the transmission line will often be allowed to reestablish in the outer edge of the right-of-way. Right-of-way maintenance practices may include a combination of mechanical and hand clearing, with herbicide use where allowed, to remove or control vegetation growth.

The Applicants will implement measures to avoid the introduction of noxious weeds as a result of O&M practices.

9.4.8 Storm and Emergency Response and Restoration

Transmission infrastructure has few mechanical elements and is built to withstand weather extremes that are normally encountered in the region. Except for outages due to severe weather such as tornadoes, extreme winds, and heavy ice storms, transmission lines rarely fail. In the event of a fault on the transmission system, protective relaying equipment is

designed to immediately detect the fault and automatically remove the transmission line from service. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. However, unplanned outages of transmission facilities can happen for a variety of reasons.

Unplanned outages can occur due to such things as mechanical failures or severe weather, such as heavy ice, wind, or a combination of ice and wind. If a storm or emergency outage were to occur, the Applicants have the necessary infrastructure and crews in place to respond quickly and safely to return the line to service. The goal of any repair is to place the transmission system back into service as quickly and safely as possible to minimize the impact to the transmission system. In addition to line crews, the Applicants also have experienced internal engineering departments that can assist in the event of unplanned outages. If a storm or emergency outage were to occur, on-call engineers can be notified to assist in identifying an appropriate repair. The engineer will assess the situation based on feedback from on-site personnel and design an appropriate solution for any damaged infrastructure. Based on the scale of the damage, additional engineering resources can be requested as needed.

10 Alternative Sites and Siting Criteria (ARSD 20:10:22:12)

ARSD 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, wind energy, 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.

As described in Section 3.3 the Applicants evaluated numerous route corridors and preliminary routes while developing the Proposed Route. Preliminary routes were assessed using the routing criteria described in Section 3.3, including engineering feasibility, constructability, existing and planned land uses, environmental resources, residences and other sensitive receptors, local land-use controls, stakeholder input, and the ability to construct, operate, and maintain the Project safely and reliably.

10.1 General Project Location and Route Selection

As discussed in more detail in Section 2, in June 2025, the Applicants began developing and evaluating potential preliminary routes for a 765kV transmission line to connect the Big Stone South and Brookings County substations before continuing to the Minnesota border. This process began with the identification of a study area, routing constraints, and opportunities as described in Section 3.3. Routing constraints included both engineering and environmental factors, such as proximity to residences, wind turbines and associated infrastructure like battery energy storage systems, other high-voltage transmission lines, airports and associated airspace, and land designations like the U.S. Fish and Wildlife Service (USFWS) wetland easements, Natural Resources Conservation Service (NRCS) conservation easements, Nature Conservancy lands, and wetland banking easements, as well as local land-use controls such as Deuel County's recent 2,000-foot setback requirement.[21] The Applicants initially considered a study area extending further south to include Moody and

[21] Deuel County Ordinance No. B2022-01-11, An Ordinance Amending Ordinance B2022-01, 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 Herewith (effective Apr. 14, 2026).

Minnehaha counties, but ultimately rejected in favor of the study area described in Section 3.3 which includes Grant, Deuel and Brookings counties and sought to route the Project into Minnesota as soon as practicable.

10.2 Route Alternatives Considered

Throughout the route development process, several variations of the Proposed Route were considered, evaluated, and rejected, or modified based on the Applicants' analysis, changes in the Deuel County Zoning Ordinance, and stakeholder input.

Because county-specific land-use controls influenced route development in different ways across the Project area, the preliminary route discussion is organized by county.

10.2.1 Grant County

In October 2025, the Applicants hosted a series of public open houses, including two in Grant County at venues in Big Stone City and Milbank, South Dakota. At these meetings, the Applicants presented maps showing four 2,000-foot-wide route corridors in Grant County. These corridors shown on Map 2 were developed using the routing criteria and associated constraints and opportunities described in Section 3.3 to identify areas that could accommodate a potential route.

Based on input received at the open houses and continued routing analysis, the Applicants developed two preliminary routes in Grant County that were presented at a second round of open houses in January 2026.

The Applicants considered but rejected a preliminary route east of the Applicants' Proposed Route. This preliminary route went east around several granite quarry operations in Sections 12 and 13 of Township 120 North, Range 48 West and Sections 7, 8, 17 and 18 of Township 120 North, Range 47 West (Map 2). This route was rejected because of its proximity to homes. The Proposed Route maintains a distance of at least 1,000 feet from any residences in Grant County, while the rejected eastern route is within 350 feet of one residence and is within 650 feet of another.

The Proposed Route is the result of several modifications made to a preliminary route shared with the public at the January 2026 open houses. Areas where modifications were made to the preliminary route can be seen on Map 2. These modifications were based on landowner requests and were made to:

- Increase the distance to existing residences. The preliminary route was within 150 feet of one residence and within 400 feet of another compared to the Proposed Route which has zero Grant County residences within 1,000 feet;
- Avoid boxing in properties where electric transmission lines would be located on more than one side of the property; and

- Minimize impacts to farming by following field lines instead of traveling diagonally through a field.

10.2.2 Deuel County

In October 2025, the Applicants hosted a series of public open houses, including one in Deuel County in Clear Lake, South Dakota. At that meeting, the Applicants presented maps showing several 2,000 to 7,000-foot-wide route corridors in Deuel County. These route corridors shown on Map 3 were developed using the routing criteria and associated constraints and opportunities described in Section 3.3 to identify areas that could accommodate a potential route.

Based on input received at the open houses and continued routing analysis, the Applicants developed a preliminary route with several variations in Deuel County that were presented during a second round of open houses in January 2026 (Map 3).

As described in Section 3.5.2, Deuel County adopted amendments to its zoning ordinance in early 2026, establishing a setback of 2,000 feet from inhabited residences for high-voltage transmission lines greater than 345 kV. The route presented during the January 2026 open house was rejected by the Applicants because of the zoning ordinance change and the route had 46 residences within the 2,000-foot setback.

Two new preliminary routes were developed in March 2026 for Deuel County in response to the new zoning ordinance to reduce the number of waivers of the 2,000 foot setback that would be required. These routes followed an identical path for much of their length but deviated near Glenwood Township (Map 3), creating an eastern route and a western route. These preliminary routes were presented to the public at a third open house in Deuel County in April 2026. The western route was ultimately rejected for the following reasons:

- The western route would require twice as many (10 instead of 5) non-tangent structures;
- The western route is 0.15 miles longer;
- Both lines would require crossing the existing WAPA line; however, the western route would cross at a location that results in engineering and construction challenges due to the proximity of this crossing to other existing transmission lines, existing wind turbines, and Crow Creek; and the western route would also require crossing the existing CAPX 345kV line twice.
- The western route was within 1,000 feet of a residence with limited options to move further away due to nearby wind turbines and USFWS easements.

The Proposed Route is the result of several modifications made to the eastern route shared with the public at the April 2026 open house. Areas along the Proposed Route where modifications were made are shown on Map 3. These modifications were based on landowners' requests and were made to:

- Increase the distance to existing residences; and
- Minimize impacts to farming by following field lines instead of traveling diagonally through a field.

10.2.3 Brookings County

In October 2025, the Applicants hosted a series of public open houses, including one in Brookings County in Brookings, South Dakota. At that meeting, the Applicants presented maps showing several 2,000-foot-wide route corridors in Brookings County. These route corridors shown on Map 4 were developed using the routing criteria and associated constraints and opportunities described in Section 3.3 to identify areas that could accommodate a potential route. The route corridors also included an expanded 8-mile-wide area around the Brookings Substation because a property for the Brookings County 765 kV Substation Expansion had not been identified yet.

Based on input received at the open houses and continued routing analysis, including identification of a site for the Brookings County 765 kV Substation Expansion, the Applicants developed preliminary routes in Brookings County with several variations that were presented during a second round of open houses in January 2026 (Map 4).

Within Brookings County, separate 765 kV and 345 kV preliminary routes were developed and are discussed separately in Sections 10.2.3.1 and 10.2.3.2.

10.2.3.1 765 kV Routes

One preliminary route from the Deuel County border to the Brookings County 765 kV Substation Expansion and two preliminary routes from the Brookings County 765 kV Substation Expansion to the Minnesota border (a northern route and a southern route) were presented at the January 2026 open house (Map 4).

The Proposed Route from the Deuel County border to the Brookings County 765 kV Substation Expansion is the result of several modifications to the preliminary route shared with the public at the January 2026 open house. Areas along the Proposed Route where modifications were made are shown on Map 4. These modifications were made for the following reasons:

- The changes made to preliminary routes in Deuel County in response to the amended zoning ordinance changed the location where the Proposed Route was proposed to cross into Brookings County;
    - Increase the distance to existing residences;
        - As discussed in Section 3.5.3, Brookings County established the Brookings County 765 kV Transmission Line Advisory Committee to evaluate potential setbacks. It is unclear if Brookings County will implement a setback like

Deuel County. Regardless, routes were modified to increase the distance to existing residences.

- Landowners' requests to:
    - Avoid the location of future home construction.
    - Minimize impacts to farming by following field lines instead of traveling diagonally through a field.
    - Minimize tree clearing.

The southern preliminary route from the Brookings County 765 kV Substation Expansion to the Minnesota border was rejected in favor of the northern preliminary route (Proposed Route) for the following reasons:

- The southern route is longer,
- The southern route impacts more residences, and
- The Proposed Route (northern crossing location) reduced impacts and provided more routing opportunities for the Project to continue in Minnesota.

10.2.3.2 345 kV Routes

A single preliminary route from the Brookings County 765 kV Substation Expansion to the Brookings County 345 kV Substation was presented at the January 2026 open house (Map 4). The Proposed Route is the result of several modifications made to the preliminary route shared with the public at the January 2026 open house. Areas along the Proposed Route where modifications were made are shown on Map 4. These modifications were based on landowners' requests and were made to:

- Shorten the Proposed Route; and
- Minimize impacts to farming by following field lines instead of diagonally crossing through fields.

10.2.4 Advantages of the Proposed Route

The Proposed Route was selected because it:

- Maintains greater separation from residences than many alternatives considered;
- Responds to local land-use controls, including Deuel County setback requirements;
- Avoids or minimizes impacts to existing infrastructure, including wind energy facilities and transmission lines;
- Minimizes impacts to agricultural operations through the use of field boundaries and property lines where practicable;

- Incorporates stakeholder and landowner feedback received during the public engagement process; and
- Provides a feasible crossing location into Minnesota that supports routing opportunities on both sides of the state border.

It should be noted that modifications made to the preliminary routes to avoid or minimize impacts to residences, existing infrastructure, and agricultural operations come at a cost of increased project length and number of dead-end and angle structures, leading to increased costs.

10.3 Substation Expansion Sites Considered

10.3.1.1 Big Stone South Substation Expansion

No other sites were considered because adequate space adjacent to the existing site was available.

10.3.1.2 Brookings County 345 kV Substation Expansion

No other sites were considered because adequate space adjacent to the existing site was available.

10.3.1.3 Brookings County 765 kV Substation Expansion

Alternative sites were required because sufficient space meeting the siting criteria was not available for the 765 kV Substation Expansion adjacent to the existing Brookings County Substation.

Sites for the Brookings County 765 kV Substation Expansion were assessed based on engineering feasibility, constructability, existing and planned land uses, flat topography, environmental resources, availability of approximately up to 300 acres, paved-road access, existing infrastructure, competing land interests, and landowner willingness to sell.

Initially, 10 potential sites were identified (Map 5). A five-mile search radius around the existing Brookings County Substation was applied to focus the evaluation on sites reasonably close to the existing facility. Four sites were removed from further consideration because they were located more than five miles from the existing substation. The remaining six sites were evaluated in greater detail. As shown in Table 10-1, five of the six sites were evaluated and ultimately rejected. Site 6 was ultimately chosen as the most favorable site. The site is approximately four miles southwest of the existing Brookings County Substation and able to accommodate the size requirements. The evaluation showed that the site had favorable topography and paved access from County Road 27. It was approximately one mile north of U.S. Highway 14, and access from the highway would require no bridge crossings and would follow favorable slopes. The landowners were also willing to sell the property.

Table 10-1 Site Evaluation Rejection Reasons

Site	Rejection Reasons
1	Unfavorable topography; Poor access; Limited available acreage; No landowner interest; and competing land interests.
2	Poor access, lack of landowner support, and potential topography challenges.
3	Proximity to an existing farm; Poor access; Limited available acreage; and existing 115 kV Line along the western property line.
4	No landowner interest.
5	Existing land rights held for solar development; Poor access; Existing 115 kV Line along the western property line; and no landowner interest.

10.4 Reliance on Eminent Domain

Consistent with the routing criteria described in Section 3.3, the Applicants considered landowner concerns and opportunities to minimize impacts during route development. Many route modifications were made in response to landowner feedback, including adjustments to increase distance from residences, follow field boundaries, and reduce impacts to agricultural operations. The Applicants are actively pursuing voluntary easement acquisition and seek to obtain as many voluntary easements as possible. For parcels where we are not able to obtain voluntary easements, the Applicants will rely on eminent domain to construct the Project. The Applicants are not aware of an alternative route that would materially reduce potential reliance on eminent domain while continuing to satisfy the Project's engineering, reliability, environmental, and land-use objectives.

11 Effect on Physical Environment (ARSD 20:10:22:14)

ARSD 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 or wind energy site or through which the transmission facility will pass;

(2) A topographic map of the plant, wind energy, or transmission site;

(3) A written summary of the geological features of the plant, wind energy, 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 plant, wind energy, or transmission site;

(5) A description of the soil type at the plant, wind energy, or transmission 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 plant, wind energy, 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.

11.1 Geological Resources

11.1.1 Existing Geological Resources

11.1.1.1 Description of Regional Land Forms

The Project lies on the eastern side of the Coteau des Prairies division of the Great Plains Physiographic Province (reference (2)). The Coteau des Prairies consists of a broad highland of glacial origin with an undulating surface gently sloping from west to east. Elevations along the Proposed Route range from 1,050 feet above mean sea level (AMSL) by the Big Stone South Substation in the north to 1,850 feet AMSL by the Brookings County Substation in the south (Map 6).

11.1.1.2 Geological Features and Constraints

The unconsolidated sediment that formed the Coteau des Prairies is up to 300 feet thick along the Proposed Route (reference (3)). It is comprised of glacial till from the Des Moines

lobe deposited during the Late Wisconsin period and consists of interbedded till and outwash deposits that represent a series of glacial advances and retreats of the Quaternary Period (Map 7). Portions of the Proposed Route and Substation Siting Areas are also dissected by post-glacial alluvium deposited by streams and rivers.

The South Dakota Geological Survey (SDGS) mapped the following surficial geologic units within the Proposed Route and Substation Siting Areas (reference (3)):

- Qal – Alluvium (Quaternary) – Silt, clay, and fine sand, with minor amounts of sand and gravel deposited by streams and rivers. Thickness up to 75 feet (23 meters).
- Qe – Eolian, loess (Quaternary) - Silt to medium-grained sand. Deposited as sand sheets; barchan, linear, and dome-like dunes; and as a veneer on uplands. Thickness up to 300 ft (91 m).
- Qlo – Outwash, undifferentiated (Upper Wisconsin) – Heterogeneous sand and gravel with minor clay and silt, of glaciofluvial origin, including outwash plains, kames, kame terraces, and other undifferentiated deposits. Thickness is up to 30 feet (9 meters).
- Qloc – Outwash, collapsed (Upper Wisconsin) – Heterogeneous sand and gravel of glaciofluvial origin. Deposited as outwash sediments that collapsed due to the melting of buried ice. Thickness is up to 90 feet (27 meters).
- Qll – Lacustrine sediments (Upper Wisconsin) - Glaciolacustrine clay and silt with minor sand and gravel. Forms flat, low-lying terrain. Includes deposits from Glacial Lake Dakota and Glacial Lake Agassiz. Thickness up to 60 ft (18 m).
- Qlt – Till, moraine (Upper Wisconsin) - Compact, silty, clay-rich matrix with sand- to boulder-sized clasts of glacial origin. Exhibits a distinctive, weathered, dissected surface. Typically overlain by up to 10 feet (3 meters) of loess. Thickness up to 150 feet (46 meters).
- Qltg – Till, ground moraine (Upper Wisconsin) – Compact, silty, clay-rich matrix with sand- to boulder-sized clasts of glacial origin. A geomorphic feature characterized by smooth, rolling terrain. The composite thickness of all Upper Wisconsin till may be up to 300 feet (91 meters).
- Qlts – Till, stagnation moraine (Upper Wisconsin) – Compact, silty, clay-rich matrix with sand-to boulder-sized clasts of glacial origin. A geomorphic feature characterized by hummocky terrain with abundant sloughs resulting from stagnation of ice sheets. The composite thickness of all Upper Wisconsin till may be up to 300 feet (91 meters).

The unconsolidated sediment within the majority of the Proposed Route is underlain by Upper Cretaceous shale. Portions of the Proposed Route's far northern extent are underlain by Upper Archean Milbank Granite, and the far southern extent of the Proposed Route is underlain by Precambrian Sioux Quartzite (reference (4)) (Map 8).

11.1.1.3 Economic Deposits

Information from the South Dakota Department of Agriculture and Natural Resources (SDDANR) Minerals and Mining Program indicates there are no commercial mineral deposits or operations (sand, gravel, construction aggregate) that would be impacted by the Project (reference (5)).

Quarrying operations, predominantly surface mining, are active in the Milbank (Grant County) area; however, they would not be impacted by the Project. Operations include both extraction sites and fabrication facilities by Dakota Granite and Cold Spring Granite (Map 9).

11.1.1.4 Seismic Risks

The Project's seismic risk is considered low. According to the SDGS, no earthquakes have been recorded within Grant, Deuel, or Brookings Counties from 1872 to 2025 (reference (6)).

11.1.1.5 Subsidence Potential

The potential for subsidence or slope instability within the Proposed Route and Substation Siting Areas is negligible and not considered a risk. The uppermost bedrock is buried by thick deposits of glacial till and outwash across the Project. The bedrock units do not exhibit karst topography or contain layers susceptible to dissolution by water. Historic underground mining operations, which could lead to an increase in subsidence potential, do not exist within the Proposed Route or Substation Siting Areas.

11.1.2 Geological Resource Impacts and Avoidance, Minimization, and Mitigation Measures

Thick glacial deposits cover the Project. Bedrock is generally deeper than 50 feet; however, in some areas, bedrock outcrops or is present just below the surface. Construction and operation of transmission line projects have the potential to impact geology through temporary, construction-related impacts. The installation of structural foundations could impact bedrock. Geotechnical borings will be completed, and soil samples will be tested to determine the engineering characteristics of the site subgrade soils and develop Project-specific design and construction parameters.

Impacts to topography, such as the creation of abrupt elevation changes, are not expected. Transmission line structures will be installed at the existing grade, and minimal grading is anticipated for substation work. Additionally, the Project faces minimal risk of earthquake-related impacts. Therefore, no additional mitigation beyond adhering to prevailing industry specifications is anticipated.

Existing granite quarrying operations, sand/aggregate mining operations, and the currently known planned expansion of these facilities will be avoided by the Project; therefore, no additional mitigation is anticipated. Additional details are included in Section 15.1 Land Use.

11.2 Soils

11.2.1 Existing Soil Resources

Soil information for the Proposed Route was obtained from the U.S. Department of Agriculture (USDA)-NRCS Soil Survey Geographic (SSURGO) Database (reference (7)). Soil map units identified in the Proposed Route and Substation Siting Areas are shown on Map 10 and summarized in Appendix G. Soils mapped in the Proposed Route and Substation Siting Areas mostly consist of loam, sandy loam, silty loam, and clay loam surface textures.

According to the SSURGO database, exposed soils within the Proposed Route and Substation Siting Areas have a potential erosion hazard ranging from moderate to severe. The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures could be needed; and "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Soil rutting potential within the Proposed Route and Substation Siting Areas ranges from moderate to severe. Ratings indicate the potential of surface rut formation through the operation of heavy, wheeled equipment. Ratings are based on depth to the water table, rock fragments on or below the surface, the classification of the soil material based on the Unified Soil Classification System, depth to a restrictive layer, and slope. A rating of "slight" indicates that the soil is subject to little or no rutting, "moderate" indicates that rutting is likely, and "severe" indicates that ruts form readily.

Soil compaction susceptibility within the Proposed Route and Substation Siting Areas ranges from low to medium. Soil compaction occurs when moist or wet soil particles are pressed together, reducing pore space between them, and is primarily caused by heavy vehicular traffic or permanent structure placement, such as with the new substations. Soils are rated based on their susceptibility to compaction from the operation of ground-based equipment for planting, harvesting, and site preparation activities when soils are moist. A “low” rating means the soil can support standard equipment with minimal compaction. A “medium” rating means that after the initial compaction (that is, the first equipment pass), the soil can support standard equipment with only minimal increases in soil density. A “high” rating means that the soil will continue to compact after each equipment pass.

Hydric soils are present within the Proposed Route and the Big Stone South Substation Siting Area. A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. Hydric soils are typically associated with lowlands and wetlands and are rated by their proportion of hydric soil in the map unit. Within the right-of-way, soils consist of non-hydric (0 percent), marginally hydric (1-32 percent), partially hydric (33-66 percent), predominantly hydric (67-99 percent), and hydric (100 percent) soils. Soils in the Substation Siting Areas are typically not hydric and marginally hydric, with the Big Stone South Substation Siting Area also having a minimal amount of predominantly hydric and hydric soils.

Table 11-1 Soils Mapped within the Proposed Route and Substation Siting Areas

Project Component	Erosion Hazard – Moderate or Severe Rating (acres (%))	Rutting Hazard – Moderate or Severe Rating (acres (%))	Compaction Susceptibility – Medium or High Rating (acres (%))	Hydric Soils or Predominantly Hydric Soils (acres (%))
345 kV Route	42.9 (43.9%)	97.9 (100%)	95.1 (97.2%)	2.5 (2.6%)
765 kV Route	712 (26.1%)	2,724 (99.6)	2,318.4 (84.8%)	280.8 (10.3%)
Big Stone South Substation Siting Area	22.9 (58.1%)	39.4 (100%)	39.4 (100%)	2.2 (5.5%)
Brookings County 345 kV Substation Siting Area	1.1 (4.1%)	26.2 (100%)	17.9 (68.3%)	0
Brookings County 765 kV Substation Siting Area	37.2 (15.6%)	238.7 (100%)	224.2 (93.9%)	0

11.2.1.1 Prime Farmland

The USDA-NRCS SSURGO Database identifies farmland soils based on three categories, which are subject to protection under the Farmland Protection Policy Act. These categories include prime farmland, prime farmland if drained, prime farmland if irrigated and farmland of statewide importance. Prime farmland is defined by the NRCS as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Prime farmland if drained includes soils that have the potential to be prime farmland but require drainage or hydrologic alteration to achieve high productivity. Prime farmland if irrigated includes soils that have the potential to be prime farmland but require irrigation to achieve high productivity. Farmland of statewide importance includes soils that are nearly prime, but are not as productive due to permeability, slope, erosion potential, or some other soil property. Farmland soils in the Proposed Route and Substation Siting Areas are summarized in Table 11-2.

Table 11-2 Prime Farmland Classifications within the Proposed Route and Substation Siting Areas

Prime Farmland Classification	345 kV Route (acres (%))	765 kV Route (acres (%))	Big Stone South Substation Siting Area (acres (%))	Brookings County 345 kV Substation Siting Area (acres (%))	Brookings County 765 kV Substation Siting Area (acres (%))
Prime farmland	50.8 (51.9%)	1,392.2 (50.9%)	14.4 (36.4%)	15.4 (58.7%)	223.3 (93.5%)
Prime farmland if drained	8.2 (8.3%)	164.9 (6.0%)	2.2 (5.5%)	8.3 (31.7%)	0
Prime farmland if irrigated	2.0 (2.1%)	98.7 (3.6%)	0	1.4 (5.5%)	3.3 (1.4%)
Farmland of statewide importance	15.3 (15.6%)	300.4 (11.0%)	14.0 (35.7%)	1.1 (4.1%)	11 (4.6%)
Not prime farmland	21.6 (22.0%)	778.5 (28.5%)	8.8 (22.4%)	0	1.2 (0.5%)

11.2.2 Soil Resource Impacts and Avoidance, Minimization, and Mitigation Measures

Surface soils will be disturbed as a result of clearing, grading, and excavation activities. With the exception of structure locations and substation infrastructure, most impacts will be temporary. Impacts on soils are dependent, to some extent, on the conditions of the soil surface at the time of construction. Construction activities that occur on wet soils, particularly hydric soils and/or soils that have a high susceptibility to compaction or rutting, tend to have longer-lasting impacts. BMPs, such as matting and low ground pressure equipment, will be used to minimize impacts where soil disturbance is necessary in wet soil conditions.

Soil erosion may occur if surface vegetation is removed, especially on fine-textured soils. Construction will require coverage under the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities, which requires preparation of a stormwater pollution prevention plan (SWPPP) that identifies potential sources of stormwater pollution and specifies BMPs to control erosion and sedimentation to minimize negative impacts caused by stormwater discharges from the Project. Depending on the site, BMPs may include installation of silt fence, straw bales, or ditch blocks, and/or covering bare soils with mulch, plastic sheeting, or fiber rolls to protect drainage ways and streams from sediment runoff. Construction will be completed according to permit requirements and SWPPP.

Some Project components will traverse prime farmland, prime farmland if drained or irrigated, and/or farmland of statewide importance, as noted in Table 11-2. Impacts to agricultural lands are discussed in Section 20.2.2.2.

Permanent impacts to soils would occur at the structure locations or substation locations. These Project components will contribute to a marginal increase in impervious surface area and a subsequent loss of rainwater infiltration at their locations. Temporary impacts from clearing and grading within the right-of-way or Substation Siting Areas, such as crop damage and soil compaction, may occur during construction activities. These areas will be restored and put back into production (except for the area within the base of the 765 kV Route's structures) after completion of construction activities.

12 Effect on Hydrology (ARSD 20:10:22:15)

12.1 Groundwater Resources

12.1.1 Existing Groundwater Resources

In eastern South Dakota, glacial outwash aquifers provide most of the water supply. Of all the public water supply systems east of the Missouri River, the majority use glacial outwash aquifers. The Dakota Formation (Cretaceous sandstone) is the only bedrock unit underlying the Project that contains aquifers (reference (8)).

Groundwater flow direction in these shallow, glacial outwash aquifers is expected to follow surface topography and surface water flow. However, groundwater flow direction could vary depending on factors such as the presence of shallow bedrock, underground utilities, and/or other surficial features. The first occurrence of aquifer materials along the Proposed Route ranges from less than 50 feet to greater than 100 feet below the land surface (reference (9))(Map 11)

The EPA defines a sole source aquifer (SSA) or principal source aquifer area as:

- One that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer
- Where contamination of the aquifer could create a significant hazard to public health
- Where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer.

There are currently no EPA-designated SSAs along the Project (reference (10)).

The SDDANR Water Well Completion Reports provide information about wells, such as location, depth, geology, construction, and static water level at the time of construction. According to the reports, and as summarized in Table 12-1, there are two wells within the 765 kV Route right-of-way and one well within the expanded Brookings County 765 kV Substation Siting Area (Map 12) (reference (11)).

Table 12-1 Water Wells within Right-of-Way

Location	Well ID	Status	Depth (ft)	Static Water Level (ft) on Completion Report	Owner/Use	Shown onMap 12
765 kV Route	22959	Unknown	80	29	Roland Colony/ Irrigation	Map 12-31
765 kV Route	25283	Unknown	60	31	Cold Spring Granite/ Industrial	Map 12-3
Brookings County 765 kV Substation Expansion	22960	Unknown	300	Not Listed	Rodney Foster/ Test Hole	Map 12-32

The main water source in eastern South Dakota is the Big Sioux Aquifer. The Big Sioux Aquifer is a shallow, unconfined aquifer covering approximately 1,000 square miles in the Big Sioux River basin. This glacial outwash aquifer ranges in thickness from a few feet to over 100 feet, and averages 20 feet thick. Several other unconfined aquifers and isolated outwash deposits occur in eastern South Dakota (reference (12)). Grant, Deuel, and Brookings Counties have Wellhead/Aquifer Protection Zoning Ordinances focused on protecting water supplies and shallow groundwater resources and on reducing potential groundwater contamination from groundwater/surface water interchange and non-point pollution sources (reference (13)). No wellhead protection areas are crossed by the Proposed Route or located within the Substation Siting Areas (reference (14)).

Flowing wells and borings are drilled holes that encounter an aquifer with sufficient natural pressure to force water above the ground surface so that water will flow without pumping. Flowing artesian conditions exist when a low-permeability confining layer, such as clay or shale, overlies the aquifer. This puts the groundwater under pressure because the material doesn't permit water to flow through it. When a well or boring is completed, the confining layer is breached, creating a pressure relief valve that allows the water to rise above the top of the aquifer. If the pressure in the aquifer is great enough to force water to rise above the land surface, the well flows. These unique features can be found in eastern South Dakota and are not limited to certain areas or geography (reference (15)).

12.1.2 Groundwater Resource Impacts and Avoidance, Minimization, and Mitigation Measures

Artesian groundwater conditions, when unintentionally encountered, can cause excavation stability issues and uncontrolled release of groundwater at the ground surface and to surface waters. However, subsurface investigations and construction in artesian groundwater

conditions can be completed successfully, provided the pressurized conditions and extents are identified and understood, and measures are implemented to manage pressurized groundwater conditions should they be encountered. The Applicants will coordinate with the SDDANR as necessary to confirm that ground disturbing activities, such as geotechnical investigation and structure installation placement, do not disrupt groundwater hydrology.

The Applicants will conduct geotechnical evaluations prior to project construction to identify locations where potential groundwater impacts could occur.

The Applicants will assess any wells identified within the right-of-way during Project construction to determine if they are open and will seal them, if necessary, in accordance with SDDANR requirements.

Indirect impacts to groundwater can be mitigated by avoiding or minimizing impacts to surface waters. Measures to control soil erosion and sedimentation will be implemented during construction activities.

Wellhead/Aquifer Protection Zoning Ordinances will be reviewed by the Applicants. To minimize impacts, the Applicants will store materials, including fuel and gasoline, in sealed containers to prevent spills, leaks, or other discharges to soil and groundwater in accordance with the SWPPP during construction.

Construction of the Project will likely require dewatering of excavated areas due to shallow groundwater. Any dewatering will be temporary and minimized to the extent practicable. Dewatering will be conducted in accordance with the SDDANR General Surface Water Discharge Permit for Temporary Discharge Activities (General Permit).

The Project is unlikely to have adverse effects on groundwater quality, which was confirmed by the SDDANR in its letter dated July 16, 2026 (Appendix B).

12.2 Surface Water Resources

12.2.1 Existing Surface Water Resources

The Proposed Route crosses several watersheds within the following three sub-basins: the Upper Minnesota sub-basin (07020001) in the northern part of the Project, the Lac Qui Parle sub-basin (07020003) in the central part of the Project, and the Middle Big Sioux sub-basin (10170202) in the southern part of the Project (Map 13). Surface waters and drainage patterns across the Project are shown on Map 13.

The Proposed Route crosses several watercourses, as summarized in Table 12-2 and shown on Map 12 and Map 13. No major waterbodies are crossed by the Proposed Route; however, 11 small, unnamed lakes are crossed by the 765 kV Route, and one small, unnamed lake is crossed by the 345 kV Route (Map 12 and Map 13). No lakes are located in the Substation

Siting Areas. One intermittent stream intersects the southeast corner of the Expanded Brookings County 765 kV Substation Siting Area (Map 12 and Map 13); no other watercourses are located within the Substation Siting Areas.

Table 12-2 Watercourses Crossed by Proposed Route

Watercourse	Number of Times Crossed by 345 kV Route	Number of Times Crossed by 765 kV Route
Cobb Creek	0	3
Crow Creek	0	1
Crow Timber Creek	0	1
Deer Creek	3	3
Lost Creek	0	1
Monighan Creek	0	3
Mud Creek	0	1
North Fork Yellow Bank River	0	1
South Fork Yellow Bank River	0	1
West Branch Lac qui Parle River	0	1
Unnamed (includes several unnamed perennial, intermittent, and ephemeral streams)	10	117

The goal of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 United States Code 1251(a)). As a result, the CWA requires states to biannually publish a list of streams and lakes that are not meeting their designated uses because of excess pollutants. Under Section 303(d) of the CWA, territories and authorized Tribes, collectively referred to in the CWA as "states," are required to develop lists of impaired waters. The South Dakota 2024 Integrated Report for Surface Water Quality Assessment (reference (16)) identifies three impaired watercourses (Table 12-3; Map 12). No impaired lakes are crossed by the Proposed Route.

Table 12-3 Impaired Waters Crossed by the Proposed Route

Watercourse or Waterbody	Beneficial Uses	Impairment
North Fork Yellow Bank River	Fish and wildlife propagation, recreation, and stock watering waters; Irrigation waters; Limited contact recreation water; Warmwater marginal fish life propagation waters	Limited contact recreation waters - *Escherichia coli* (*E. coli*)
South Fork Yellow Bank River	Coldwater marginal fish life propagation waters; Fish and wildlife propagation, recreation, and stock watering waters; Irrigation waters; Limited contact recreation water	Limited contact recreation waters - *E. coli*
Mud Creek	Fish and wildlife propagation, recreation, and stock watering waters; Irrigation waters; Limited contact recreation water; Warmwater marginal fish life propagation waters	Limited contact recreation waters - *E. coli*

The National Park Service Nationwide Rivers Inventory (NRI) is a listing of more than 4,500 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential Directive and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that will adversely affect one or more NRI segments. There is one NRI-listed watercourse that intersects the 765 kV Route, the South Fork Yellow Bank River (Map 12). The NRI describes this watercourse as a "cool water stream with pools and riffles; sustains introduced brook trout populations" (reference (17)).

12.2.1.1 Floodplains

Federal Emergency Management Agency (FEMA) floodplain data is not complete in the part of Deuel County where the Project is located. FEMA floodplain mapping in Grant and Brookings counties identifies approximately 158.4 acres of 100-year floodplain in the Proposed Route, the majority of which (154.3 acres) are in the 765 kV Route (Map 12). No 100-year floodplains are in the Substation Siting Areas.

12.2.2 Surface Resource Impacts and Avoidance, Minimization, and Mitigation Measures

The Project was designed to avoid or minimize impacts to surface water resources to the extent practicable. The Project is not anticipated to result in changes to existing drainage patterns, cause significant changes in runoff patterns or volume of runoff, or have adverse impacts on existing hydrology.

The Proposed Route will span all watercourses and waterbodies; as such, no structures will be placed within these features, and no direct impacts to watercourses and waterbodies are anticipated.

During construction, there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, vegetation removal, grading, and construction traffic. Appropriate storm water management BMPs will be implemented during construction and operation of the Project to control erosion and reduce the potential for sediment-laden runoff from exposed soils during precipitation events. Construction of the Project will require coverage under the General Permit for Storm Water Discharges Associated with Construction Activities issued by the SDDANR, which includes the development and implementation of a SWPPP, which will prescribe BMPs to control erosion and sedimentation. The Applicants will implement BMPs to avoid and/or minimize the potential for sediment to reach surface waters. Temporary erosion and sediment control methods will be properly placed, monitored, and maintained adjacent to water resources. Erosion and sediment control BMPs may include the use of silt fence, straw wattles, erosion control blankets, re-vegetation, or other features and methods designed to control storm water runoff and mitigate erosion and sedimentation. These BMPs will also be used to minimize potential impacts to the NRI-listed watercourse and impaired waters that intersect the Proposed Route. Where appropriate, the Applicants will revegetate disturbed areas to mimic preconstruction conditions, in consultation with the landowner or land manager.

Impacts to 100-year floodplains during construction may include soil disturbance and removal of vegetation if necessary. The Project may require that transmission line structures be placed within 100-year floodplains in three areas (one on the 345 kV Route and two on the 765 kV Route) where the 100-year floodplain may be too wide to span (>1,200 feet). If it is not possible to avoid floodplains with structures, the Applicants will coordinate with county Floodplain Administrators to review structure locations and obtain floodplain development permits, as needed. The placement of transmission line structures in the 100-year floodplain is not anticipated to alter the flood storage capacity due to their minimal footprint in comparison to the floodplain.

12.3 Current and Planned Water Use

Water use for the Project will be restricted to dust control and, if necessary, at the substation locations to assist with compaction when grading. This water will be pumped from local surface waters following consultation with applicable resource agencies. If a suitable local source is not available, water may be transported on-site from a municipal source using water trucks.

Public water systems serving the areas within and adjacent to the Project include the Town of Gary, Newdale Colony, and the City of Elkton (reference (18)).

There are two private wells within the 756 kV Route and one well within the Brookings County 765 kV Substation Expansion (Map 12; reference (11)).

12.3.1 Effect on Current and Planned Water Use

No groundwater resources will be used for the construction or operation of the Project. Water use for the Project will be restricted to dust control. This water will be pumped from local surface waters following consultation with applicable resource agencies; if such a source is not available, water will be brought on-site from a municipal source using water trucks. Construction will require an SDDANR Stormwater Permit for Construction, which identifies requirements for water use and dewatering and will specify appropriate BMPs. Following construction, the Project will not require new water uses or water rights.

The Project is not anticipated to have impacts on public water supply systems in its vicinity. The Applicants will assess any wells identified within the Proposed Route during Project construction to determine if they are open and will seal them, if necessary, in accordance with SDDANR requirements. Impacts on current and planned water uses are not anticipated.

12.4 Wetlands

12.4.1 Existing Wetlands

Wetlands are defined in the USACE Wetland Delineation Manual (Environmental Laboratory 1987) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The manual identifies three wetland criteria that must be met for a wetland to be present: dominance of hydrophytic vegetation, hydric soils, and sufficient hydrology. Some wetlands, as well as other waterbodies, are considered waters of the United States under Section 404 of the CWA and are, therefore, regulated by the USACE with respect to the discharge of fill material into the water features.

Wetlands within the Proposed Route and Substation Siting Areas were identified through a desktop wetland determination (Appendix C). The desktop wetland determination process followed a standardized, multi-step methodology for evaluating wetland hydrology according to the USACE Wetland Delineation Manual and as documented in Appendix C. The review involved identifying potential wetland areas using a combination of aerial imagery, hydric soil data, topography (LiDAR), and existing wetland mapping, such as the National Wetlands Inventory and National Hydrology Dataset (NHD). Each year of aerial imagery was evaluated in the context of antecedent precipitation (wet, normal, or dry conditions) to confirm that hydrology indicators were interpreted correctly.

Table 12-4 and Table 12-5 summarize the total acres of wetlands within the Proposed Route, and Table 12-6 summarize the total acres of wetlands within the Substation Siting Areas. Most of the wetlands were classified as freshwater emergent wetlands. The desktop delineated wetlands are depicted on Map 12. Additional information on the desktop wetland determination is provided in Appendix C.

Table 12-4 Desktop Delineated Wetlands within the 765 kV Route

Wetland Type	Area (acres)
Freshwater Emergent Wetland	221.4
Freshwater Forested/Shrub	12.3
Freshwater Pond	19.2
Lake	13.9
Riverine	10.5
Total	277.3

Table 12-5 Desktop Delineated Wetlands within the 345 kV Route

Wetland Type	Area (acres)
Freshwater Emergent Wetland	7.7
Freshwater Pond	0.9
Total	8.6

Table 12-6 Desktop Delineated Wetlands within the Substation Siting Areas

Wetland Type	Area (acres) in Big Stone South Substation Siting Area	Area (acres) in Brookings County 765 kV Substation Siting Area	Area (acres) in Brookings County 345 kV Substation Siting Area
Freshwater Emergent Wetland	0.7	0	0
Freshwater Forested/Shrub	0	0	0
Freshwater Pond	0	0	0
Lake	0	0	0
Riverine	0	0	0
Total	0.7	0	0

Following the desktop determination, a field wetland verification will be conducted for each wetland type identified along the Proposed Route and within the Substation Siting Areas. The field verification is anticipated to occur in 2027 to support permitting efforts and will be completed in coordination with the USACE.

12.4.2 Wetland Impacts and Avoidance, Minimization, and Mitigation Measures

During construction, sediment may reach wetlands as ground is disturbed by excavation, grading, and construction access. Once the Project is completed, it will have no impact on surface water quality. Maintaining water quality during construction of the Project will minimize potential impacts to rare and common aquatic organisms and the aquatic environment.

The Applicants will avoid permanent impacts during Project construction where practical. All wetlands within the Proposed Route can be spanned by the transmission lines. The typical span length between 765 kV transmission line structures will be approximately 1,200 to 1,400 feet, with shorter or longer spans used as needed. The typical span length between 345 kV structures will be approximately 800 to 1,200 feet. In the event construction activities cause a disturbance, the Applicants will confirm best management construction practices are utilized to minimize impacts to the wetlands. Permanent impacts to wetlands within the substation areas, if applicable, will be mitigated as part of the wetland permitting process.

To minimize potential impacts to wetlands, the Applicants will implement appropriate BMPs as outlined in the SWPPP.

13 Effect on Terrestrial Ecosystems (ARSD 20:10:22:16)

13.1 Vegetation

The Applicants have been coordinating with the USFWS and SDGFP regarding sensitive vegetation and ecological resources that may occur in the vicinity of the Project; documentation of this is provided in Appendix H.

13.1.1 Existing Vegetation

The Proposed Route is situated in the Northern Glaciated Plains Level III Ecoregion (Ecoregion 46), which is a semi-arid to subhumid landscape spanning parts of Saskatchewan, Manitoba, North Dakota, South Dakota, and Minnesota (reference (19)). The Northern Glaciated Plains Level III Ecoregion is characterized by flat-to-rolling glacial drift and high concentrations of prairie pothole wetlands; this region is dominated by intensive agriculture. Within the Northern Glaciated Plains Level III Ecoregion, the Proposed Route intersects the following four Level IV Ecoregions from north to south: Minnesota River Prairie (Ecoregion 46o), Prairie Coteau Escarpment (Ecoregion 46l), Prairie Coteau (Ecoregion 46k), and Big Sioux Basin (Ecoregion 46m) (Map 14).

The Minnesota River Prairie Ecoregion consists of level terrain on thick glacial drift. Winds and the historic fire regime promoted the prairie ecosystem in this ecoregion; however, the ecoregion is transitional to woodland, which occurs to the north and east. The Prairie Coteau Escarpment is a small ecoregion with higher elevations and precipitation than surrounding areas, which favors deciduous forest growth. The Prairie Coteau Ecoregion is a glacial plateau known for its rolling, hummocky topography filled with prairies and wetlands. The Big Sioux Basin Ecoregion intersects the Prairie Coteau Ecoregion; in contrast to the Prairie Coteau Ecoregion, the Big Sioux Basin Ecoregion has a well-developed drainage network and gentler topography.

According to the National Landcover Database, the most dominant landcover type in the Proposed Route and Substation Siting Areas is cultivated cropland; additional landcover types present in the Proposed Route and Substation Siting Areas are shown on Map 14 and summarized in Table 13-1 and Table 13-2.

Table 13-1 National Landcover Database Landcover Types in Proposed Route

Landcover Type	345 kV Route (acres (%))[1]	765 kV Route (acres (%))[1]
Cultivated Crops	50.2 (51.3%)	1,781.8 (65.1%)
Hay/Pasture	12.6 (12.9%)	388.3 (14.2%)
Herbaceous	27.5 (28.1%)	313.7 (11.5%)
Developed, Open Space	7.4 (7.6%)	112.1 (4.1%)
Emergent Herbaceous Wetlands	0.2 (0.2%)	91.4 (3.3%)
Developed, Low or Medium Intensity	0	19.3 (0.7%)
Open Water	0	16.4 (0.6%)
Deciduous Forest	0	9.3 (0.3%)
Barren Land	0	2.1 (0.1%)
Woody Wetlands	0	0.7 (<0.1%)

[1] NLCD landcover data is coarsely mapped and, based on a review of aerial photographs, approximately 48 acres of tree removal will occur for the 765 kV Route and <1 acre of tree removal will occur for the 345 kV Route.

Table 13-2 National Landcover Database Landcover Types in Substation Siting Areas

Landcover Type	Big Stone South Substation Siting Area (acres (%))	Brookings County 345 kV Substation Siting Area (acres (%))[1]	Brookings County 765 kV Substation Siting Area (acres (%))
Cultivated cropland	39.4 (100%)	23.9 (91.2%)	224.3 (93.9%)
Developed, Open Space	0	1.1 (4.1%)	10.6 (4.4%)
Developed, Low or Medium Intensity	0	0.2 (0.7%)	0.4 (0.2%)
Herbaceous	0	1.0 (4.0%)	3.1 (1.3%)
Hay/Pasture	0	0	0.4 (0.2%)

[1] NLCD landcover data is coarsely mapped, and based on a review of aerial photographs, approximately 4 acres of tree removal will occur for the Brookings County 345 kV Substation Siting Area.

13.1.1.1 Potentially Undisturbed Grassland

Potentially undisturbed grasslands are grasslands that have never been cultivated or mechanically disrupted for agriculture or other uses (reference (20)). Undisturbed grassland, or native grassland, is important for biodiversity and providing habitat for a variety of species. Mapping of potentially undisturbed grassland, as discussed in (reference (20)), used a landscape-wide deductive analysis approach at a scale resolution adequate for mapping individual tracts of land that show no apparent signs of prior or current disturbance. In eastern South Dakota, where the Project is located, approximately 24 percent of the land is

considered potentially undisturbed grassland (reference (20)). The potentially undisturbed grassland that intersects the Proposed Route and Substation Siting Areas is shown on Map 15 and summarized in Table 13-3 and Table 13-4, respectively.

Table 13-3 Potentially Undisturbed Grassland in Proposed Route

Proposed Route	Acres in Route	% of Route
345 kV Route	70.2	71.7
765 kV Route	1,176.8	43.0

Table 13-4 Potentially Undisturbed Grassland in Substation Siting Area

Substation Siting Area	Acres in Footprint	% of Footprint
Big Stone South Substation Siting Area	0	0
Brookings County 345 kV Substation Siting Area	0.5	0.9
Brookings County 765 kV Substation Siting Area	6.6	1.4

13.1.1.2 Federally Listed Plant Species

The USFWS Information for Planning and Consultation (IPaC) website was used to identify whether any federally listed plant species potentially occur within or near the Proposed Route or Substation Siting Areas. The IPaC query identified the federally threatened western prairie fringed orchid (*Platanthera praeclara*) as a species that could be found in the area (Appendix H). However, the western prairie fringed orchid is presently known to occur in only six states (Iowa, Kansas, Minnesota, Missouri, Nebraska, and North Dakota) and Manitoba, Canada; and appears to be extirpated from South Dakota, Oklahoma, and Wyoming (references (21); (22)). Suitable habitat for the western prairie fringed orchid includes mesic upland prairies, wet prairies, sedge meadows, sub-irrigated prairies, and swales in sand dune complexes.

13.1.1.3 South Dakota Natural Heritage Database Plant Species

A search of the SDGFP South Dakota Nongame Conservation Database was conducted for the Project on June 1, 2026, for a list of sensitive plant species that have been documented within 0.5 miles of the Project (Appendix H). The sensitive plant species records included in a Nongame Conservation Database report mostly originate from the South Dakota Natural Heritage Database (SDNHD). The SDNHD tracks species at risk and certain unique habitats. These species may be monitored because they are rare, indicative of a vulnerable habitat

type, or are legally designated as state or federal threatened or endangered species. Some species identified in the environmental review report are classified as Species of Greatest Conservation Need (SGCN). The South Dakota State Wildlife Action Plan identifies and focuses on SGCN and ecosystems that require conservation strategies to avoid future listing as threatened or endangered species. SGCN are not afforded protections under the State endangered species law statute.

The SDNHD sensitive plant species that have been documented within 0.5 miles of the Project, and their typical habitats, are summarized in Table 13-5.

Table 13-5 South Dakota Natural Heritage Database Plant Species Documented within One-half Mile of the Project

Common Name	Scientific Name	Federal Status	State Status	Species of Greatest Conservation Need	Habitat[1]
Loesel's Twayblade	*Liparis loeselii*	Not listed	Not listed	Yes	Rare but found in fens in eastern part of South Dakota.
Tall Cottongrass	*Eriophorum angustifolium*	Not listed	Not listed	No	Fens in eastern South Dakota and the Black Hills.

[1] Source: reference (23))

13.1.1.4 Noxious Weeds

Noxious weeds may be regulated by state (SDCL 38-22) and federal (7 Code of Federal Regulations 360) rules and regulations designed to stop the spread of plants that are detrimental to the environment, crops, livestock, and public health. Table 13-6 summarizes the SDDANR noxious weeds that are regulated at the state or county level where the Project is located.

Table 13-6 State and County Noxious Weeds

Common Name	Scientific Name	State or County
Absinth wormwood	*Artmisia absinthium*	State
Leafy spurge	*Euphorbia esula*	State
Canada thistle	*Cirsium arvense*	State
Perennial sow thistle	*Sonchus arvensis*	State
Purple loosestrife	*Lythrum salicaria*	State
Salt cedar	*Tamarix aphylla, T. chinensis, T. gallica, T. parviflora,* and *T. ramosissima*	State
Musk thistle	*Carduus nutans*	Brookings, Grant, and Deuel Counties
Plumeless thistle	*Carduus acanthoides*	Brookings, Grant, and Deuel Counties
Bull thistle	*Cirsium vulgare*	Brookings, Grant, and Deuel Counties
Yellow toadflax	*Linaria vulgaris*	Deuel County
Poison hemlock	*Coniimum maculatum*	Deuel County
Common Mullein	*Verbascum thapsus*	Deuel and Grant Counties
Common burdock	*Arctium minus*	Grant County
Spotted knapweed	*Centaurea stoebe*	Grant County

13.1.2 Vegetation Impacts and Avoidance, Minimization, and Mitigation Measures

Construction of the Project will result in short-term impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities involving the establishment and use of access roads, staging, and stringing areas will also have short-term impacts on vegetation by concentrating surface disturbance and equipment use. Vegetation will be permanently removed where structures will be installed and substation infrastructure built. Each structure will result in permanent removal of vegetation – approximately 100 square feet for each 345 kV structure, approximately 2,500 square feet for a typical tangent 765 kV structure, and approximately 5,625 square feet for angle 765 kV structures. The 765 kV structures are four-legged and the 2,500 to 5,625 square foot area includes the area in between the four legs. Permanent vegetation removal will occur in each Substation Siting Area to accommodate substation infrastructure; this could total up to approximately 304 acres if vegetation removal is required throughout the entirety of each Substation Siting Area (quantified in Section 22).

Construction will also result in long-term impacts to vegetation by permanently removing high-growing and forested vegetation within the Proposed Route where present. These forested areas will be permanently converted to low-stature vegetation. Tree clearing will be minimal for the 345 kV Route and Brookings County 345 kV Substation Siting Area, and not necessary for the other two Substation Siting Areas. Tree clearing in the 765 kV Route could result in forest fragmentation and/or the widening of existing road corridors. However, given the predominance of agricultural vegetation in the region, forest fragmentation is anticipated to be minimal for the Project. Non-woody vegetation is allowed to regrow within the right-of-way.

Temporary impacts to vegetation will be mitigated through the use of BMPs, such as employing appropriate erosion control measures and reseeding areas disturbed by construction activities unless otherwise directed by the landowner. Areas temporarily disturbed due to construction will be re-vegetated with vegetation types matching the surrounding agricultural landscape unless otherwise directed by the landowner.

13.1.2.1 Potentially Undisturbed Grassland

Given the length of the Proposed Route, the extensive grassland in the area, and avoidance of other resources (residences, businesses), crossing potentially undisturbed grassland is unavoidable. The 345 kV Route will cross two areas, and the 765 kV Route will cross 24 areas of potentially undisturbed grassland that are too wide to span (>1,200 feet). As a result, transmission line structures may need to be placed within these potentially undisturbed grasslands. During routing, efforts were made to minimize the placement of the Proposed Route through larger swaths of potentially undisturbed grassland. It is anticipated that the minimal acreage of potentially undisturbed grassland in the Brookings County 345 kV Substation Siting Area and the expanded Brookings County 765 kV Substation Siting Area will be avoided by the Project's infrastructure.

13.1.2.2 Federally Listed Plant Species

As discussed in Section 13.1.1.2, western prairie fringed orchid is not known to exist in South Dakota; as such, no impacts to this species are anticipated from the Project, and no mitigation is proposed.

13.1.2.1 South Dakota Natural Heritage Database Plant Species

As discussed in Section 13.1.1.3, two sensitive plant species, Loesel's twayblade and tall cottongrass, have been documented within 0.5 miles of the Proposed Route. Both species inhabit fens. BMPs that minimize potential impacts to wetlands, which will be outlined in the SWPPP, will minimize potential impacts to these species.

13.1.2.2 Noxious Weeds

Construction and maintenance activities have the potential to result in the introduction or spread of noxious weeds and other non-native species. Noxious weeds can be introduced to new areas through propagating material like roots or seeds transported by contaminated construction equipment. Activities that could potentially lead to the introduction of noxious weeds and other non-native species due to the Project include ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed, and conversion of landscape type, particularly from forested to open settings.

The spread of noxious weeds due to the Project will be controlled using weed-free seed mixes where applicable and the potential use of herbicides, where allowed. The Applicants will identify and establish the procedures to limit the introduction and spread of noxious weeds due to the Project during construction, operation, and ongoing operations.

13.2 Wildlife

The Applicants have been coordinating with the USFWS and SDGFP regarding sensitive terrestrial wildlife and ecological resources that may occur in the vicinity of the Project; documentation of this is provided in Appendix H.

13.2.1 Existing Wildlife

The Project and its vicinity provide habitat for a variety of species that are accustomed to grasslands and agricultural lands. Watercourses, waterbodies, and areas of natural vegetation such as forest, wetlands, grassland, and open herbaceous areas also provide habitat for wildlife in the area. Wildlife species expected to occur in the vicinity of the Project include common species found throughout the Northern Glaciated Plains Level III Ecoregion, as summarized in Table 13-7.

Table 13-7 Common Wildlife Species in the Northern Glaciated Plains Level III Ecoregion

Common Name	Scientific Name
White-tailed deer	*Odocoileus virginianus*
Pronghorn antelope	*Antilocapra americana*
Bobcat	*Lynx rufus*
Jackrabbit	*Lepus spp.*
Sage grouse	*Centrocercus urophasianus*
Coyote	*Canis latrans*
Ground squirrel	*Urocitellus richardsonii; Ictidomys tridecemlineatus*
Prairie dog	*Cynomys spp.*
Golden eagle	*Aquila chrysaetos*
Ferruginous hawk	*Buteo regalis*
Lark bunting	*Calamospiza melanocorys*
Western diamondback rattlesnake	*Crotalus atrox*
Short-horned lizard	*Phrynosoma hernandesi*

Source: (reference (24))

Federal and state areas preserved or managed for wildlife in the vicinity of the Project include USFWS Waterfowl Production Areas (WPAs), Wildlife Management Areas (WMAs), and South Dakota Game Production Areas (GPAs; Map 16). USFWS WPAs are easements in small natural wetlands and grasslands that provide breeding, resting, and nesting habitat for waterfowl, shorebirds, grassland birds, and other wildlife. The USFWS WPA easement program pays landowners to permanently protect wetlands and natural grasslands. Wetlands covered by a wetland easement cannot be drained, filled, leveled, or burned. When these wetlands dry up naturally, they can be farmed, grazed, or hayed. A USFWS wetland easement protects the wetland basin of a parcel; however, the upland area outside the wetland is not covered by the easement. A grassland easement is a legal agreement that pays landowners to keep their land in grass. Land covered by a USFWS grassland easement may not be cultivated and mowing, haying, and grass seed harvesting must be delayed until after July 15 each year. This restriction is to help grassland nesting species, such as ducks and pheasants, complete their nesting before the grass is disturbed. Grazing is restricted on some grassland easements. Hunting and trapping are allowed on both wetland and grassland easements, and the easements do not affect landowners' mineral rights. Several parcels which contain WPA wetland and/or grassland easements are scattered throughout the northern three-fourths of the Project area, 11 of which (76 acres) intersect the 765 kV Route (Map 16).

The USFWS manages WMAs to conserve fish, wildlife, and native plant habitats. The Dakota Tallgrass Prairie WMA aims to conserve tallgrass prairie in southeastern North Dakota and eastern South Dakota through the acquisition of voluntary grassland conservation

easements. This WMA supports over 147 breeding bird species, including declining grassland birds, and also boasts waterfowl densities exceeding 100 pairs per square mile—some of the highest duck production habitat in the nation (reference (25)). An edge of the Dakota Tallgrass Prairie WMA (approximately 0.5 acres) intersects the 765 kV Route adjacent to County Road 27 (Map 16).

GPAs are managed for wildlife production and public hunting opportunities; several GPAs are scattered throughout the northern and central parts of the 765 kV Route. However, none of them intersect the Proposed Route. The nearest GPA is approximately 0.15 miles east of the Proposed Route.

Sharp-tailed grouse (*Tympanuchus phasianellus*), a South Dakota native game bird managed by SDGFP, inhabit prairie-dominated landscapes in central and western South Dakota. The SDGFP has identified Priority Habitat Areas in eastern South Dakota. Tier 1, 2, and 3 Priority Habitat Areas intersect the southern half of the Proposed Route, as shown on Map 16 and summarized in Table 13-8. No Priority Habitat Areas intersect the Substation Siting Areas.

The Priority Habitat Areas serve as an important tool for many aspects of grouse habitat management. Tier 1 areas are generally indicative of favorable intact landscapes where maintaining landscape-level habitat characteristics should be a priority (e.g., grassland easements). Tier 1 areas are also prime candidates for local-scale habitat assessments and appropriate treatments such as managed grazing or measures to prevent tree encroachment into grasslands. Tier 2 and Tier 3 areas will generally represent areas with more landscape-level habitat improvement opportunities, such as grassland restorations, reduction of developed areas, and removal of encroaching trees in grasslands (reference (26)).

Table 13-8 Sharp-Tailed Grouse Priority Habitat Areas in Proposed Route

Category	345 kV Route (acres)	765 kV Route (acres)
Tier 1	0	60.2
Tier 2	0	213.1
Tier 3	51.5	833.6

13.2.1.1 Avian Species

The state of South Dakota is in the Central Flyway of North America. The Central Flyway is a bird migration route that encompasses the Great Plains of the U.S. and Canada. Migratory birds use portions of the Central Flyway as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer. Suitable habitats for migratory birds is present throughout the Project's landscapes.

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712), which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Avian species that are common throughout the Upper Great Plains and may be found in the vicinity of the Project include: red-winged blackbird (*Agelaius phoeniceus*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), mourning dove (*Zenaida macroura*), mallard (*Anas platyrhynchos*), ruddy duck (*Oxyura jamaicensis*), gadwall (*Mareca strepera*), killdeer (*Charadrius vociferus*), horned lark (*Eremophila alpestris*), barn swallow (*Hirundo rustica*), house wren (*Troglodytes aedon*), common yellowthroat (*Geothlypis trichas*), vesper sparrow (*Pooecetes gramineus*), common grackle (*Quiscalus quiscula*), western meadowlark (*Sturnella neglecta*), American robin (*Turdus migratorius*), and American goldfinch (*Spinus tristis*).

The USFWS identifies certain migratory and non-migratory birds (beyond those already designated as federally threatened or endangered) as Birds of Conservation Concern (BCC); these species represent the highest conservation priorities. The USFWS identifies several BCC that could potentially occur within the vicinity of the Project; these species and their breeding seasons are provided in Appendix H.

Bald eagles (*Haliaeetus leucocephalaus*) and golden eagles (*Aquila chrysaetos*) have the potential to be present in the vicinity of the Project. Bald and golden eagles are protected under the MBTA and the federal Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668d), which specifically prohibits the taking or possession of and commerce in, either alive or dead, or any part, nest, or egg of these eagles.

13.2.1.2 Federally Listed Terrestrial Wildlife Species

The USFWS IPaC online tool was queried on June 1, 2026, for a list of federally threatened and endangered species, proposed species, candidate species, and designated critical habitat that could be present in the vicinity of the Project. The IPaC report identified one federally endangered species, two federally threatened species, and four federally proposed endangered or threatened species (Table 13-9); aquatic species are discussed in Section 14.1.1. IPaC did not identify any designated critical habitat intersecting the Proposed Route or Substation Siting Areas.

A federal proposed endangered or threatened species is a species the USFWS has determined is in danger of extinction throughout all or a significant portion of its range and has proposed a draft rule to list as endangered under the Endangered Species Act (ESA). Federally proposed endangered or threatened species are not legally protected under the ESA.

Table 13-9 Federal and State Listed Terrestrial Wildlife Species Potentially Occurring in Project Vicinity

Common Name	Scientific Name	Federal Status	State Status
Northern long-eared bat	*Myotis septentriionalis*	Endangered	Not listed
Tricolored bat	*Perimyotis subflavus*	Proposed endangered	Not listed
Rufa red knot	*Calidris canautus rufa*	Threatened	Not listed
Dakota skipper	*Hesperia dacotae*	Threatened	Not listed
Monarch butterfly	*Danaus Plexippus*	Proposed threatened	Not listed
Western regal fritillary	*Argynnis idalia occidentalis*	Proposed threatened	Not listed
Suckley's cuckoo bumble bee	*Bombus suckleyi*	Proposed endangered	Not listed

Northern Long-Eared Bat

The northern long-eared bat is protected under the ESA and is federally listed as endangered. The northern long-eared bat hibernates in caves or abandoned mines during the winter. During the summer, the northern long-eared bat may roost beneath the loose bark of live, dead, or dying trees. Additionally, the northern long-eared bat may roost in barns, in sheds, under bridges, or in other buildings that have little human disturbance. Roosting and foraging habitat includes forests, wooded fence rows, and riparian areas. The primary causes of decline in northern long-eared bat populations are the rapid spread of white-nose syndrome, caused by the fungus *Pseudogymnoascus destructans*, across the eastern United States and the Midwest, habitat degradation, and human disturbance of hibernacula (caves or abandoned mines) during hibernation (reference (27)).

In South Dakota, the distribution of northern long-eared bats consists of the Black Hills National Forest in the western part of the state and the forests along the Missouri River in the central part of the state. However, forested areas in eastern South Dakota could serve as habitat for northern long-eared bats. As discussed in Section 13.1.1, the Proposed Route and Substation Siting Areas are primarily composed of cultivated cropland and grassland with minimal forested landcover.

Tricolored Bat

The tricolored bat is proposed for listing as endangered under the ESA and is not currently afforded protection under the ESA. Tricolored bats hibernate in caves or abandoned mines

during the winter. During the summer, the tricolored bat may roost within leaf clusters of live, dead, or dying trees (reference (28)). Additionally, the tricolored bat may roost in barns, under bridges, culverts, buildings with little human disturbance, or in Spanish moss or lichen at the southern and northern parts of their range, respectively. Roosting and foraging habitat includes forests, wooded fence rows, and riparian areas. The tricolored bat primarily occupies forest interiors. Although this species does occur in highly fragmented, agriculturally dominated landscapes, it generally forages over waterways and forest edges.

South Dakota is on the western edge of the tricolored bat's range. Forested areas in eastern South Dakota could serve as habitat for tricolored bats. As discussed in Section 14.1.1, the Proposed Route and Substation Siting Areas are primarily composed of cultivated cropland and grassland with minimal forested landcover.

Rufa Red Knot

The Rufa Red Knot is protected under the ESA and is federally listed as threatened. The Rufa Red Knot is a medium-sized, stocky, short-necked sandpiper that migrates long distances annually between the Canadian Arctic and several wintering regions, including the southeastern United States (reference (29)). A majority of Rufa Red Knots follow migration routes along the east and west coasts of the United States, but small numbers of this species have been documented along an inland migration route across the Midwest during spring and fall migrations. These sightings are typically concentrated along the Great Lakes. Rufa red knots typically use habitats such as alkali lakes and wetlands, including sparsely vegetated shorelines, sandbars, islands, salt-encrusted mud flats, and gravelly salt flats. The Rufa Red Knot does not breed in South Dakota. Although suitable habitat is lacking within the Proposed Route and Substation Siting Areas, it is possible that a Rufa Red Knot could fly over the Project area during migration.

Dakota Skipper

The Dakota skipper is protected under the ESA and is federally listed as threatened. The Dakota skipper is a small butterfly that inhabits high-quality native dry mesic to dry prairie where mid-height grasses such as little bluestem, prairie dropseed, and side oats grama are a major component of the vegetation (reference (30)). Dakota skippers may survive in areas where the land has some grazing or haying, and they are dependent on habitats that experience periodic disturbance. As discussed in Section 13.1.1, potentially undisturbed grassland is abundant in the Proposed Route; some of these areas may provide suitable habitat for Dakota skippers.

Monarch Butterfly

The monarch butterfly is proposed for listing as threatened under the ESA and is not currently afforded protection under the ESA. The monarch butterfly is a migrating insect whose range extends throughout most of the continental United States. This butterfly can live in a variety of habitats, including prairies, savannas, and field edges with abundant flowering plants.

Although the monarch can live in many different habitats, their larval stage requires a diet of milkweed (primarily *Asclepias* spp.) species. Because of this reliance on milkweed, habitats with milkweed may be more likely to have monarch butterflies present. Suitable habitat for monarch butterflies is present in the Proposed Route and Substation Siting Areas.

Western Regal Fritillary

The western regal fritillary is proposed for listing as threatened under the ESA and is not currently afforded protection under the ESA. The western regal fritillary requires an abundance of violets (*Viola* spp.), which serve as host plants for the caterpillars, nectar-bearing flowers, which serve as food for adult butterflies, and native warm-season bunch grasses that provide protective sites for all life stages (reference (31)). Suitable grassland habitat is large (ideally more than 2,471 acres), contiguous, and maintained by periodic disturbance, such as fire. Adult males are generally present earlier in summer than females, beginning about May 15, but females are generally present later into the fall, until about October 31. Eggs are typically laid in prairie landscapes from August 15 to October 31, and individuals overwinter as larvae before pupating from approximately May 1 to July 31.

The biggest threat to the western regal fritillary is the loss and fragmentation of large, intact native grasslands through conversion by agriculture and development. The distribution of the western regal fritillary covers much of the state of South Dakota, including the Project area. The prairie and potentially undisturbed grassland habitats in the Proposed Route and its vicinity could provide suitable habitat for the western regal fritillary.

Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bee is proposed for listing as endangered under the ESA and is not currently afforded protection under the ESA. Suckley's cuckoo bumble bees are obligate nest parasites, primarily on the declining subgenus Bombus (reference (32)). Its life cycle is directly linked to a host species for survival because they have lost the ability to collect sufficient pollen and nectar to produce colonies. This species enters the nests of other bumblebee species, kills or subdues the queen of that colony, and forces (through aggression and pheromones) the workers to rear their offspring. The nests that host Suckley's cuckoo bumble bees are primarily underground cavities that have been created naturally or by other animals, such as abandoned rodent nests. The species is found in similar habitats to their hosts, including meadows, grasslands, and forest edges.

The primary threat to Suckley's cuckoo bumblebee is the decline of its host species, as well as habitat loss and pesticides. The historical range of Suckley's cuckoo bumblebee covered the state of South Dakota. The grasslands across the Proposed Route could provide suitable habitat for Suckley's cuckoo bumblebee; however, the species is rarely documented in South Dakota today.

13.2.1.3 South Dakota Natural Heritage Database Terrestrial Wildlife Species

A search of the SDGFP South Dakota Nongame Conservation Database was conducted for the Project on June 1, 2026, for a list of sensitive wildlife species that have been documented within 0.5 miles of the Project (Appendix H). As discussed in Section 13.1.1.3, the sensitive species records included in a Nongame Conservation Database report mostly originate from the SDNHD, which tracks species at risk and certain unique habitats. The SDNHD sensitive terrestrial wildlife species that have been documented within 0.5 miles of the Project, and their typical habitats, are summarized in Table 13-10.

Table 13-10 South Dakota Natural Heritage Database Terrestrial Wildlife Species Documented within One-Half Mile of the Project

Common Name	Scientific Name	Federal Status	State Status	Species of Greatest Conservation Need	Habitat
Dekay's brownsnake	*Storeria dekayi*	Not listed	Not listed	No	Riparian woodlands, wet meadows, and residential areas throughout their large range. Habitats used are typically moist with abundant organic material.[2]
Northern red-bellied snake	*Storeria occipitomaculata*	Not listed	Not listed	No	Riparian woodlands, deciduous forests, wet meadows, and residential areas.[2]
Silver-haired Bat	*Lasionycteris noctivagans*	Not listed	Not listed	Yes	Typically roost and forage in forested habitats, but also use open clearings, roadways, and waterways for foraging. Hibernate in tree cavities or rock crevices, primarily in the Black Hills.[3]

[1] Source: (reference (30))
[2] Source: (reference (33))
[3] Source: (reference (34))

13.2.2 Wildlife Impacts and Avoidance, Minimization, and Mitigation Measures

Construction activities that generate noise, dust, or disturbance of habitat could result in temporary impacts on wildlife, such as mortality, injury, or decreased breeding success. During construction of the Project, wildlife may be displaced within and adjacent to the Proposed Route and Substation Siting Areas. Clearing and grading activities could also

destroy birds' eggs or nestlings and less mobile wildlife species such as small mammals, amphibians, and reptiles that might be unable to avoid equipment. Many wildlife species may avoid the immediate area during construction; the distance of wildlife displacement depends on the species and the tolerance level of each animal. However, comparable habitat is available adjacent to the Project.

Three of the 11 WPAs that intersect the Proposed Route are in areas that may be too wide to span (>1,200 feet); all three are wetland easements and are located in the 765 kV Route. As a result, transmission line structures may need to be placed within these WPAs. The Applicants have coordinated with the USFWS regarding WPA easements, and the Project will avoid temporary and permanent impacts to wetland basins within USFWS wetland easements.

Because the Proposed Route intersects only an edge of the Dakota Tallgrass Prairie WMA in a location that follows a road corridor, impacts to the WMA from the Project are not anticipated.

Impacts to GPAs are not anticipated from the Project, as no GPAs are located in the Proposed Route.

As discussed in Section 13.2.1, the Proposed Route intersects several sharp-tailed grouse Priority Habitat Areas and routing through these areas is unavoidable. Impacts to sharp-tailed grouse could occur as a result of the Project due to the potential for habitat abandonment and interference with lekking grouse. Transmission line structures could serve as elevated perches for avian predators like raptors and ravens. The potential is highest where the Proposed Route crosses Tier 1 and Tier 2 Priority Habitat Areas. Avoiding construction activities adjacent to known leks from March 25 through April 30, when feasible would minimize disturbance to lekking grouse.

To avoid and minimize wildlife impacts, the Applicants will avoid and minimize disturbance to wetlands, riparian areas, native prairie, and intact grassland habitats; follow existing rights-of-way where practicable to reduce habitat fragmentation; implement erosion and sediment control measures and restoring disturbed areas with native vegetation following construction; incorporate design features and operational measures to reduce risks to birds near wetlands, water bodies, and migration corridors; and apply appropriate seasonal construction considerations to minimize potential impacts on grouse where applicable.

13.2.2.1 Avian Species

Potential impacts to avian species could occur due to electrocution and collision with transmission line conductors. Electrocution occurs when an arc is created by contact between a bird and energized lines or an energized line and grounded structure equipment. Electrocution occurs more frequently with larger bird species, such as hawks, because they have wider wingspans that are more likely to create contact with the conductors.

Independent of the risk of electrocution, birds could be injured by colliding with transmission line structures and conductors. The risk of collision is influenced by several factors, including habitat, flyways, foraging areas, and bird size. Waterfowl, especially larger waterfowl such as swans and geese, are more likely to collide with transmission lines. The frequency of collisions increases when a transmission line is placed between agricultural fields that serve as feeding areas and wetlands or open water, which serve as resting areas. In these areas, waterfowl and other birds likely travel between different habitats, increasing the likelihood of a collision.

The Applicants will implement applicable avian protection measures for transmission infrastructure and coordinate with resource agencies regarding appropriate protective measures where sensitive avian resources are identified. To minimize the potential for collisions and electrocution, the Project will incorporate the Avian Power Line Interaction Committee (APLIC) considerations for overhead powerlines. The Project will be designed in accordance with APLIC's suggested practices, to the extent practicable.

13.2.2.2 Federally Listed Terrestrial Wildlife Species

As discussed in Section 13.2.1.2, the IPaC query indicated that seven federally endangered, threatened, or proposed endangered or threatened terrestrial wildlife species have the potential to occur within or near the Project.

The Project area is predominantly agricultural/grassland, with only small areas of forested habitat. However, impacts to northern long-eared bats and tricolored bats could occur if tree clearing or construction takes place during the active season, when bats are breeding, foraging, or raising pups in forested habitats. Bats could be injured or killed if occupied trees are cleared during the active season, and the species could be disturbed during clearing or construction activities due to noise or human presence. The Applicants will comply with applicable USFWS requirements related to northern long-eared bats during construction of the Project, including applicable tree-clearing restrictions.

Rufa Red Knots are not common in South Dakota and do not nest in the state. Impacts to Rufa Red Knots are not anticipated; although it is possible that Rufa Red Knots inhabit the Project area during migration, it is unlikely given the lack of suitable habitat. The impact minimization measures identified for avian species in Section 13.2.2.1 are applicable to minimizing potential impacts to Rufa Red Knots.

Based on the June 1, 2026, SDGFP South Dakota Nongame Conservation Database search, no Dakota skippers have been documented within 0.5 miles of the Project (Appendix H). However, suitable prairie habitat is present in the Proposed Route, and vegetation clearing or ground disturbance in prairie habitat could adversely affect Dakota skippers should they be present. Potential impacts to Dakota skippers are anticipated to be negligible and could be minimized by avoiding or reducing permanent vegetation clearing in areas of suitable habitat.

Potential impacts to monarch butterflies could occur from ground-disturbing activities and/or the removal of suitable reproductive (milkweed plants) or feeding (flowering plants) habitat. Potential impacts to monarch butterflies are anticipated to be negligible and could be minimized by avoiding or reducing permanent vegetation clearing in areas of suitable habitat.

Suitable habitat for the western regal fritillary is present in the prairie and potentially undisturbed grassland habitats in the Proposed Route. Potential impacts to the western regal fritillary could occur from ground-disturbing activities and/or the removal of suitable reproductive (violet plants) or feeding (flowering plants) habitat. Potential impacts to the western regal fritillary are anticipated to be negligible and could be minimized by avoiding or reducing permanent vegetation clearing in areas of suitable habitat.

Suckley's cuckoo bumble bees are parasitic bees that invade the nests of other bumble bees and rely on them to rear their young. Suckley's cuckoo bumble bees are not common in South Dakota. However, it is possible that Suckley's cuckoo bumble bees could use the suitable habitats in the Proposed Route. Should they be present, potential impacts to this species could occur as a result of ground-disturbing activities and/or removal of vegetation in areas of suitable habitat, such as meadows, grasslands, and forest edges. Potential impacts to Suckley's cuckoo bumble bees are anticipated to be negligible and could be minimized by avoiding or reducing permanent vegetation clearing in areas of suitable habitat.

13.2.2.3 South Dakota Natural Heritage Database Terrestrial Wildlife Species

As discussed in Section 13.2.1.3, three sensitive terrestrial wildlife species, Dekay's brownsnake, northern red-bellied snake, and silver-haired bat, have been documented within 0.5 miles of the Project.

Suitable habitat for Dekay's brownsnake and northern red-bellied snake is present in the riparian areas and wet meadow wetland communities. Potential impacts on these species are anticipated to be negligible and can be minimized by spanning these wet habitats.

The Project area is predominantly agricultural/grassland, with only small areas of forested habitat. However, impacts to silver-haired bats could occur as a result of tree clearing, should this bat species be present. The impact minimization measures identified for northern long-eared bats in Section 13.2.2.2 will also minimize potential impacts to silver-haired bats.

14 Effect on Aquatic Ecosystems (ARSD 20:10:22:17)

The Applicants have been coordinating with the USFWS and SDGFP regarding sensitive aquatic species and ecological resources that may occur in the vicinity of the Project; documentation is provided in Appendix H.

14.1 Existing Aquatic Ecosystems

Aquatic ecosystems in the Project vicinity include watercourses, waterbodies, and wetlands, as discussed in Section 12.2.1 and shown on Map 12. These surface waters provide habitat for aquatic biota, such as fish, mollusks, crustaceans, insects, waterfowl, amphibians, reptiles, and small mammals.

Many of the watercourses and waterbodies present within the vicinity of the Project support fish populations valued by sportsmen. These fisheries can be of high value and produce desirable game species such as northern pike (*Esox lucius*), walleye (*Sander vitreus*), yellow perch (*Perca flavescens*), and other game fish.

14.1.1 Federally Listed Aquatic Species

The USFWS IPaC online tool was queried on June 1, 2026, for a list of federally threatened and endangered species, proposed species, candidate species, and designated critical habitat that could be present within the vicinity of the Project. The IPaC report identified one federally endangered aquatic species, the Topeka shiner (*Notropis topeka*) (Appendix H). IPaC did not identify any designated critical habitat intersecting the Project.

The Topeka shiner is protected under the ESA and is federally listed as endangered. The Topeka shiner is a small pool-dwelling minnow that typically inhabits quiet, open, permanent pools of small, clear, high-quality headwaters and creeks that drain upland prairie areas, including tiny spring-fed pools in headwater streams and larger streams (reference (35)). Habitat alterations, such as land use changes and watershed activities, have had the biggest impact on Topeka shiner populations. In South Dakota, the Topeka shiner has been found in about 40 streams in the James River, Big Sioux River, and Vermillion River Watersheds. The Topeka shiner currently retains its historic distribution and is locally abundant in South Dakota; however, population trends are unclear. The distribution of Topeka shiner overlaps the southern extent of the Project and the Proposed Route crosses Deer Creek, where Topeka shiner has been documented (Map 12).

14.1.2 South Dakota Natural Heritage Database Aquatic Species

A search of the SDGFP South Dakota Nongame Conservation Database was conducted for the Project on June 1, 2026, for a list of sensitive aquatic species that have been documented within 0.5 miles of the Project (Appendix H). As discussed in Section 13.1.1.3, the sensitive

species records included in a Nongame Conservation Database report mostly originate from the SDNHD, which tracks species at risk and certain unique habitats. The SDNHD sensitive aquatic species that have been documented within 0.5 miles of the Project, and their typical habitats are summarized in Table 14-1.

Table 14-1 South Dakota Natural Heritage Database Aquatic Species Documented within One-Half Mile of the Project

Common Name	Scientific Name	Federal Status	State Status	Species of Greatest Conservation Need	Habitat[1]
Blackside Darter	*Percina maculata*	Not listed	Not listed	Yes	Creeks and small to medium rivers.
Carmine Shiner	*Notropis percobromus*	Not listed	Not listed	Yes	Clear, swift, large creeks and small rivers.
Creek Heelsplitter	*Lasmigona compressa*	Not listed	Not listed	Yes	Small to large rivers and streams.
Creeper	*Strophitus undulatus*	Not listed	Not listed	No	Small to large streams and rivers, can tolerate lakes and ponds, particularly in outlets.
Golden Redhorse	*Moxostoma erythrurum*	Not listed	Not listed	No	Creeks and small to large rivers, occasionally in lakes.
Hornyhead Chub	*Nocomis biguttatus*	Not listed	Not listed	Yes	Small to medium streams.
Northern Redbelly Dace	*Chrosomus eos*	Not listed	Threatened	Yes	Boggy lakes, ponds; beaver ponds, and pools of headwaters and creeks.
Topeka Shiner	*Notropis topeka*	Endangered	Not listed	Yes	Quiet, open, permanent pools of small, clear, high-quality headwaters and creeks that drain upland prairie areas, including tiny spring-fed pools in headwater streams and larger streams.

[1] Source: (reference (36))

14.2 Aquatic Ecosystems Impacts and Avoidance, Minimization, and Mitigation Measures

The Project has been designed to avoid or minimize impacts to aquatic ecosystems, to the extent practicable. Potential impacts to aquatic resources are primarily related to the installation of structures within the aquatic habitat or sediment deposition related to construction activities. The Project will avoid or span all watercourses and waterbodies. To the extent practicable, the Project will avoid or span wetlands, 100-year floodplains, and other drainage systems to minimize potential disturbance to aquatic habitats. During construction, there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. The BMPs described in Section 9.4.5, pertaining to minimizing/mitigating potential impacts to surface waters and wetlands, also apply to minimizing/mitigating potential impacts to aquatic ecosystems.

Water use for the Project will be restricted to dust control. This water will be pumped from local surface waters following consultation with applicable resource agencies. No impacts to aquatic ecosystems as a result of water use during Project construction are anticipated.

14.2.1 Federally Listed Aquatic Species

As discussed in Section 14.1.1, the IPaC query identified the federally endangered Topeka shiner as potentially being present in the Project area, and the SDNHD indicated that it has been documented within 0.5 miles of the Project. The Proposed Route crosses Deer Creek, in which Topeka shiners are known to occur. Because all watercourses, including Deer Creek, will be spanned and BMPs will minimize the potential for indirect effects, impacts to Topeka shiner are not anticipated from the Project.

14.2.2 South Dakota Natural Heritage Database Aquatic Species

As discussed in Section 14.1.2, eight sensitive aquatic fish (including Topeka shiner) and mussel species have been documented within 0.5 miles of the Project. Because all watercourses will be spanned and BMPs will minimize the potential for indirect effects, impacts to fish and mussels are not anticipated from the Project.

15 Effect on Land Use (ARSD 20:10:22:18)

ARSD 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 plant, wind energy, or transmission site identifying existing land use according to the following classification system:

(a) Land used primarily for row and non-row crops in rotation;

(b) Irrigated lands;

(c) Pasturelands and rangelands;

(d) Haylands;

(e) Undisturbed native grasslands;

(f) Existing and potential extractive non-renewable 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 systems; 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.

15.1 Land Use

15.1.1 Existing Land Use

The Project is in Grant, Deuel, and Brookings Counties, South Dakota. The Project crosses portions of Big Stone, Alban, and Vernon townships in Grant County; Antelope Valley, Lowe, Glenwood, Herrick, Norden, and Scandinavia townships in Deuel County; and Lake Hendricks, Oak Lake, Sherman, and Alton townships in Brookings County. The Project is located entirely outside of municipal limits. The nearest municipalities include the City of Astoria (approximately 0.9 miles east) and the City of Big Stone (approximately 1.5 miles northeast) (Map 1).

The land surrounding the 765 kV Route consists primarily of rural agricultural land, including cultivated cropland and hay/pasture, with scattered farmsteads, rural residences, wetlands, streams, grasslands, public roads, and existing utility infrastructure. Near the northern end of the Project, existing energy infrastructure, including the Big Stone South Substation, the nearby Big Stone Power Plant, and existing high-voltage transmission facilities, is a prominent land use in the vicinity. Farther south, the 765 kV Route crosses a predominantly agricultural landscape in Deuel and Brookings counties, with small communities, rural development, and scattered water and wetland features located in the surrounding area. The 345 kV Route connects the Brookings County 345 kV Substation Expansion to the Brookings County 765 kV Substation Expansion and is located within a similar landscape that is generally characterized by agricultural land and existing utility uses. The Big Stone South Substation Siting Area is located within a rural landscape where existing energy generation, transmission, and substation infrastructure are established land uses. The Brookings County 345 kV Substation and Brookings County 765 kV Substation Siting Areas are also located in a predominantly agricultural setting, with nearby cropland, local roads, rural development, and existing transmission infrastructure.

Land used primarily for row and non-row crops and rangelands is summarized in Table 15-1, Table 15-2, and Table 15-3. Land categorized as hay/pasture is discussed in Section 13.1.1 and shown in Table 13-1 and Table 13-2. Based on aerial imagery and a review of water rights on the SDDANR mapping tool (reference (37)), the Proposed Route does not intersect with land classified as irrigated or municipal water rights. Municipal water supply and water sources for organized rural water systems are discussed further in Section 15.2. Four center-pivot irrigation systems intersect the Project Route. In each case, the Project can span the system, so irrigation system use can continue as it does currently. Row and non-row crops, hay/pasture, water rights, and center pivot irrigation are all shown in Map 17.

Table 15-1 Land Use within the 765 kV Route

Land Use	Area (acres)
Row and non-row crops	1,789.6
Rangeland	757.1

Table 15-2 Land Use within the 345 kV Route

Land Use	Area (acres)
Row and non-row crops	52.1
Rangeland	32.6

Table 15-3 Land Use within the Substation Siting Areas

Land Use	Area (acres) in Big Stone South Substation Siting Area	Area (acres) in Brookings County 765 kV Substation Siting Area	Area (acres) in Brookings County 345 kV Substation Siting Area
Row and non-row crops	33.7	225.2	17.3
Rangeland	0	33.7	0

As detailed previously, the land is primarily agricultural and rural. Land use around the Proposed Route and Substation Siting Areas is shown in (Map 9). Undisturbed grasslands are common in South Dakota, and further discussion and reference to them are within Section 13.1.1.1.

There are no commercial or public lands in the Proposed Route or Substation Siting Area. There is one granite quarry operation, Cold Spring Granite, adjacent to the Proposed Route in Grant County (Map 9).

The broader area is primarily agricultural, with numerous residential farms in the vicinity (Map 18). Agricultural industries are discussed further in Section 20.2. Cedar Breaks Ranch is the only ranch in the Proposed Route and breeds Rocky Mountain mule deer (Map 9). Hutterite colonies are distinct institutional communities that typically include residences, agricultural operations, and shared community facilities. Several colonies are located adjacent to or within the Proposed Route (Map 9).

Noise-sensitive land uses (e.g., residences, churches, cemeteries) are also shown in Map 9. There are no rural residences, farmsteads, or residences within the Proposed Route or Substation Siting Areas. A count of residences and non-residential structures (e.g., sheds, agricultural outbuildings, or animal production structures) and their distances from the Proposed Route and Substation Siting Areas are shown in Table 15-4, Table 15-5, and Table 15-6. As shown in the table, there are eight non-residential structures within 250 feet of the centerline (i.e., within the Proposed Route), but none are within the Substation Siting Areas.

Table 15-4 Number of Residential and Non-Residential Structures within Specified Distances of the 765 kV Route

Distance	Residential Structures	Non-Residential Structures
250 feet from Centerline	0	8
500 feet from Centerline	0	20
750 feet from Centerline	1	73
1000 feet from Centerline	5	152

Table 15-5 Number of Residential and Non-Residential Structures within Specified Distances of the 345 kV Route

Distance	Residential Structures	Non-Residential Structures
150 feet from Centerline	0	0
300 feet from Centerline	0	0
600 feet from Centerline	0	4

Table 15-6 Number of Residential and Non-Residential Structures within Specified Distances of the Substation Siting Areas

Distance	Area (acres) in Big Stone South Substation Siting Area		Area (acres) in Brookings County 765 kV Substation Siting Area		Area (acres) in Brookings County 345 kV Substation Siting Area	
	Residential Structures	Non-Residential Structures	Residential Structures	Non-Residential Structures	Residential Structures	Non-Residential Structures
250 feet	0	0	0	0	0	0
500 feet	0	0	0	0	0	0
1000 feet	1	0	0	0	0	0

15.1.2 Land Use Impacts and Avoidance, Minimization, and Mitigation Measures

The Project is generally compatible with the predominantly agricultural and rural land uses in the Proposed Route and Substation Siting Areas in Grant, Deuel, and Brookings counties. Construction would result in temporary disturbance within construction access routes, work

areas, and material-staging areas, as well as permanent conversion of land at transmission structure and substation locations.

The Project has been routed and designed to avoid or minimize land use conflicts to the extent practicable. Routing considerations included avoiding residences and farmsteads where practicable, following field lines or parcel boundaries where feasible, minimizing interference with agricultural operations, avoiding or minimizing impacts to public and conservation lands, and considering special land uses such as active or planned mining areas.

Construction, operation, and maintenance of the Project will result in temporary and permanent land use impacts, primarily within agricultural lands. These lands consist predominantly of row and non-row cropland, hay/pasture, and rangeland. Temporary impacts will occur where construction access, structure work areas, stringing sites, laydown yards, staging areas, and other temporary workspaces are needed. To the extent practicable, the Applicants will coordinate with landowners to minimize interference with agricultural operations and other existing land uses. Where practicable, construction activities in cultivated cropland will be scheduled before planting or after harvest to reduce impacts to agricultural production. Landowners will be compensated for crop loss and other construction-related property damage. The Applicants will repair, or reimburse landowners for the repair of, drain tile, fences, and other property damaged during construction. Potential or actual soil compaction will be addressed through compensation for deep ripping or by providing deep-ripping services where needed.

Following construction, temporarily disturbed areas will be restored to preconstruction conditions to the maximum extent feasible. Where additional revegetation is necessary, noxious-weed-free seed will be used unless otherwise agreed to with the landowner. By implementing these measures, most temporarily disturbed land may return to its prior use following construction, while permanent land-use changes would generally be limited to transmission structure foundations and substation footprints. Detailed discussions of construction procedures, temporary use areas, restoration, and right-of-way maintenance are provided in Section 9.

While most of the agricultural land within the Proposed Route will remain available for continued farming and grazing uses, permanent conversion of agricultural land will occur at the locations of the 765 kV transmission structures. Crop production and other agricultural activities will no longer be feasible within the structure footprints. These areas will be converted to utility use for the operating life of the Project. The substation components will also result in long-term land use conversion to utility and/or industrial use. This includes the Big Stone South Substation Expansion, the Brookings County 345 kV Substation Expansion, and the Brookings County 765 kV Substation Expansion. Adjacent compatible land uses, including agricultural uses, are expected to continue.

Cold Spring Granite provided informal input on the Proposed Route through the open houses and direct correspondence. Two concerns were identified: potential conflicts with a planned expansion of their crushing operation and impacts to a grout pile. It was confirmed that the location of the Proposed Route would not affect the planned expansion or the grout pile.

Based on the current Project design, no residences, businesses, or occupied structures are anticipated to be displaced by the Project as no residences are located within the Proposed Route or Substation Siting Areas. Eight non-residential structures are located within the Proposed Route. Non-residential structures within the Proposed Route could be displaced by the project. Though the general rule is that buildings are not allowed within the Proposed Route, there are instances where the activities taking place in these buildings are compatible with the safe operation of the line. This is determined on a case-by-case basis. Agricultural outbuildings, Hutterite colonies, and other rural land uses occur adjacent to portions of the Project and will be avoided or accommodated to the extent practicable through final design and construction planning.

The Project has been routed and designed to avoid or minimize land use conflicts to the extent practicable. Routing considerations included avoiding residences and farmsteads where practicable, following field lines or parcel boundaries where feasible, minimizing interference with agricultural operations, avoiding or minimizing impacts to public and conservation lands, and considering special land uses such as active or planned mining areas.

15.2 Public Lands and Facilities

15.2.1 Existing Public Lands and Facilities

Public lands and facilities within the Project Route are shown in Map 16.

15.2.1.1 Federal Land

Public lands and facilities within and adjacent to the Project Route were reviewed to identify federal land ownership, conservation lands, wildlife management areas, and other publicly managed resources that could be affected by the Project. This review included USFWS lands and easements, Bureau of Land Management lands, and other federally protected conservation areas, as well as WPAs managed within the Waubay and Madison Wetland Management Districts. The Project is primarily located on private land, with limited interaction with publicly managed conservation lands.

Federal lands in the vicinity of the Project include USFWS WPAs, and WMAs (Map 16). These areas, as described in Section 13.2.1, generally consist of wetlands, grasslands, and associated uplands managed to support wildlife habitat, migratory birds, and wildlife-dependent recreation.

WPAs are USFWS-managed wetland and grassland easements that provide breeding, nesting, loafing, and migratory habitat for waterfowl, shorebirds, grassland birds, and other wildlife. Several WPAs occur along the Project Route, specifically with the 765 KV Route and primarily in the northern portion of the Project. In total, 11 WPAs, comprising approximately 76 acres, intersect the 765 kV Route (Map 16). See Section 13.2.1 for additional information on WPA easements.

WMAs are managed to conserve fish, wildlife, and native plant habitats. The Dakota Tallgrass Prairie WMA supports tallgrass prairie conservation in southeastern North Dakota and eastern South Dakota through voluntary grassland conservation easements. Approximately 0.5 acre along the edge of the Dakota Tallgrass Prairie WMA intersects the 765 kV Route adjacent to County Road 27 (Map 16).

The Substation Siting Areas are all located on private property and do not cross federal lands.

15.2.1.2 State Lands

As discussed in Section 13.2, GPAs are state-managed areas established to support wildlife production and public hunting opportunities. Several GPAs occur in the northern and central portions of the Project vicinity; however, none intersects the Proposed Route. The nearest GPA is approximately 0.15 miles east of the Proposed Route.

15.2.1.3 Public Facilities

Public and community facilities within and near the Project Route were reviewed to identify resources that provide public services or community functions, and that could potentially be affected by Project construction or operation. Facilities considered included places of worship, healthcare and emergency services, schools, parks and recreational facilities, airports, and cemeteries.

No public or community facilities are located within the Proposed Route, with the exception of public roads. The nearest place of worship is Bethel Lutheran Church in Astoria, located approximately 1.2 miles east of the Project. Additional public facilities, including healthcare services, emergency services, schools, parks, and recreational facilities, are located in the communities of Ortonville (approximately 3.25 miles east of the Big Stone South Substation), Milbank (approximately 5.7 miles west/southwest of Big Stone South Substation), and Brookings (approximately 9 miles west of the Brookings County 765 kV Substation Expansion).

15.2.2 Public Lands and Facilities Impacts and Avoidance, Minimization, and Mitigation Measures

There are three WPAs that intersect the 765 kV Route and may be too wide to span (>1,200 feet). As a result, transmission line structures may need to be placed within these WPAs. However, the Applicants have coordinated with the USFWS regarding wetland easements,

and the Project will avoid temporary and permanent impacts to wetland basins within USFWS wetland easements.

In addition, the Proposed Route intersects an edge of the Dakota Tallgrass Prairie WMA in a location where the Proposed Route follows a road corridor; however, impacts to the WMA from the Project are anticipated to be negligible due to the presence of the roadway.

The Proposed Route does not cross any GPAs; therefore, no impacts to these resources are anticipated.

15.3 Noise

15.3.1 Existing Sound

Noise levels are measured in units of decibels (dB) on a logarithmic scale and can be used to compare a wide range of sound intensities. Human hearing is not equally sensitive to all frequencies of sound, so certain frequencies are given more weight. The A-weighted decibel (dBA) scale accounts for the sensitivity of the human ear. It puts more weight on the range of frequencies that the average human ear perceives, and less weight on those we don't, like higher or lower frequencies. An increase of 10 dBA sounds twice as loud, due to the way that the logarithmic scale functions in compressing the measurements associated with sounds. Figure 15-1 illustrates common noise levels at various levels of the dBA scale.

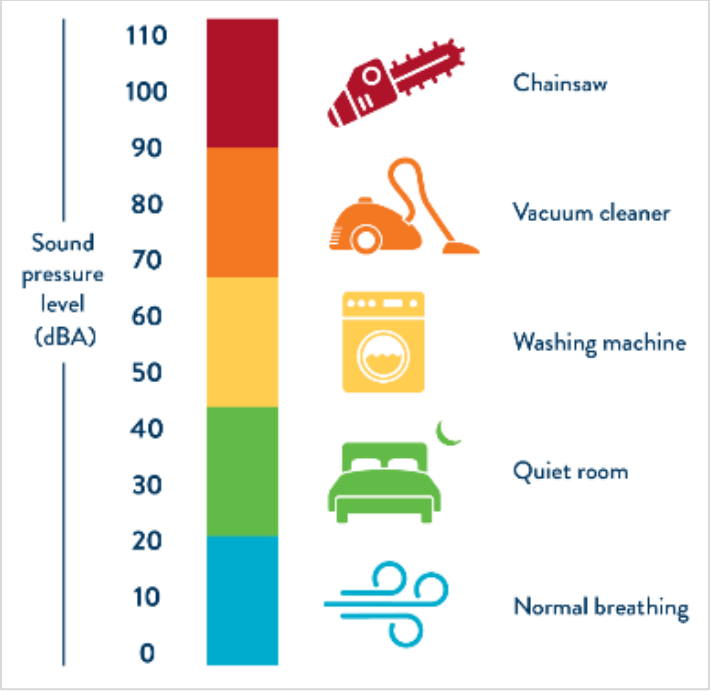

Figure 15-1 Common Activity Noise Levels

The State of South Dakota has not adopted a noise level requirement for transmission lines. Grant and Brookings Counties do not have an applicable noise level requirement. The Deuel County Zoning Ordinance provides that, for public and private utilities facilities, "Noise level for residences shall not exceed 45 DBA, average A-Weighted Sound pressure. The noise level is to be measured at the perimeter of existing residences. The property owners shall have the right to waive the respective setback requirements, the waiver needs to be in writing and filed with the Zoning Office."

For most of the Project area, ambient noise levels are expected to be in the range of 30 to 40 dBA, with temporary, higher noise levels associated with wind, vehicular traffic, and the use of gas-powered equipment (for example, tractors or chainsaws).

15.3.2 Noise Level Impacts and Avoidance, Minimization, and Mitigation Measures

15.3.2.1 Construction Noise

During Project construction, temporary, localized noise from heavy equipment and increased vehicle traffic is expected to occur along the Project Route, largely during daytime hours during implementation of the Project. Transmission line construction activity and crews would be present at a particular location during daytime hours for a few days at a time, but on multiple occasions throughout the period between initial right-of-way clearing and final restoration. Substation noise would be localized and present at a particular location from start to end. Major noise-producing activities are associated with clearing and grading, material delivery, augering foundation holes, setting structures, and stringing conductors.

Noise associated with heavy equipment can range between 80 and 90 dBA when operating at full power, 50 feet from the source. Heavy equipment generally runs at full power up to 50 percent of the time. Point source sounds decrease six dBA at each doubling of distance; therefore, a 90 dBA sound at 50 feet is perceived as a 72 dBA sound at 400 feet and a 60 dBA sound at 1,600 feet.

Distinct noise impacts during construction are anticipated to be minimal to moderate, depending on proximity to receptors, the activity occurring, and the equipment being used. Construction noise impacts will be temporary, localized, and intermittent.

15.3.2.2 Operational Noise

Noise from transmission lines (electrical conductors) is due to small electrical discharges that ionize surrounding air molecules. The level of noise from these discharges depends on conductor conditions, voltage levels, and weather conditions. Noise emissions are greatest during heavy rain events when the conductors are consistently wet.

Potential corona noise was modeled using worst-case rain scenario benchmarks. The Project's 765 kV Route was modeled using the Bonneville Power Administration Corona and Field Effects Program version 3, to evaluate audible noise from HVTLs. Table 15-7 and Table 15-8 present the L50 sound levels predicted for proposed transmission line configurations for the Project. The L50 is the level that will not be exceeded more than 50 percent of the time. These worst-case corona noise calculations represent line sounds generated during wet line conditions (i.e., rain periods), under which background sound levels are likely to be elevated as well. Dry line operations will be markedly quieter than those under rainy conditions. No significant noise impacts from line operations are expected.

Table 15-7 Calculated Audible Noise L50 for the Operation of 765 kV Transmission Line Design

Structure Type	Circuits Present	Noise L_{50} (200 ft from Centerline, dBA)*	Noise L_{50} (175 ft from Centerline, dBA)*	Noise L_{50} (150 ft from Centerline, dBA)*	Noise L_{50} (125 ft from Centerline, dBA)*	Noise L_{50} (100 ft from Centerline, dBA)*
Horizontal 765 kV Single Circuit – 50-foot conductor spacing	765 kV	42.9	43.5	44.1	44.8	45.6

* 5 Feet Above Ground

Table 15-8 Calculated Audible Noise L50 for the Operation of 345 kV Transmission Line Design

Structure Type	Circuits Present	Noise L_{50} (75 ft from Centerline, dBA)*
Single Pole, Davit Arm, 345 kV Single-Circuit	345 kV	40.9

* 5 Feet Above Ground

Operational sound levels from the 345 kV line are expected to be lower than those evaluated for the 765 kV line and similarly have minimal noise effects on nearby receptors from line operation. The predicted L50 sound level for the proposed 345 kV line at the edge of the right-of-way is 40.9 dBA.

Substation operational sound is generated primarily from energized transformers, reactors (if installed), cooling equipment, and corona activity associated with high-voltage electrical equipment. Under normal operating conditions, transformer hum is the primary substation sound source and is characterized by a low-frequency broadband noise. Noise levels vary depending on equipment size, loading conditions, ambient weather, and distance from the source.

Operational noise from a transmission substation is generally most noticeable in the immediate vicinity of the transformers, within the substation. Sound levels decrease with increasing distance due to geometric spreading, ground absorption, terrain shielding, and the presence of vegetation or other structures. Substation expansions will be designed so that sound levels will not exceed 45 dBA L50 at the property boundary.

15.4 Visual Resources

15.4.1 Existing Visual Resources

Visual impacts are inherently subjective because individuals may perceive changes to a landscape differently depending on viewing location, duration of exposure, expectations associated with the setting, and personal preferences. Visual effects generally decrease with increasing distance from Project facilities. Although transmission structures may remain visible over relatively long distances due to their height, details associated with individual structures, conductors, and other Project components become less noticeable as viewing distance increases.

The Project is located in a predominantly rural area of eastern South Dakota within Grant, Deuel, and Brookings counties. The landscape along the Proposed Route generally consists of flat to rolling glacial terrain dominated by cultivated cropland, pasture, and grassland, with scattered wetlands and limited areas of trees and other woody vegetation. Existing development is generally associated with rural residences, farmsteads, agricultural buildings, and transportation and utility infrastructure. Roads, railroads, overhead distribution and transmission lines, substations, wind turbines, barns, grain-handling facilities, and other agricultural infrastructure are established visual elements within the Project's vicinity.

Within one mile of the Proposed Route's centerline are the Bethel Lutheran Church and the Wood Lake Lutheran Church and Cemetery. Nearby WPA and GPAs may also provide sensitive viewpoints for visitors engaged in hunting, wildlife observation, and other outdoor activities. In addition, there are National Register of Historic Places (NRHP)–eligible properties, including farmsteads, schools, residences, and historic districts within one mile of the Project.

15.4.2 Visual Resource Impacts and Avoidance, Minimization, and Mitigation Measures

Visual impacts are subjective and depend on the perceptions of the observers traveling through or living in the local vicinity of the Project. The presence of utility infrastructure is a common occurrence in rural residential and agricultural areas. Although transmission lines, distribution lines, and substations currently exist in the viewshed, the visual contrast added by the taller and wider transmission structures and lines might be perceived as a visual disruption for some individuals. Visual effects would generally be most noticeable at close-range viewing locations, across open terrain, and in areas with limited vegetation, topographic screening, or existing infrastructure.

The 345 kV transmission line would be constructed using tubular single-pole structures within a 150-foot-wide right-of-way. Structures would generally range from approximately 90 to 180 feet tall and would be spaced approximately 800 to 1,200 feet apart. The poles, conductors, and associated hardware would introduce new vertical and linear elements into the open agricultural landscape. Visual contrast would generally be greatest where the line is viewed at close range, crosses open terrain, or is in areas with limited vegetation, topographic screening, or existing utility infrastructure.

The 765 kV transmission line would be constructed primarily using four-legged, self-supporting steel lattice structures. Typical structures would be approximately 150 to 175 feet tall, although structures may be approximately 195 feet tall, or greater, where transmission-line crossings, topography, environmental constraints, or other design requirements necessitate increased height. Structures would have base dimensions ranging from approximately 35 feet by 35 feet to 75 feet by 75 feet and would be spaced approximately 1,200 to 1,400 feet apart. Compared with the tubular single-pole structures proposed for the 345 kV transmission line, the 765 kV structures would be lattice-shaped, having wider bases, broader structural profiles, and more visually complex configurations. Although the 765 kV structures would typically be spaced farther apart, their height, width, and lattice configuration would make them more prominent vertical and linear elements within the predominantly open agricultural landscape. Visual effects would generally be most noticeable at close-range viewing locations, across open terrain, and in areas with limited vegetation, topographic screening, or existing infrastructure.

Visual effects would vary among the three Substation Siting Areas. The Big Stone South Substation improvements would expand an existing substation and add breakers, switches, transformers, reactors, capacitive voltage transformers, arresters, bus work, and associated facilities. Similarly, the Brookings County 345 kV Substation would be expanded to the north and would include additional substation equipment and modifications to associated transmission-line connections. Because these improvements would occur at or adjacent to existing substations, the new equipment would increase the size and density of established utility facilities but would generally represent an extension of existing land use.

The Brookings County 765 kV Substation Expansion would be constructed in a new area approximately five miles from the existing Brookings County 345 kV Substation. The Brookings County 765 kV Substation Expansion would therefore introduce a new feature into an area that does not currently contain a substation. Visual effects from the substation facilities would generally be most noticeable from nearby roads and properties and across open areas with limited intervening vegetation or topographic screening.

Construction would result in temporary visual effects from construction equipment, temporary access roads, material staging, structure assembly areas, and disturbed ground. These effects would be short-term and would generally cease after construction and restoration.

While the primary strategies for minimizing aesthetic impacts are prudent routing, the Applicants will work with landowners to identify concerns related to Project aesthetics. Mitigative measures used for potential visual impacts can include the following:

- Input from the landowner or land management agency will be considered prior to final location of structures, right-of-way, and other areas with the potential for visual disturbance.
- Input from landowners will be considered to locate structures in a way that minimizes the loss of agricultural land, forest, and wetlands, and avoids homes and farmsteads.
- Structures will be placed at a distance, consistent with sound engineering principles and system reliability criteria, from intersecting roads, highways, or trail crossings.
- Construction waste and scrap will be properly disposed of and removed from the right-of-way and all premises on which construction activities were conducted upon completion of each task. Personal litter will be removed and properly disposed of, including bottles, cans, and paper from construction activities, daily.

15.5 Satellite, Cellular, Radio, TV, and GPS Reception

15.5.1 Existing Satellite, Cellular, Radio, TV, and GPS Reception

Existing satellite, cellular, radio, TV, and GPS systems in the Project vicinity were identified by reviewing publicly available information and the Federal Communications Commission (FCC) database. Capitol Airspace also conducted a communication system interference study to determine proximity to communication facilities contained in the FCC Universal Licensing System and Licensing and Management System. The Communication Systems (AM/FM Radio, TV, land mobile radio (LMR), and Communications Towers) Interference Analysis Report, prepared by Capital Airspace, is provided as Appendix I.

15.5.1.1 Radio Broadcasting Stations

Amplitude modulation (AM) radio service is typically limited to a radius of 100 miles from the signal source, and multiple stations may be audible in the vicinity of the Project. Two AM radio broadcasting stations are within 20 miles of the Project: 1430AM KBRK in Brookings, and 1510 AM KMSD in Milbank (references (38); (39)). Six FM radio broadcasting stations are within 20 miles of the Project: 88.3 KESD in Brookings and 95.1 K236CU, 98.1 K251CX, 99.1 KXLG, 100.3 K262CK, and 104.3 KKSD in Milbank (references (40); (41)). The nearest radio stations are 1510 AM KMSD and FM 95.1 K236CU, both located approximately 7.3 miles west of the Project.

15.5.1.2 Cellular Phone

There are no FCC-licensed cellular towers located within 1 mile of the Proposed Route. Cellular service in the vicinity is provided by several carriers, including AT&T, Spectrum Mobile, Rural Cellular, and CommNet (reference (42)). Two apparent communication towers, with microwave transmitters and receivers, are located approximately 0.8 miles west of the Proposed Route at an Ottertail substation near the intersection of 175th St and 486th Ave north of Gary, South Dakota.

15.5.1.3 GPS

GPS technology is widely used throughout the Project area for applications such as agriculture, construction, surveying, logistics, wireless communications, and navigation. Accordingly, GPS-dependent devices are expected to be commonly operated within the Project vicinity.

15.5.1.4 Television

Over-the-air television broadcast service in the Project area is provided by stations located in Florence, Sioux Falls, and Brookings, South Dakota. These stations include a range of network-affiliated and independent broadcasters, such as CBS (KELO), ABC/METV (KSFY), NBC/FOX/Antenna/COZI/Court TV (KDLT), PBS (KCSD, KESD), and several independent or non-affiliated stations (reference (43)). The nearest television antenna to the Project is low power station K25OU-D located approximately 9.4 miles away in Brookings. In addition, cable and satellite television services may originate from stations located outside the immediate region and can transmit content over considerably greater distances.

15.5.1.5 Land Mobile Radio

LMR communications are generally considered two-way radio communication systems, the type of systems used to dispatch commercial service like plumbers, landscapers, deliveries, etc. LMR systems also include the communication systems used by first responders. LMR systems include a central stationary base system, such as a dispatch center, and a network of mobile radios either vehicle based or personnel based. These systems utilize a wide range of VHF and UHF frequencies that are broad and that can be “scattered” to broadcast a signal

beyond physical obstructions. In addition, LMR systems are design with redundant multiple transceivers to bounce signals off variable base units to extend range, reduce signal interference and increase reliability. Because of their general design of broad scattered frequencies and use of multiple transceivers to bounce signals further and around obstructions, transmission of high voltage lines has little impact on LMR systems.

Capital Airspace identified four LMR licensed base station systems within 0.5 miles of the Proposed Route. This list suggests the LMR systems in the vicinity of the Project include contractors, farms, and possibly private citizens (Appendix I).

15.5.2 Satellite, Cellular, Radio, TV, and GPS Reception Impacts and Avoidance, Minimization, and Mitigation Measures

In general, high-voltage transmission lines are not expected to interfere with radio, television, or other communication signals during normal operation. Although uncommon, four mechanisms have the potential to cause signal interference: gap discharges, corona discharges, and shadowing and reflection effects.

Gap discharge is the most common form of transmission line-related interference and typically results in minor effects. This phenomenon occurs when small separations develop between mechanically connected metal components (e.g., clamps, insulators, or brackets), often due to defects or wear. Electrical arcing across these gaps can generate electromagnetic noise that may affect nearby radio or television reception. The extent of any interference depends on factors such as signal strength, receiver quality, and proximity to the transmission line. The Project will incorporate design and maintenance measures to minimize the likelihood of gap discharges.

Corona discharge may also generate electromagnetic noise within frequencies used by radio and television signals. However, the potential for interference is generally low because radio frequency noise attenuates rapidly with distance from the conductors. Within a broadcast station's primary service area, signal strength is typically sufficient to overcome any minor noise generated by corona discharge. The Project will be designed and maintained to reduce corona effects to the extent practicable.

Where a proposed structure is placed can affect whether it interferes with radio signals. Close to the signal source, radio waves can be less predictable and more easily disrupted by objects. Farther away, the waves are more spread out and consistent, so objects are less likely to cause problems. The point where the close-in area ends is called the Fraunhofer distance (Appendix I).

Localized interference with AM radio signals may occur directly beneath transmission lines, in a vehicle for example; however, such effects diminish rapidly outside the right-of-way. Unless the transmission line is sited within 220 yards of any radio receiver (AM of FM), it is unlikely

that the project would have a perceivable effect on AM reception. In the unlikely event that interference occurs, it can typically be resolved through adjustments or enhancements to the receiving antenna system. Similarly, interference with television signals due to shadowing or reflection is rare and may only occur when large transmission structures obstruct weak, distant signals. These effects are typically correctable with the installation of an external antenna.

GPS, cellular, and microwave communication systems operate at frequencies that are outside the range of electromagnetic emissions generated by transmission lines. Regarding cellular service, there are many cases in the U.S. where there are cellular receivers/transmitters mounted on towers either directly next to or on high-power transmission line towers. In these circumstances, mitigation is simple with the assistance of a qualified communications engineer. There should be no impact on GPS or cellular service from the transmission line project (Appendix I).

Based on these considerations, no impacts to communication systems are anticipated, and no mitigation measures are proposed. The Communication Systems (AM/FM Radio, TV, LMR, and Communications Towers) Interference Analysis Report (Appendix I) provides greater technical details of potential communication interference and why such interference is not expected for the Project. However, should interference occur within a television station's primary coverage area, the Applicants will coordinate with affected parties to resolve the issue, including implementing corrective measures at their expense, such as the installation of external antennas or other suitable measures.

16 Effect on Local Land Use Controls (ARSD 20:10:22:19)

ARSD 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.

The Project is located in Grant, Deuel, and Brookings counties, South Dakota.

The Applicants have initiated coordination and will continue to coordinate with Grant, Deuel, and Brookings counties regarding applicable zoning ordinances, land use controls, and local permitting requirements, and will continue to coordinate with these parties throughout the permitting process. Project design and facility siting will consider applicable local requirements during ongoing route refinement and final engineering. A summary of potential permits and approvals needed is provided in Section 26.

Based on information available and the ordinances effective at the time of filing, the Project is consistent with applicable local land use controls. The Applicants will seek to obtain the required local permits and approvals before construction, as applicable. As noted in Section 3.5, the Applicants are aware that Grant and Brookings Counties are considering new setback requirements. Based on what the Applicants currently know about potential new requirements, the Project will seek to meet these setbacks.

If final structure placement, access roads, temporary workspaces, or substation-related facilities are located within mapped floodplain areas, the Project may require a floodplain development permit from each County. If a potential conflict with a local land use control is identified, the Applicants will coordinate with the applicable local authority to avoid, minimize, or resolve the conflict to the extent practicable. The Applicants will coordinate with applicable floodplain administrators and obtain floodplain development permits, as needed.

16.1 Grant County

Land use in Grant County is regulated by the Grant County Zoning Ordinance. The Grant County Planning & Zoning Office administers and enforces the Comprehensive Land Use Plan, Subdivision Ordinance, Zoning Ordinance and Drainage Ordinance (reference (44)). Grant County is currently evaluating whether to establish a setback requirement that would apply to the Project.

Based on the Applicants' review of currently available county zoning ordinances, comprehensive plans, subdivision regulations, and other applicable land use controls, no local land use control has been identified that would prevent construction or operation of the Project as currently proposed.

16.2 Deuel County

Land use in Deuel County is regulated by the Deuel County Zoning Ordinance (reference (45)) and guided by the Comprehensive Land Use Materials (reference (46)), Subdivision Ordinance, and permitting processes for building permits, conditional use/variance requests, and other regulated activities (reference (47)). The Deuel County Zoning Ordinance includes provisions for utilities and essential services, including electric transmission facilities. The Deuel County Zoning Ordinance also includes a 2,000-foot setback for 765 kV lines with an option for a landowner to grant a waiver. The Project is seeking nine waivers for the Proposed Route, five of which have been obtained. The Applicants are continuing to negotiate with landowners to obtain the remaining waivers.

16.3 Brookings County

Land use in Brookings County is regulated by the Brookings County Zoning Ordinance. The Brookings County Comprehensive Land Use Plan is the official policy guide for future land use decisions in the unincorporated areas of Brookings County and provides guidance for decisions affecting the use and development of land. Brookings County's planning and zoning materials include the Complete Zoning Ordinance, Ordinance 2025-01, and applications for conditional uses, variances, rezoning, floodplain development permits, and building permits. Brookings County also established a subcommittee, the Brookings County 765 kV Transmission Line Advisory Committee, consisting of 5 members (three Planning and Zoning Commission members along with two county commission members). The subcommittee will evaluate potential setbacks, potential Project impacts, and other considerations for 765 kV lines.

Based on the Applicants' review of currently available county zoning ordinances, comprehensive plans, subdivision regulations, and other applicable land use controls, no local land use control has been identified that would prevent construction or operation of the Project as currently proposed.

17 Effect on Water Quality (ARSD 20:10:22:20)

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.

17.1 Existing Water Quality

Groundwater and surface water resources within the vicinity of the Project are discussed in Section 12; this discussion includes a summary of the three CWA Section 303(d) impaired waters crossed by the Proposed Route.

17.2 Water Quality Impacts and Avoidance, Minimization, and Mitigation Measures

During construction, ground disturbance associated with excavation, grading, and construction traffic could result in erosion and transport of sediment to nearby surface waters, which could temporarily affect water quality. Implementation of erosion and sediment control BMPs will minimize erosion and help prevent sediment from leaving the construction area and entering receiving waters.

Construction of the Project will require coverage under the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities, which requires preparation of a SWPPP. The SWPPP will identify potential sources of stormwater pollution and specify BMPs to control erosion and sedimentation. The SWPPP will be prepared before the start of construction. The Applicants will implement BMPs during construction of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Construction practices will be completed in accordance with the National Pollutant Discharge Elimination System (NPDES) permit requirements. BMPs may include:

- Containment of stockpiled material away from stream banks and shorelines as required by the NPDES permit.
- Stockpiling and respreading topsoil at laydown areas and/or permitted areas.
- Reseeding and revegetating disturbed areas as required by the NPDES permit.
- Implementing erosion and sediment controls as required by the NPDES permit, such as use of silt fence, straw wattles, erosion control blankets, re-vegetation, or other features and methods designed to control storm water runoff and mitigate erosion and sedimentation.
- Minimizing stormwater generated by construction by following BMPs.

Because erosion and sediment controls will be in place for construction of the Project, impacts to water quality are expected to be negligible.

18 Effect on Air Quality (ARSD 20:10:22:21)

ARSD 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.

18.1 Existing Air Quality

The entire state of South Dakota is in attainment for all National Ambient Air Quality Standards criteria pollutants (reference (48)). The nearest ambient air quality monitoring site to the Project is in Brookings, South Dakota (AQS ID Number 46-011-0003), which is located approximately 12 miles west of the Project. This site monitors particulate matter smaller than 10 microns (PM_{10}), particulate matter smaller than 2 microns ($PM_{2.5}$), and ozone.

18.2 Air Quality Impacts and Avoidance, Minimization, and Mitigation Measures

Temporary construction activities may lead to fugitive dust emissions and short-term emissions from diesel trucks and construction equipment. However, any air quality effects resulting from construction will be short-term and limited to the duration of construction activities, without exceeding the National Ambient Air Quality Standards for particulate matter or significantly increasing greenhouse gas emissions.

Operations and maintenance (O&M) of the transmission line is expected to have negligible impacts on air quality. Studies examining ozone production under transmission lines have generally been unable to detect any significant increases attributable to a transmission facility (Sebo et al. 1976; Valuntaite et al. 2009). Existing calculations concerning ozone production and concentration typically assume conditions of high humidity or rain, with no reduction in the amount of ozone due to oxidation or air movement. These calculations therefore overestimate the amount of ozone produced and concentrated at ground level.

During O&M activities, negligible amounts of dust and vehicle exhaust emissions may occur, without causing exceedances of air quality standards or negative impacts on climate change. Project O&M could produce small amounts of ozone and nitrogen oxides emissions as a result of atmospheric interactions with the energized conductors. These minor emissions during O&M will have a negligible impact on ambient air quality.

The Project will comply with all applicable federal and state air quality requirements.

19 Time Schedule (ARSD 20:10:22:22)

ARSD 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.

The Applicants anticipate that the Project will be placed in service in 2034. An estimated schedule for major Project milestones is provided in Table 19-1. This schedule is based on information available at the time of filing and is subject to change as Project planning, permitting, engineering, land acquisition, regulatory review, material procurement, contractor availability, and other Project-related factors evolve. The Minnesota portion of the 765 kV transmission line from the South Dakota/Minnesota state line to Lakefield Junction 765 kV transmission line (described in Section 2.2), was included in the PowerOn Midwest Certificate of Need application submitted to the MPUC in March 2026. The Route Permit Application for the Minnesota segment is anticipated to be submitted in 2027. The start date for the SDPUC Facility Permit process is ahead of the MPUC Route Permit process due to the timeline set forth in SDCL 49-32-20.

Table 19-1 Estimated Permitting and Construction Schedule

Milestone	Estimated Timeframe
Project planning, route development, stakeholder outreach, and easement discussions	2025 – 2027
Facility permit application preparation and filing	2025 – 2026
Acquisition of land rights	2026 - 2029
Permitting, engineering design, ongoing environmental surveys, and ongoing stakeholder engagement	2027 – 2029
Other federal, state, and local permits	2028 – 2029
Construction	2030 – 2034
Cleanup and site restoration	2034
In-service operation	2034

20 Community Impact (ARSD 20:10:22:23)

ARSD 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 applicant's 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

20.1 Socioeconomic and Community Resources

20.1.1 Existing Socioeconomic and Community Resources

The Proposed Route and Substation Siting Areas are predominantly located in a rural setting characterized by agricultural land, dispersed residences and farmsteads, small communities, and agricultural support facilities. The largest residential areas near the Proposed Route and Substation Siting Areas are the City of Astoria (0.9 miles east) and the City of Big Stone (1.5 miles northeast). Residential development outside these communities generally consists of individual homes and farmsteads located along county and township roads. Residential and non-residential structures within the Proposed Route and Substation Siting Areas are discussed in Section 15.

The U.S. Census Bureau's American Community Survey data, shown in Table 20-1 and Table 20-2, provide five-year estimates (2019-2024) of population, employment, income,

poverty, and demographic characteristics. These tables include statewide data for South Dakota and the three counties that are traversed by the Project.

Table 20-1 summarizes population, employment, income, and poverty characteristics. Population density varies across the three counties, with Deuel County having the lowest population density and Brookings County having the highest. Population trends also vary, indicating population growth in Grant and Brookings counties, with population declining in Deuel County. Educational services, health care and social assistance; manufacturing; and retail trade are among the leading employment sectors across the three counties. Notably, agriculture, forestry, fishing and hunting, and mining is among the leading employment sectors in Deuel County, but not in Grant or Brookings counties. Despite this, agricultural land and associated farm operations are prominent land uses throughout the Proposed Route. The agricultural character of the area is reflected in its cultivated fields, farmsteads, livestock operations, agricultural buildings, and related businesses and infrastructure.

Table 20-1 Population, Employment and Income

	South Dakota	Grant County	Deuel County	Brookings County
Population	907,428	7,563	4,328	35,353
Percent Population Change	8.9%	2.7%	-1.6%	7.5%
Population per Square Mile	12.2	11.1	6.9	44.6
Per Capita Income in Last 12 Months (2020 $)	40,550	37,694	37,252	35,295
Unemployment Rate (%)	2.9	2.7	2.1	3.7
Persons in Poverty (%)	11.9	11.6	8.8	13.2
Top 3 Industries	Educational services and health care and social assistance; Retail trade; Manufacturing	Educational services, and health care and social assistance; Manufacturing; Retail trade	Educational services and health care and social assistance; Manufacturing; Agriculture, forestry, fishing and hunting, and mining	Educational services, and health care and social assistance; Manufacturing; Retail trade

Table 20-2 summarizes racial, ethnic, and limited English-speaking households. The percentage of people identifying as White alone, not Hispanic or Latino is lower in each of the three counties reviewed than in South Dakota as a whole. The percentage of limited English-speaking households is only higher than in the statewide data in Brookings County. While county-level data provides general context, it may not reflect specific conditions within individual communities or census tracts crossed by the Project.

Table 20-2 Population Demographics

	South Dakota	Grant County	Deuel County	Brookings County
White Alone, Not Hispanic or Latino (%)	79.8	87.5	93.9	89.3
Black or African American Alone (%)	2.1	1.0	0.5	0.4
American Indian or Alaska Native Alone (%)	7.1	0.8	0.0	0.3
Asian Alone (%)	1.4	3.3	0.1	0.8
Native Hawaiian/ Pacific Islander Alone (%)	0.0	0.0	0.0	0.0
Some Other Race Alone (%)	0.3	0.0	0.0	0.0
Two or More Races (%)	4.4	2.8	2.4	1.9
Hispanic or Latino (%)	4.8	4.6	3.1	7.4
Total Minority (%)1	20.0	12.5	6.1	10.7
Limited English Speaking Households (%)	1.3	0.2	0.0	1.8

20.1.2 Socioeconomic and Community Resource Impacts and Avoidance, Minimization, and Mitigation Measures

The Project is expected to create short- and long-term benefits to the local economy. Socioeconomic effects associated with construction would be temporary and would occur primarily during the construction phase. Local businesses, including restaurants, grocery stores, hotels, fuel suppliers, and other service providers, may experience increased demand from construction workers. Local and regional businesses that provide construction materials, equipment, and related services may also benefit from Project construction.

Section 23 discusses typical construction and operations jobs, as well as the estimated labor-hours that would be needed to support the Project's construction. The workforce is expected to include local and non-local personnel with specialized skills needed to construct the Project. Construction may temporarily increase demand for hotels, motels, campgrounds, rental housing, and other accommodations. This demand is expected to be distributed across the Project area in Grant, Deuel, and Brookings counties.

Construction and operation of the Project is not anticipated to result in long-term changes in population, demographics, income, occupational distribution, or community cohesion. No additional permanent staff are expected to be required for the O&M of the transmission lines or substations. Long term operation and maintenance would involve periodic inspection, vegetation management, repair, and maintenance of the Project. These activities are not expected to result in the permanent relocation of workers to the area.

The Project is not anticipated to displace commercial or industrial operations. Construction may result in short term, localized economic benefits to commercial and industrial sectors from purchases of goods, services, fuel, lodging, food, and construction materials.

Agricultural impacts are discussed in more detail in Section 20.2.2. Project construction may temporarily affect agricultural operations. This would be through construction access, excavation, structure and foundation installation, material staging, soil compaction, and crop disturbance. Landowners will be compensated for crop damage and other construction-related property damage in accordance with applicable easement or land rights agreements.

Potential effects on land values would depend on property-specific factors, including the type and location of Project facilities, proximity to transmission structures or substations, existing land use, easement terms, and surrounding development. Landowners from whom easements or other property interests are acquired will be compensated in accordance with negotiated agreements or applicable acquisition procedures.

Long term beneficial impacts from the Project will include benefits to the local tax base in the form of revenues generated from utility property taxes. The actual amount of property tax revenue generated by the Project will be based on the final capital investment and applicable assessment and tax requirements. As discussed in Section 8, the estimated cost of the Project is approximately $1.284 billion in 2024 dollars for the base estimate and approximately $1.666 billion in 2024dollars for the high-range estimate, inclusive of permitting, engineering, materials, land rights and right-of-way, and construction costs, including allowance for funds used during construction. Based on a range of total capital costs, the Project is estimated to generate approximately $6,750,000 in taxes annually to the South Dakota counties crossed by the Project.

Overall, the Applicants anticipate that the Project would provide socioeconomic benefits by supporting reliable electric service, strengthening the regional transmission system,

generating short-term construction-related economic activity, and providing long-term revenues to affected taxing jurisdictions. The Project is not anticipated to adversely affect long term population trends, housing, income, occupational distribution, public services, or population demographics. The proposed landowner coordination, compensation, restoration, traffic management, and agricultural and construction related measures are expected to adequately minimize potential socioeconomic effects.

20.2 Commercial, Industrial, and Agricultural Sectors

20.2.1 Commercial and Industrial Sectors

20.2.1.1 Existing Commercial and Industrial Sector

The principal industries within the Project area vary by county. In Grant and Brookings Counties, the leading industries include: education, healthcare and social services; manufacturing; and retail. Deuel County exhibits a similar industry composition: education, healthcare, and social services; manufacturing; and agriculture, forestry, fishing, hunting, and mining. No commercial or industrial land uses are located within or immediately adjacent to the Proposed Route.

20.2.1.2 Commercial and Industrial Sector Impacts and Avoidance, Minimization, and Mitigation Measures

Construction of the Project may result in short-term, localized economic benefits. Businesses such as restaurants, grocery stores, lodging establishments, and fuel providers may experience increased demand due to the presence of temporary construction personnel. Additionally, some construction materials and services may be procured from regional suppliers, providing indirect economic benefits to industrial businesses. The Project will not cross or displace any commercial or industrial operations, and no adverse impacts to these sectors are anticipated.

20.2.2 Agricultural Industry

20.2.2.1 Existing Agricultural Industry

The Proposed Route is predominantly agricultural land. In 2011, Grant County's estimated 555 farms (totaling 363,689 acres) produced $185.8 million in agricultural products (reference (49)). Of the agricultural products sold, 44 percent were from livestock sales, and 56 percent were from crop sales. Cattle and calves were the top livestock inventory items, and corn was the top crop product, in terms of acreage. Grant County ranked 22 of the 66 South Dakota counties in total value of agricultural products sold (reference (49)).

In 2011, Deuel County's estimated 583 farms (totaling 317,164 acres) produced $148.0 million in agricultural products (reference (49)). Of the agricultural products sold, 51 percent were from

livestock sales, and 49 percent were from crop sales. Cattle and calves were the top livestock inventory items, and corn was the top crop product, in terms of acreage. Deuel County ranked 31 of the 66 South Dakota counties in total value of agricultural products sold (reference (49)).

In 2011, Brookings County's estimated 986 farms (totaling 462,579 acres) produced $291.3 million in agricultural products (reference (49)). Of the agricultural products sold, 47 percent were from livestock sales, and 53 percent were from crop sales. Cattle and calves were the top livestock inventory items, and corn was the top crop product in terms of acreage. Brookings County ranked 6 of the 66 South Dakota counties in total value of agricultural products sold (reference (49)).

20.2.2.2 Agricultural Industry Impacts and Avoidance, Minimization, and Mitigation Measures

The Proposed Route would cross approximately 3,179.8 acres of existing agricultural lands. Construction of the Project is expected to result in temporary ground disturbance, primarily within existing agricultural lands, including row and non-row crops, pasturelands and rangelands, and haylands (Section 15.1.1). Upon completion of construction, all temporary workspaces will be restored to preconstruction conditions in accordance with applicable lease and easement agreements. Landowners will be compensated for any damage to or loss of agricultural land and/or revenues occurring on agricultural land during construction.

Long-term operational impacts to agricultural land would result from the permanent structures and access routes associated with the Project. In accordance with future applicable leases and easement agreements, landowners will be compensated for the long-term loss of agricultural land and/or revenues resulting from permanent Project infrastructure.

Each structure will result in permanent removal of vegetation, including agricultural lands – approximately 100 square feet for each 345 kV structure, approximately 2,500 square feet for a typical tangent 765 kV structure, and approximately 5,625 square feet for angle 765 kV structures. The 765 kV structures are four-legged and the 2,500 to 5,625 square foot area includes the area in between the four legs. Permanent vegetation removal will occur in each Substation Siting Area to accommodate substation infrastructure.

20.3 Community Facilities and Services

20.3.1 Existing Community Facilities and Services

Table 20-3 identifies community facilities located within a 5-mile radius of the Project that provide essential public services, including hospitals, law enforcement, fire protection, emergency medical services, schools, religious institutions, parks, and recreational amenities. Electrical service providers intersecting the Project include Whetstone Valley Electric Cooperative, Otter Tail, H-D Electric Cooperative, and Sioux Valley Energy (reference (50)). Rural water service in the Project vicinity is provided by Grant-Roberts Rural Water Systems, Inc. and Brookings-Deuel Rural Water System, Inc., both of which maintain distribution infrastructure within the surrounding area (reference (51)).

Table 20-3 Community Facilities within 5 Miles of the Project Route

Community Facility Type	Name	Location	Distance from Proposed Route's Centerline (miles)
Park	Elkton City Park	Elkton, SD	3.2
Church	United Parish of Elkton	Elkton, SD	3.7
Church	Our Lady of Good Parish	Elkton, SD	3.6
Church	First Baptist Church	Elkton, SD	3.3
Church	Calvary Community Church	Elkton, SD	2.5
Schools	Elkton Public Schools	Elkton, SD	3.5
Schools	Deubrook Jr./Sr. Schools	White, SD	4.9
Church	United Methodist Church	White, SD	4.5
School	Duebrook Elementary School	Toronto, SD	3.9
Church	Bethel Lutheran Church	Astoria, SD	1.7
Church	Wood Lake Lutheran Church	Astoria, SD	2.5
Church	Antelope Valley Reformed Church	Revillo, SD	2.0
Church	St. John's Lutheran Church	Revillo, SD	2.0
Church	Annunciation Catholic Church	Revillo, SD	2.2

Community Facility Type	Name	Location	Distance from Proposed Route's Centerline (miles)
Church	Bethlehem Lutheran Church	Milbank, SD	1.0
Park	Pribyl Park	Milbank, SD	4.6
Ambulance	Grant Robert Ambulance	Milbank, SD	4.7
Police	Milbank Police	Milbank, SD	4.1
School	Milbank Middle and High School	Milbank, SD	4.1
Hospital	Milbank Area Hospital	Milbank, SD	3.9
Church	American Lutheran Church	Milbank, SD	3.9
Park	Big Stone American Legion and Campground	Big Stone, SD	0.3
Church	Big Stone Tabor Methodist Church	Big Stone, SD	2.1
Church	St. Charles Catholic Church	Big Stone, SD	2.0
School	Big Stone City School	Big Stone, SD	1.9
Park	Big Stone Island Nature Area	Big Stone, SD	4.6
Park	Rearing Islands State Lakeside Use Area	Big Stone, SD	3.9
Park	Ortonville Swimming	Ortonville, MN	3.4
Park	Sioux Historical Park	Ortonville, MN	3.5
Park	Northside Park	Ortonville, MN	3.5
Park	Peninsula Park	Ortonville, MN	3.3
Park	Nielson Park	Ortonville, MN	3.2
Park	Lakeside Park	Ortonville, MN	3.1
Park	Central Park	Ortonville, MN	3.2
Park	Riverside Park	Ortonville, MN	2.9
Hospital	Ortonville Area Health Services	Ortonville, MN	3.6
School	Ortonville High School	Ortonville, MN	3.4
Church	New Life Community Baptist Church	Ortonville, MN	3.9

Community Facility Type	Name	Location	Distance from Proposed Route's Centerline (miles)
Church	Trinity Lutheran Church Parsonage - Trinity Lutheran Church	Ortonville, MN	3.5-3.7
Church	Church of St. John	Ortonville, MN	3.3
Church	Abiding Faith Lutheran Church	Ortonville, MN	3.7
Church	St. James Catholic Church	Nassua, MN	4.3
Church	St. Paul Lutheran Church	Nassua, MN	4.4
Church	First Lutheran Church	Gary, SD	2.6
Church	Antelope Valley Reform Church	Antelope Valley, SD	2.0
Park	Altamont Prairie Preserve	Glenwood, SD	1.6

20.3.2 Community Facilities and Services Impacts and Avoidance, Minimization, and Mitigation Measures

Due to the short-term and limited scope of construction activities, the Project is not anticipated to result in a measurable increase in demand for public services, including police, fire protection, or emergency response. Similarly, long-term operation and maintenance are not expected to generate a substantial increase in the local population's need for community resources. Existing community infrastructure and services are anticipated to be sufficient to support the temporary construction workforce. As such, no adverse impacts to local governments, utilities, or community services are expected.

The Project is not anticipated to adversely affect public safety or security within the surrounding communities during either construction or long-term operations. While construction activities inherently involve temporary safety risks typical to projects of similar scale, these risks will be effectively managed through the implementation of project-specific health and safety plans. The construction contractor will be responsible for securing active work areas and restricting public access to maintain safe conditions for both workers and the general public.

20.4 Transportation

20.4.1 Existing Ground Transportation

The Project would be accessed via existing roadway infrastructure, which generally follows section lines and consists of a network of state highways and county roads. State highways in the vicinity are asphalt-paved, while county roads are a combination of asphalt and gravel surfaces.

Average daily traffic volumes for the year 2025 on highways near the Project, including total traffic and estimated heavy truck volumes, are presented in Table 20-4 (reference (52)). Due to variability across the broader Project area, county road traffic volumes are provided as a high/low range in Table 20-5 (reference (52)).

Table 20-4 Highway Traffic Near the Project

Highway	Total Traffic Counts	Estimated Truck traffic
Highway 12	3,201	364
Highway 212	1,304	502
Highway 14 (crossed twice)	2,307	422

Table 20-5 County Road Traffic Range Near the Project

County Road	High Traffic Counts	Low Traffic County
482 Avenue	235	20
483 Avenue	430	115
485 Avenue	280	140
486 Avenue	365	25
149 Street	360	200
153 Street	290	80
161 Street	120	105
175 Street	135	50
179 Street	100	N/A
188 Street	340	190
191 Street	40	N/A
197 Street	415	190

20.4.1.1 Rail

Two railroad crossings occur within the Project area, both intersecting the Burlington Northern Santa Fe (BNSF) rail line, which is part of the BNSF Agricultural Shuttle and Unit Train Facilities System (references (53); (54)). These crossings are located north of U.S. Highway 12 between Milbank and Big Stone, South Dakota and approximately 0.5 mile east of 483rd Avenue near Albee, South Dakota (Map 18-1 and Map 18-8). The BNSF line in this area primarily transports agricultural commodities, consumer goods, and coal. The Project would span these crossings and is not anticipated to disrupt rail operations during construction or operation. The Applicants will coordinate with railroads regarding the Project to avoid and/or minimize effects on rail infrastructure and operations.

20.4.2 Existing Air Transportation

20.4.2.1 Air Traffic

No municipal or commercial airports are located within the Proposed Route. The nearest facility is Milbank Municipal Airport, approximately 3.5 miles southwest of Big Stone South Substation. Regional commercial air service is available Brookings Regional Airport (approximately 11.5 miles west of the southern portion of the Project), Watertown Regional Airport (approximately 30 miles west of the Project), and Sioux Falls Regional Airport (approximately 49 miles south of the Project) which provides the most extensive commercial service (reference (55)).

20.4.3 Transportation Impacts and Avoidance, Minimization, and Mitigation Measures

20.4.3.1 Ground Transportation

In accordance with SDCL 49-41B-38, the Applicants will provide an indemnity bond to support the repair and restoration of roads affected by construction activities. Following completion of construction, long-term impacts to ground transportation resources are expected to be minimal. O&M activities will primarily involve periodic site visits by personnel using light-duty vehicles, with infrequent use of heavy equipment for major maintenance or component replacement.

Project construction would cause a short-term increase in traffic from the movement of equipment, materials, and personnel. These effects are expected to be minor and temporary because relatively few workers and vehicles would access any one location of the Proposed Route at a given time, and traffic would return to normal after construction. Operation and maintenance activities would have negligible effects on local traffic.

The Applicants and the Project will comply with applicable federal, state, and local requirements, including NESC standards for highway crossings. The Applicants will coordinate

with USDOT, SDDOT, county highway departments, and other applicable road authorities to obtain necessary permits, manage oversized or overweight deliveries, address traffic management needs, and coordinate road use and restoration.

As described in Section 9.1.1, where the Project parallels existing road right-of-way, the Applicants generally intend to place the Proposed Route adjacent to or, where appropriate, overlap the road right-of-way. For a typical 765 kV route, the Proposed Route's centerline would be approximately 100 feet from the road right-of-way edge, resulting in about 25 feet of overlap. Project structures and conductors would not permanently overhang the road right-of-way. Final feature locations and easement needs would be determined through post-permit survey and title work.

20.4.3.2 Rail

The Applicants will coordinate with BNSF to confirm construction, operation, and long-term maintenance of the Project will not negatively affect rail lines or their uses.

20.4.3.3 Air Transportation

20.4.3.4 Air Traffic

There are no airports within three miles of the Project. The Applicants have been in coordination with the FAA and Milbank Municipal Airport during routing and preliminary route design. Through the coordinated discussions, the Applicants identified potential air traffic conflicts with an early preliminary route and has revised the Proposed Route to avoid such conflict. The Applicants will continue to consult with the FAA and Milbank Municipal Airport and will comply with all applicable requirements according to FAA guidelines, including filing Form 7460-1 (Noticed of Proposed Construction an Alteration) prior to construction, as appropriate. The Applicants do not anticipate conflicts with air traffic and will obtain a FAA Determination of No Hazard to air navigation.

20.5 Cultural Resources

To identify and preliminarily assess cultural resources for the Project, a Level I cultural resources literature review was completed. The Level I cultural resources review focused on identifying previously documented archaeological and historic architectural resources within a 1-mile buffer of the Proposed Route and Substation Siting Areas. Where landowner permissions are available, a Level III intensive survey will be completed in the fall of 2026 and spring and summer of 2027 and will focus on identifying Tribal and archaeological resources within a 500-foot survey corridor (250 feet on either side of the Proposed Route) and the Substation Siting Areas (together, the Survey area), and historic architectural resources within the 1-mile buffer.

Cultural resources consist of archaeological, historic architectural, and tribal cultural resources. Archaeological resources are defined as any site location that contains material remains of past human life or activities, or other places and/or items that possess cultural importance to individuals or a group. Historic architectural resources include "buildings, bridges, tunnels, statues, and other structures that create tangible links to the American past, whether in relation to historical events and people, traditional ways of life, architectural design, or methods of construction" (reference (56)). Tribal cultural resources may include places, landscapes, traditional cultural properties, cultural practices, or other resources that hold cultural, spiritual, historical, or traditional significance to Tribes.

Once identified through documentary research and/or field investigations, cultural resources are evaluated using the NRHP criteria for evaluation (36 CFR 60.4). To be considered eligible for the NRHP, a resource generally must retain sufficient integrity and be associated with important historical events or persons, distinctive architectural or engineering characteristics, or information important to understanding history or prehistory. Resources determined eligible for or listed in the NRHP are considered historically significant. NRHP eligibility determinations presented in this application are based on existing South Dakota State Historic Preservation Office (SHPO) records and previously completed cultural resource investigations.

20.5.1 Existing Cultural Resources

This section provides an overview of existing cultural resources within the Survey area and the state and federal regulatory framework applicable to their identification, evaluation, and treatment.

20.5.1.1 Regulatory Framework

Pursuant to SDCL §1-19A-11.1, state agencies or political subdivisions of the state, or any instrumentality thereof, may not undertake any project that will encroach upon, damage, or destroy any historic property included in the NRHP or the State Register of Historic Places until the South Dakota State Historical Society (SDSHS) has been given notice and an opportunity to investigate and comment on the proposed project. Any project which requires permits from the state, county, or municipalities, including a Facility Permit issued by the Commission, is subject to this law.

The Applicants are completing cultural resource investigations for archaeological resources, historic architectural resources, and tribal cultural resources. For archaeological resources, investigations are focused on the Survey area. For historic architectural resources, investigations include a 1-mile buffer of the Proposed Route and Substation Siting Areas. Tribal cultural resource investigations are being conducted in coordination with participating Tribes. All cultural resource work will be conducted in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48FR 44716-44742) and Identification (48 FR 44720-44723) and the SHPO 2023 *South Dakota Guidelines*

for Complying with Federal and State Preservation Laws (reference (57)).Level I Literature Review

Barr completed a Level I cultural resources literature review for the Project in July 2026. The review focused on cultural resources within the Survey area and a 1-mile buffer surrounding the Project (Appendix D). A report detailing the results of the Level III Intensive Survey will be submitted to the SD SHPO after the anticipated Level III survey in 2027.

The Level I cultural resources literature review included a records request through the SDSHS Archaeological Research Center for information on archaeological sites, surveys, and investigations, as well as National Historic Landmarks (NHLs) and historic architectural resources. This data was received on June 15, 2026. A review of the SDSH Archaeological Resources Management System online data portal for archaeological site, cemetery, and survey location information and the SHPO CRGRID online portal for information on historic structures, bridges, and cemeteries was also completed. The NHL list and the NRHP database were also reviewed. For the purposes of this application, the cultural resources literature review focuses on archaeological resources documented within the Survey area, and historic architectural resources within a 1-mile buffer of the Project.

20.5.1.1.1 Previously Identified Archaeological Resources

The literature review found that 16 archaeological sites have been documented in the Survey area (Table 20-6). Of those 16 sites, three have been determined eligible for the NRHP, seven remain unevaluated, and six are not eligible or recommended not eligible. The NRHP-eligible sites which intersect the Survey area consist of a Native American stone circle feature and artifact scatter (765 kV Route) and historic railroad remnants (765 kV Route and the Big Stone South Substation Siting Area).

Table 20-6 Archaeological Resources in the Survey Area

Site Number	Site Description	NRHP Status	County	Project area
39BK0004	Native American artifact scatter; unknown cairn; Native American stone circle; Euro-American isolated find	**Eligible**	Brookings	765 kV Route
39BK0046	Euro-American artifact scatter	Unevaluated	Brookings	765 kV Route
39BK0056	Native American Artifact Scatter	Not Eligible	Brookings	765 kV Route
39BK0154	Native American Isolated Find	Not Eligible	Brookings	765 kV Route
39BK0235	Euro-American Farmstead	Unevaluated	Brookings	765 kV Route

Site Number	Site Description	NRHP Status	County	Project area
39BK0252	Native American stone circle, alignment, cairn; unknown depression	Unevaluated	Brookings	345 kV Route
39BK0277	Unknown cairn	Unevaluated	Brookings	765 kV Route
39BK0278	Native American Isolated Find	Not Eligible	Brookings	765 kV Route
39BK0280	Euro-American farmstead	Unevaluated	Brookings	765 kV Route
39BK0281	Native American isolated find	Not Eligible	Brookings	765 kV Route
39BK0311	Native American Artifact Scatter	Recommended Not Eligible	Brookings	765 kV Route
39DE0010	Native American Stone Circle	Unevaluated	Deuel	765 kV Route
39DE0041	Native American Artifact Scatter	Unevaluated	Deuel	765 kV Route
39DE0174	Euro-American artifact scatter	Not Eligible	Deuel	765 kV Route
39GT2007	Railroad	**Eligible**	Grant	765 kV route; Big Stone South Substation Siting Area
39GT2042	Railroad	**Eligible**	Grant	765 kV Route; Big Stone South Substation Siting Area

20.5.1.1.2 Previously Identified Historic Architectural Resources

The Level I review also identified 463 historic architectural resources within the 1-mile buffer, 11 of which have been determined or recommended eligible for the NRHP. Of the 463 resources, four are present within the Survey area, including structures and bridges (Table 20-7). Of these, one is unevaluated for the NRHP and three are not eligible. The unevaluated resource consists of an unspecified agricultural structure (BK00000052) in Brookings County.

Table 20-7 Historic Architectural Resources in the Survey Area

SHPO Number	Name/Description	Construction Date	NRHP Status	County	Project Area
BK00000052	Unknown Agricultural	Unknown	Unevaluated	Brookings	765 KV Route
BK00002050	Farmstead remnants	c. 1910	Not Eligible	Brookings	765 KV Route
BK00002350	Windmill	unspecified 20th century	Not Eligible	Brookings	765 KV Route
BK00002189	Bridge 06-291-080/ Steel Stringer	c.1928	Not Eligible	Brookings	765 KV Route

Table 20-8 provides information about the NRHP-eligible resources in the 1-mile buffer. The 11 NRHP-eligible structures that are within the 1-mile buffer, but outside the Survey area, consist primarily of farmsteads that are more than ½ mile from the Proposed Route and may not be visible to/from the Project, depending on factors such as natural topography, the built environment, and vegetative screening. Two eligible resources (BK00002029/Peterson Farmstead and DE00000023/Bridge 20-175-240) are within ¼ mile of the Proposed Route.

- Resource BK00002029 is the Peterson Farmstead, which is located approximately 410 feet east of the 345 kV Route in Bushnell, Brookings County. This farmstead includes 10 structures: a house, a barn, a granary, a hog shed, a storage shed, two silos, a pole barn, and two grain storage tanks. Additional information regarding this property is not readily available.
- Resource DE00000023 is a single Pratt Pony Truss bridge constructed in 1908 that crosses 190th Street over Cobb Creek in Toronto, Deuel County. It is an example of a pin-connected bridge, a construction type last used in the early 1910s, and maintains good integrity.

Table 20-8 NRHP-Eligible Historic Architectural Resources in the 1-Mile Buffer

SHPO Number	Name/Description	Distance from Survey area (approximate)	NRHP Status	County	Project Area
BK00002029	Peterson Farmstead: This farmstead includes ten structures, a house, a barn, a granary, a hog shed, a storage shed, two silos, a pole barn, and two grain storage tanks. The house is T-shaped with a gable roof, concrete foundation, and wood siding.	410 feet	Eligible	Brookings	345 kV Route
BK04900005	Farmstead; wood frame barn with gambrel roof and silo; c. 1900s	0.4 miles	Eligible (criterion unavailable)	Brookings	765 kV Route, 345 kV Route, Brookings County 345 kV Substation Siting Area
BK00000007	Br. No. 06-290-177; steel Pony-Truss; c. 1913	0.4 miles	Eligible: Criterion C	Brookings	765 kV Route
DE00000023	Bridge 20-175-240; single Pratt Pony Truss; example of pin-connected bridges in the state, a construction type last used in the early 1910s	0.25	Eligible: Criterion C	Deuel	765 kV Route
DE01400001	Historic District (Gary, SD); Farmstead; Folk Victorian; c. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route
DE01400002	Historic District; Farmstead; wood frame, gambrel roof; C. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route
DE01400003	Agricultural outbuilding; c. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route
DE01400004	Agricultural outbuilding; c. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route

SHPO Number	Name/Description	Distance from Survey area (approximate)	NRHP Status	County	Project Area
DE01400005	Metal Windmill; c. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route
DE01400006	Metal Windmill; c. 1900; Historic Farmstead District JB. 9-17-13	0.8 miles	Eligible: Criteria A and C	Deuel	765 kV Route
GT00000361	Herman Friewald Barn; timber joist frame, gable roof; c. 1910; additional wood-frame farm buildings stand on the property but only the barn and silo are included in the National Register	0.6 miles	Listed: Criterion C	Grant	765 kV Route

20.5.1.1.3 Documented Historic Cemeteries

A review of CRGRID indicates that no documented cemeteries are present within the Survey area.

20.5.1.1.4 Historic Maps

A review of nineteenth-century General Land Office maps and mid-twentieth-century U.S. Geological Survey 7.5' topographic maps indicate the presence of features such as historic roadways, railroads, trails, and structures in the Survey area. In addition, the review identified at least one historic waterway that is no longer present. The presence of these features may increase the potential for cultural resources in and around these areas.

20.5.1.1.5 Previous Cultural Resource Investigations

The literature review indicates that 36 previous cultural resource surveys intersect the Survey area, conducted between 1887 and 2024(Table 20-9). The previously surveyed areas constitute approximately 11 percent of Survey area.

Table 20-9 Cultural Resource Surveys in the Survey Area

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
1887	ABK-0014	T.H. Lewis Notes for Brookings County, South Dakota	T.H. Lewis	Brookings	765 kV Route
1994	ABK-0036	An Intensive Cultural Resources Survey and Evaluations of the Proposed Road Improvements Along US Highway 14 East of Brookings to the Minnesota State Line Brookings County, South Dakota	Estep, Rose	Brookings	765 kV Route
1997	ABK-0044	An Intensive Cultural Resources Survey of Sioux Valley Southwestern Electric Company's Proposed 1997 Underground Cable Installation in T111N and T112N, R48W, Brookings County, South Dakota	Gillen, Timothy	Brookings	765 kV Route

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2006	ABK-0094	Phase I (Minnesota) and Class III (South Dakota) Archaeological Resources Inventory for the Buffalo Ridge - White 115kV Transmission Line Project, Lincoln County, Minnesota, Brookings County, South Dakota	Palmer, Erika, and Michael Justin	Brookings	765 kV Route, Brookings County 345 kV Substation Siting Area
2008	ABK-0102	A Level III Cultural Resource Report for a Pipeline and Livestock Watering Tanks Project, T11N, R48W, Section 26, Brookings County, South Dakota	Vaillancourt, Dana	Brookings	765 kV Route
1982	ABK-0126	A Class III Cultural Resource Investigation, Brookings-White 230-kV Transmission Line, Brookings County, South Dakota	Newkirk, Judith	Brookings	765 kV Route
2007	ABK-0129	Class III Archaeological Inventory for the White Wind Farm Project, Alton and Sherman Townships, Brookings County, South Dakota	Kloss, Julie/ HDR	Brookings	765 kV Route
2008	ABK-0137	A Level III Cultural Resources Evaluation of Iberdrola Renewables Proposed Buffalo Ridge II Wind Farm Project within Brookings County, South Dakota	Ranney, William, John Bozell, Jason Kruse, Timothy Gillen, Jessica Kleinschmidt, and Austin Buhta	Brookings	765 kV Route; Brookings County 345 kV Substation Siting Area
2018	ABK-0139	A Level III Intensive Archaeological Survey of Coyote Ridge Wind Project in Brookings County, South Dakota	Florin, Frank, Kent Bakken, James Lindbeck, Beth Wergin, Kevin Reider, and Amanda Peterson	Brookings	765 kV Route; 345 kV Route; Brookings County 345 kV Substation Siting Area

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2018	ABK-0149	A Non-Invasive Search for a T.H. Lewis Documented Fort and Burial Mound Using Light Detection and Ranging (LiDAR), Brookings County, South Dakota	Florin, Frank, and David Maki	Brookings	765 kV Route
2013	ABK-0164	Level III Archaeological Survey for the Brookings County Substation to SD/MN Border Segment of the CapX2020 Brookings County to Hampton 345 kV Transmission Line Project	Eigenberger, Dylan	Brookings	Brookings County 345 kV Substation Siting Area
2016	ADE-0067	An Intensive Cultural Resources Survey of SDDOT Culvert Replacement Project NH 0212(172)401, PCN 03TL, and Mill and PCCP Overlap Project NH 0212(173)397, PCN 04E9, Deuel County, South Dakota	Holst, David	Deuel	765 kV Route
2017	ADE-0082	Level III Archaeological Survey for the Proposed Astoria Station Project, Deuel County, South Dakota	Flynn, Pamela	Deuel	765 kV Route
2020	ADE-0083	2020.SD.PFW.061 Robert Hauger Pipeline Cultural Resources Inventory, Deuel County, South Dakota	Springer, Karri	Deuel	765 kV Route
1989	AGT-0015	A Reconnaissance Cultural Resource Survey of the Proposed Expansion of Granite Quarry Operations for the Cold Spring Granite Company in Grant County, South Dakota	Stahl, Robert	Grant	765 kV Route
2024	AGT-0128	A Level III Cultural Resource Survey for the Big Stone South to Alexandria 345-kV, Transmission Line Project, T121N R46W Sec. 19,20 T121N R47W Sec. 24, Grant County, South Dakota	Boyd, Lars and Kevin Gilmore/ HDR	Grant	765 kV Route; Big Stone South Substation Siting Area

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2024	AGT-0129	A Level III Cultural Resource Survey Addendum for the Big Stone South to Alexandria 345-kV Transmission Line Project, T121N R46W Sec. 18-20; T121N R47W Sec. 13, 24	Gilmore, Kevin, Thomas Lux, and Megan Mueller/ HDR	Grant	765 kV Route
1973	ESD-0001	An Archaeological Survey of the Proposed Watertown, South Dakota – Moville, Iowa 345 KV Transmission Line 1973, Brookings, Codington, Deuel, Lincoln, Minnehaha, Moody and Union Counties, South Dakota	Sistad, John/ Archaeology Lab, USD	Brookings	345 kV Route; 765 kV Route
1991	ESD-0047	A Reconnaissance Cultural Resource Survey of the Proposed Rural Electric Cable Installation for Whetstone Valley Electric in Roberts and Grant Counties, South Dakota	Stahl, Richard	Grant	765 kV Route
1982	ESD-0094	Cultural Resource Investigations of the South Dakota Segment of the Northern Border Pipeline Project. Environmental Assessment and Volumes 1 to 5	Apley, Judith et al.	Deuel/ Grant	765 kV Route
1989	ESD-0102	An Intensive Cultural Resource Survey of Portions of the Proposed Sioux Valley Electric Two-Year Construction Plan in Eastern South Dakota	Lueck, Edward	Brookings/ Deuel	345 kV Route
2001	ESD-0254	A Reconnaissance Cultural Resource Survey of the Proposed Underground Lines for Whetstone Valley Electrical Cooperative (#2102h0901), Project 010228004F, in Roberts and Grant Counties	Downing, Patricia/ South Dakota Prairie Lakes Archaeological Services	Grant	765 kV Route
2008	ESD-0457	Class III Archaeological Inventory for the Big Stone II Transmission Line Project, Deuel and Grant Counties, South Dakota	Kennedy, Laura, Michael Justin, and Michael Madson / HDR	Deuel/ Grant	765 kV Route; Big Stone South Substation Siting Area

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2016	ESD-0573	Level III Intensive Archaeological and Traditional Cultural Property Resources Inventory for the Big Stone South to Ellendale 345 kV Transmission Line Project, Brown, Day, and Grant Counties, South Dakota. Volume I of IV	Sabatke, Stephen, and Alan Stanfill/ HDR	Grant	765 kV Route, Big Stone South Substation Siting Area
2013	ESD-0642	Level I and III Archaeological Investigation of the CapX2020 Big Stone South to Brookings County 345 kV Transmission line Project: Southern Portion, Deuel and Brookings Counties, South Dakota.	Doperalski, Mark/ Environmental Resources Management	Deuel	765 kV Route
2013	ESD-0643	Level I and III Archaeological Investigation of the CapX2020 Big Sioux South to Brookings County 345 kV Transmission Line Project: Southern Portion, Deuel and Brookings Counties, South Dakota, Addendum I.	Doperalski, Mark/ Environmental Resources Management	Brookings/ Deuel/ Grant	765 kV Route
2014	ESD-0645	Level I and III Archaeological Investigation of the CapX2020 Big Stone South to Brookings County 345 kV Transmission Line Project, Grant, Deuel, and Brookings Counties, South Dakota. Addendum II.	Doperalski, Mark	Brookings/ Deuel/ Grant	765 kV Route, Brookings County 345 kV Substation Siting Area
2014	ESD-0646	Level I and III Archaeological Investigation of the CapX2020 Big Stone South to Brookings County 345 kV Transmission Line Project, Grant, Deuel, and Brookings Counties, South Dakota. Addendum III.	Doperalski, Mark	Brookings/ Deuel/ Grant	765 kV Route

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2015	ESD-0647	Level I and III Archaeological Investigation of the CapX2020 Big Stone South to Brookings County 345 kV Transmission Line Project, Grant, Deuel, and Brookings Counties, South Dakota. Addendum IV.	Doperalski, Mark/ Environmental Resources Management	Deuel	345 kV Route, 765 kV Route, Brookings County 345 kV Substation Siting Area, Big Stone South Substation Siting Area
2016	ESD-0648	Level I and III Archaeological Investigation of the CapX2020 Big Stone South to Brookings County 345 kV Transmission Line Project, Grant, Deuel, and Brookings Counties, South Dakota. Addendum V.	Doperalski, Mark/ Environmental Resources Management	Deuel	765 kV Route
2018	ESD-0649	Level III Intensive Archaeological and Traditional Cultural Property Resources Inventory for the Crowned Ridge Transmission Line, Codington and Grant Counties, South Dakota.	SWCA	Grant	765 kV Route, Big Stone South Substation Siting Area
2019	ESD-0663	Addendum 1 to Level III Intensive Archaeological and Traditional Cultural Property Resources Inventory for the Crowned Ridge Transmission Line, Codington and Grant Counties, South Dakota.	SWCA	Grant	765 kV Route
2019	ESD-0676	Addendum 2 to Level III Intensive Archaeological and Traditional Cultural Property Resources Inventory for the Crowned Ridge Transmission Line, Codington and Grant Counties, South Dakota	SWCA	Grant	765 kV Route

Report Year	Survey ID	Report Title	Author(s)/ CRM Co.	County	Project Area
2015	ESD-0781	Big Stone South to Ellendale 345kV Transmission Line Project, Intensive Historic Building Inventory and Evaluation, North Dakota/South Dakota Border to the Big Stone South Substation	Sabatke, Stephen, and Alan Stanfill/ HDR	Grant	765 kV Route, Big Stone South Substation Siting Area
2010	ESD-0800	A Level I and Level III Cultural Resource Inventory for the Deer Creek Station Project in Brookings and Deuel Counties, South Dakota	Thomas, Jennifer, and Rebecca Broedel/ South Dakota Ethnoscience, Inc.	Brookings	345 kV Route, Brookings County 345 kV Substation Siting Area
2023	ESD-0895	A Level III Intensive Cultural Resource Inventory for the Brookings-Deuel Rural Water System Project in Brookings and Deuel Counties, South Dakota,	Baker, Amanda, Alex Atkinson, and Wade Burns	Brookings/ Deuel	765 kV Route

20.5.1.2 Level III Cultural and Architectural Resource Survey

A Level III Intensive Survey will be completed for the portions that have not been surveyed within the past 10 years. Where landowner permissions are obtained, the survey is planned to occur in the fall of 2026 and the spring and summer of 2027 in accordance with the SHPO's 2023 *South Dakota Guidelines for Complying with Federal and State Preservation Laws* (reference (57)). The results of the survey and recommendations for mitigation and/or avoidance measures will be detailed in a technical report.

20.5.1.3 Tribal Cultural Resources

The Applicants commenced Tribal engagement for the Project, seeking input from Tribes on the Proposed Route and any impacts on resources of Tribal significance. Twelve Tribes with ancestral ties to the Project area were identified using the U.S. Department of Housing and Urban Development's Tribal Directory Assistance Tool (Appendix B). These Tribes were then contacted via letter on December 19, 2025, introducing the Project. The three South Dakota Tribes closest to the Project: Yankton Sioux, Flandreau Santee Sioux, and Sisseton Wahpeton Oyate of the Lake Traverse Reservation, were then contacted via phone call the week of January 5, 2026 to request an in-person meeting during a series of scheduled Open Houses

near the Project the week of January 12, 2026. The Yankton Sioux, Flandreau Santee Sioux, and Sisseton Wahpeton Oyate of the Lake Traverse Reservation each elected to engage in the permitting and planning process for the Project, and are participating Tribes for the Project. A Project introduction meeting was held with each participating Tribe during the week of January 12, 2026. After this introductory meeting, the Applicants have held monthly meetings with these Tribes, to seek their input and provide them with updates (Appendix B). The Flandreau Santee Sioux and Sisseton Wahpeton Oyate Tribe of the Lake Traverse Reservation are each planning on completing a Tribal Cultural Survey for the Project in 2026/2027.

20.5.2 Cultural Resources Impacts and Avoidance, Minimization, and Mitigation Measures

Impacts to cultural resources could occur from the Project's construction and operation. Impacts to Tribal, archaeological, and historic architectural resources could result from construction activities such as vegetation clearing, placement of structures, the construction of new substations and access roads, temporary construction areas, and vehicle and equipment operation. Additional impacts to Tribal and historic architectural resources could occur if the Project is located near or within the viewshed of the resource. The preferred means of mitigating impacts to these resources is prudent routing or structure placement to avoid known resources.

The Applicants will conduct a Level III Intensive Survey of the portions of the Survey area that have not been surveyed within the past 10 years. Should NRHP-eligible cultural resources or resources of tribal significance be identified during the survey, recommendations for mitigation and/or avoidance will be detailed in a technical report that will be submitted to the South Dakota SHPO and to participating tribes for their review and comments. In addition, the Applicants will work with interested Tribes to develop an unanticipated discoveries plan, detailing the procedures that will be undertaken should unanticipated cultural resources be encountered during Project construction.

21 Summary of Potential Impacts and Avoidance, Minimization, and Mitigation Measures

The Applicants have routed and designed the Project to avoid or minimize impacts to identified resources in the vicinity to the extent practicable. Additionally, the Applicants will implement certain measures to avoid, minimize and/or mitigate potential impacts due to Project construction. A summary of avoidance, minimization, and mitigation measures is presented in Table 21-1.

Table 21-1 Summary of Potential Impacts and Proposed Avoidance/Minimization/Mitigation Measures

Resource	Potential Impact	Proposed Avoidance/Minimization/Mitigation Measures
Physical environment		
Geological resources	Construction and operation of the Project have the potential to result in temporary impacts to geologic resources from foundation installation and could affect existing quarrying or aggregate mining operations if not avoided during Project siting and routing.	Geotechnical soil borings will be conducted at transmission line structure locations to characterize subsurface conditions and inform foundation design. Transmission line routing will avoid existing granite quarrying operations, sand and aggregate mining operations, and known planned expansions of those facilities.
Soils	Surface soils will be disturbed as a result of site clearing, grading, and excavation activities. Apart from structure locations and substation infrastructure, most impacts will be temporary. Surface disturbance caused by construction of the transmission structures may cause the soil surface to become more prone to erosion or compaction.	Impacts to soils will be minimized through implementation of BMPs and compliance with the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities. A SWPPP will be prepared to identify potential sources of stormwater pollution and specify erosion and sediment control measures. BMPs may include construction matting, low ground pressure equipment, silt fence, straw bales, ditch blocks, mulch, plastic sheeting, fiber rolls, and other site-specific measures. Temporarily disturbed areas will be restored following construction.
Hydrology		
Groundwater resources	Construction of the Project could temporarily affect groundwater resources through excavation, dewatering activities, and disturbance of shallow groundwater during construction.	The Applicants will coordinate with the SDDANR, as necessary, to ensure ground-disturbing activities do not disrupt groundwater hydrology. Prior to construction, geotechnical evaluations will be conducted to identify locations where groundwater impacts or artesian conditions may occur. Any wells identified within the right-of-way will be evaluated and, if necessary, properly sealed in accordance with SDDANR requirements. Materials such as fuels and lubricants will be stored and handled in accordance with the SWPPP and applicable regulations to prevent releases to soil and groundwater. Erosion and sediment control BMPs will be implemented during construction, and any dewatering activities will be temporary, minimized to the extent practicable, and conducted in accordance with applicable permit requirements.
Surface water resources	During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. The Project not anticipated cause changes to existing drainage patterns. Water use for the Project will be restricted to dust control and foundation construction and will be pumped from local surface waters. Some structures may be placed within a designated floodplain. Impacts to floodplain storage capacity are not anticipated.	The Project has been designed to avoid surface water features whenever feasible. Structure foundations will be located outside of all watercourses and waterbodies. The Applicants will obtain coverage under the SDDANR's General Permit for Storm Water Discharges Associated with Construction Activities, which includes the development and implementation of a SWPPP which will prescribe BMPs to control erosion and avoid and/or minimize the potential for sediment to reach surface waters. Erosion and sediment control BMPs may include use of silt fence, straw wattles, erosion control blankets, re-vegetation, or other features and methods designed to control storm water runoff and mitigate erosion and sedimentation. Water used for the Project will be pumped from local surface waters following consultation with applicable resource agencies. Final structure locations will be determined based on final design, and floodplains will be considered in structure placement. If it is not possible to avoid floodplains with structures, Applicants will coordinate with county Floodplain Administrators to review structure locations and obtain floodplain development permits, as needed.
Current and planned water use	Construction activities will require limited temporary water use for dust control. No new water withdrawals, water rights, or water supply demands are anticipated during Project operation.	Construction water use will be limited primarily to dust control. Water will be obtained from local surface water sources following consultation with applicable resource agencies or, if necessary, transported from a municipal source. The Applicants will obtain coverage under the applicable SDDANR construction stormwater permit and comply with permit requirements related to water use and dewatering. Any wells identified within the Proposed Route during construction will be evaluated and, if necessary, sealed in accordance with SDDANR requirements. The Project will not require new water rights or ongoing water use during operation.
Wetlands	The Project is anticipated to result in temporary impacts to wetlands within the proposed right-of-way from construction activities. Permanent impacts may occur where transmission line structures or substation facilities cannot avoid delineated wetlands; however, transmission lines will span wetlands where practicable, and final facility locations will be evaluated to further avoid and minimize permanent wetland impacts.	The Project has been designed to avoid and minimize impacts to wetlands to the extent practicable. Transmission lines will span wetlands where feasible, and the Applicants will evaluate final structure locations to further avoid or minimize permanent wetland impacts. If wetland impacts occur, the Applicants will comply with applicable USACE Nationwide Permit requirements and any associated mitigation requirements. The Applicants will develop and implement a SWPPP that includes erosion and sediment control BMPs to minimize sedimentation and protect wetland resources during construction. Temporary erosion and sediment control measures will be properly installed, monitored, and maintained until disturbed areas are stabilized. Where appropriate, disturbed wetland and riparian areas will be restored and revegetated to approximate preconstruction conditions.

Resource	Potential Impact	Proposed Avoidance/Minimization/Mitigation Measures
Terrestrial ecosystems		
Vegetation	The Project will temporarily impact vegetation from localized physical disturbance and soil compaction as a result of establishment and use of access roads, staging, and stringing areas. Permanent impacts to vegetation will occur where structures and substation infrastructure are placed. In addition, all high growing and forested vegetation will be permanently removed. Structure placement may occur within areas of potentially undisturbed grassland that are too large to span, which could result in habitat fragmentation. Construction and maintenance activities also have the potential to introduce or spread noxious weeds and other non-native plant species. Impacts to federal or state protected vegetation are not anticipated.	Temporary impacts to vegetation will be minimized through implementation of BMPs, including erosion and sediment control measures and revegetation of disturbed areas following construction unless otherwise directed by the landowner. Disturbed areas will be revegetated using appropriate seed mixes and vegetation types compatible with surrounding land uses. Construction practices will be implemented to minimize disturbance to native vegetation and trees. During routing, efforts were made to avoid and minimize fragmentation of potentially undisturbed grasslands. The Applicants will develop and implement noxious weed control measures, including the use of weed-free seed mixes where appropriate, to minimize the introduction and spread of noxious weeds and other invasive species.
Wildlife	The Project may impact wildlife and wildlife habitat as a result of construction activities and/or loss of habitat. Structures may need to be placed in WPAs and sharp-tailed grouse Priority Habitat Areas. Operational impacts to avian species could occur from the potential for avian electrocution or collision. The Project may impact sharp-tail grouse, should leks be located near the Project. The potential for impacts to federally and state protected species is anticipated to be negligible. The exception being northern long-eared bats and silver-haired bats. Permanent removal of suitable forested habitat for these species will be necessary to accommodate safe operation of the transmission line.	The Project has been sited to avoid and minimize potential impacts to wildlife, wildlife habitat, and federally and state protected species to the extent practicable. Effects on wildlife and wildlife habitat will be minimized through implementation of BMPs and other impact minimization measures, including consideration of recommendations that may be made during further agency consultation. The Applicants will implement measures, where practicable, to minimize potential impacts to bats and bat habitat, including timing considerations for tree clearing and further coordination with applicable resource agencies, as appropriate. The Applicants will consider and, where appropriate, implement measures to minimize potential impacts to sharp-tailed grouse and other sensitive wildlife species. The Project will follow APLIC guidance to minimize potential impacts to avian species.
Aquatic ecosystems	Potential impacts to aquatic resources will be primarily related to installation of structures within aquatic habitat area or sediment deposition related to construction activities. No permanent impacts to aquatic ecosystems are anticipated as a result of the Project. No impacts to aquatic ecosystems from water use during Project construction are anticipated.	The Project has been designed to avoid and/or minimize impacts to aquatic ecosystems. To the extent practicable, the Project will avoid streams and other drainage systems and minimize disturbance to wetlands during construction. The Project is expected to span all rivers and streams, thus avoiding potential permanent impacts. The Applicants will develop and implement a SWPPP, which will include sediment and erosion control BMPs. In addition, Project design and construction practices will avoid in-water work where practicable and minimize the potential for impacts to streams known to support sensitive or rare aquatic species.
Land use		
Land use	The Project will primarily affect agricultural lands (cultivated crops and hay/pasture). Transmission line structures, substations, and associated facilities will result in the conversion of land from existing uses to transmission and electric utility uses.	The Project is generally compatible with existing land uses. The Applicants will continue to coordinate with Grant, Deuel, and Brookings counties regarding applicable zoning ordinances, land use controls, and local permitting requirements, and will obtain required permits and approvals prior to construction. If potential conflicts with local land use controls are identified, the Applicants will coordinate with the applicable local authority to avoid, minimize, or resolve such conflicts to the extent practicable. The Applicants will coordinate construction activities with landowners to minimize interference with agricultural operations, as possible. Landowners will be compensated for crop loss and other property damage. The Applicants will repair or reimburse landowners for damage to drain tiles, fences, and other property in accordance with applicable landowner agreements. Following construction, temporarily disturbed areas will be restored to preconstruction conditions to the maximum extent feasible. Where revegetation is necessary, noxious-weed-free seed will be used unless otherwise agreed to by the landowner.

Resource	Potential Impact	Proposed Avoidance/Minimization/Mitigation Measures
Public lands and facilities	The Project will cross 11 WPAs; three crossings on the 765 kV Route may require transmission line structures to be placed within a WPA because the areas are too wide to span. Structure placement within a WPA could result in minor permanent surface disturbance. The Proposed Route intersects approximately 0.5 acre along the edge of the Dakota Tallgrass Prairie WMA where the Route follows an existing road corridor; therefore, impacts to the WMA are anticipated to be negligible. The Proposed Route does not cross any GPAs. Construction-related noise, traffic, and other activities could result in temporary impacts to nearby public lands and their users.	The Project has been designed to avoid and minimize impacts to public lands and facilities to the extent practicable. The Proposed Route intersects the Dakota Tallgrass Prairie WMA adjacent to an existing road corridor, minimizing potential impacts to this resource. Where transmission line structures cannot avoid placement within a WPA, the Applicants will coordinate with the USFWS regarding structure placement and construction activities. Construction activities will generally occur during daytime hours and temporary disturbances associated with construction will be minimized to the extent practicable.
Noise	Construction noise will be temporary, with the primary sources including heavy equipment operation, substation construction activities, and increased vehicle traffic associated with construction personnel and material deliveries. Construction impacts along the Proposed Route will be of limited duration at any given location as work progresses along the line. Additional intermittent construction-related noise may occur depending on final Project design and construction methods.	Construction noise levels will be minimized by ensuring that construction equipment is equipped with properly functioning mufflers and maintained in good working order. Construction activities will generally occur during daytime hours, to the extent practicable, to minimize potential impacts on nearby receptors. Operational noise from the transmission lines and substations is expected to be minimal and is not anticipated to result in significant noise impacts.
Visual resources	The Project will introduce additional visual elements into the landscape, although the degree of visual change will vary by location. Existing viewsheds within the Project area include some transmission and distribution lines, substations, roadways, railroads, wind energy facilities, agricultural buildings, and other rural infrastructure. Although the Project would generally be consistent with these existing features, the proposed 345 kV and 765 kV transmission lines would introduce additional vertical and linear elements into the landscape. The 765 kV lattice structures would be taller, wider, and more visually prominent than the 345 kV single-pole structures. Expansion of the Big Stone South Substation and Brookings County 345 kV Substation would represent extensions of existing utility facilities, while the Brookings County 765 kV Substation Expansion would introduce a new concentration of utility infrastructure into the surrounding landscape. Construction activities would also result in temporary visual impacts associated with construction equipment, staging areas, structure assembly areas, temporary access roads, and disturbed ground.	Where feasible, input from landowners and land management agencies will be considered when determining final structure locations, right-of-way, and other areas with the potential for visual disturbance. Structure placement will consider minimizing impacts to homes, farmsteads, agricultural lands, wetlands, and other sensitive viewpoints while maintaining sound engineering and reliability requirements. Construction waste and debris will be removed following construction activities, and temporarily disturbed areas will be restored. Vegetation clearing will be limited to that necessary for safe construction, operation, and maintenance of the Project.
Electromagnetic interference (satellite, cellular, radio, TV, and GPS reception)	No impacts to satellite, cellular, radio, television, LMR, or GPS systems are anticipated. Minor, localized interference with radio or television reception could occur in isolated circumstances; however, such effects are expected to be uncommon and are typically correctable through adjustments to receiving equipment.	The Project will be designed, constructed, and maintained to minimize the potential for electromagnetic interference, including minimizing the potential for gap discharges and corona-related effects. If GPS, radio, or television interference is determined to result from the operation of the Project in areas where satisfactory reception existed prior to Project construction, the Applicants will evaluate the circumstances and identify appropriate corrective measures. In the unlikely event that the Project causes interference within a television station's primary service area, the Applicants will work with affected parties to resolve the issue, including implementation of appropriate corrective measures, which may include installation of external antennas or other suitable solutions.

Resource	Potential Impact	Proposed Avoidance/Minimization/Mitigation Measures
Local land use controls	The Project is not anticipated to conflict with applicable local land use controls based on current ordinances.	The Applicants have coordinated and will continue to coordinate with Grant, Deuel, and Brookings counties regarding applicable zoning ordinances, land use controls, and local permitting requirements. Project design, facility siting, and final structure placement will consider applicable local requirements, including county zoning and setback requirements, during ongoing route refinement and final engineering.. Based on the Applicants' review of currently available county ordinances, comprehensive plans, subdivision regulations, and other applicable land use controls, no local land use control has been identified that would prevent construction or operation of the Project as currently proposed.
Water quality	During construction, ground disturbance associated with excavation, grading, and construction traffic could result in erosion and transport of sediment to nearby surface waters, which could temporarily affect water quality.	The Applicants will obtain coverage under the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities and prepare and implement a SWPPP. The SWPPP will identify potential sources of stormwater pollution and specify BMPs to control erosion and sedimentation and protect adjacent water resources. BMPs may include proper management of stockpiled materials, topsoil segregation and restoration, revegetation of disturbed areas, and implementation of erosion and sediment controls such as silt fence, straw wattles, erosion control blankets, and other measures designed to minimize stormwater runoff, erosion, and sedimentation. Construction activities will be conducted in accordance with applicable NPDES permit requirements.
Air quality	Temporary construction activities may result in fugitive dust emissions and short-term emissions from diesel-powered construction equipment and vehicles. Operational impacts on air quality are expected to be negligible and may include minor emissions associated with maintenance activities and atmospheric interactions with energized conductors.	Construction-related air emissions will be temporary and limited to the duration of construction activities. The Applicants will comply with all applicable federal and state air quality standards and regulations. Construction activities will be conducted in a manner that minimizes fugitive dust and unnecessary equipment emissions to the extent practicable. Operational emissions associated with the Project are expected to be negligible and are not anticipated to result in exceedances of applicable air quality standards. No air quality permits or variances are anticipated to be required for operation of the Project.
Community Impact		
Socioeconomic and community resources	The Proposed Route and Substation Siting Areas are located primarily in rural agricultural areas near dispersed residences, farmsteads, and small communities. Construction may temporarily increase demand for local lodging, restaurants, fuel suppliers, and other businesses and services and may temporarily disrupt agricultural activities. Long-term benefits would include construction-related spending, utility property tax revenues, and support for reliable electric service and the regional transmission system. Because Project operation would not require a substantial permanent workforce, no long-term changes to population, housing, employment, income, public services, community cohesion, or demographic characteristics are anticipated.	The Project is expected to provide short-term economic benefits through construction employment, purchases of goods and services, and local spending. Temporary effects on agricultural operations, businesses, and nearby residents will be minimized through landowner coordination, management of construction traffic and access, compensation for crop loss and construction-related property damage in accordance with applicable agreements, and restoration of temporarily disturbed areas following construction. The Applicants are not aware of any commercial or industrial operations that would be displaced by the Project. No long-term changes to population, demographics, employment patterns, housing, public services, or community cohesion are anticipated.
Commercial, industrial, and agricultural sectors	The Project is anticipated to provide short-term economic benefits to commercial and industrial sectors in the vicinity of the Project during construction through increased demand for lodging, food service, fuel, materials, equipment, and other goods and services. No adverse impacts to commercial or industrial operations are anticipated, and the Project will not displace commercial or industrial businesses. Construction activities will affect agricultural lands within the Proposed Route and Substation Siting Areas and adjacent work areas used for access, staging, and foundation installation. These activities may temporarily affect agricultural productivity, disrupt farming operations, displace livestock, and result in crop disturbance or loss. Long-term impacts to agricultural lands will be limited to the areas beneath the 765 kV Route's structures and substation infrastructure. Agricultural activities will generally be allowed to resume within the Proposed Route following construction within the majority of the right-of-way.	Landowners will be compensated for crop damage, temporary loss of agricultural production, and construction-related damage to property and agricultural infrastructure in accordance with applicable easement, lease, or land rights agreements. The Applicants will coordinate with landowners regarding construction schedules, access, and agricultural operations, including the potential need for early harvest where appropriate. Following construction, temporary workspaces and other disturbed areas will be restored to preconstruction conditions to the extent practicable, including restoration of contours, drainage patterns, and areas temporarily removed from agricultural production. Disturbed areas will be revegetated using appropriate seed mixes unless otherwise agreed to by the landowner. The Applicants will work with landowners to identify and mark drain tile systems, where known, and will make reasonable efforts to avoid damage during construction. Any drain tile systems, fences, gates, cattle guards, or similar agricultural infrastructure damaged during construction will be repaired or replaced in accordance with applicable landowner agreements.

Resource	Potential Impact	Proposed Avoidance/Minimization/Mitigation Measures
Community facilities and services	Due to the short-term and limited scope of construction activities, Project construction is not anticipated to result in a measurable increase in demand for public services. Similarly, long-term operation and maintenance are not expected to generate a substantial increase in demand for public services. Existing community facilities, utilities, infrastructure, and services are anticipated to be sufficient to support the temporary construction workforce and long-term operation of the Project.	The Project is not anticipated to adversely affect community facilities, public utilities, public safety, or emergency services. Temporary construction-related safety risks will be managed through implementation of project-specific health and safety plans. Construction contractors will secure active work areas and restrict public access where appropriate to promote the safety of workers and the public. The Applicants will coordinate with applicable utility providers as needed during final design and construction to avoid or minimize disruptions to existing services.
Transportation	Construction of the Project will temporarily increase traffic on local roads, county roads, and state highways due to the movement of construction personnel, equipment, and materials. Traffic impacts associated with operation and maintenance of the Project following construction are expected to be minimal. No significant impacts to airports, air navigation, railroads, or rail service are anticipated.	In accordance with SDCL 49-41B-38, the Applicants will provide an indemnity bond to support the repair and restoration of roads affected by construction activities. The Applicants will coordinate with USDOT, SDDOT, and county highway departments regarding road use, traffic management, oversized or overweight deliveries, permitting requirements, and road restoration, as needed. Highway crossings will be designed to meet or exceed applicable NESC requirements. The Applicants will coordinate with BNSF Railroad to ensure construction, operation, and maintenance of the Project do not adversely affect railroad infrastructure or operations. The Applicants will continue coordination with the FAA and Milbank Municipal Airport, comply with applicable FAA requirements, including filing FAA Form 7460-1 as appropriate, and obtain FAA determinations required for Project construction.
Cultural resources	Cultural resources within the Project area may be subject to direct and indirect impacts. Direct impacts could result from ground-disturbing activities associated with construction and maintenance of the Project, including transmission line structures, access roads, substations, and temporary construction workspaces. Indirect impacts may occur where Project facilities alter the setting or viewshed of historic architectural resources, Tribal cultural resources, or other culturally significant properties. Previously identified archaeological resources within the Survey area include NRHP-eligible, unevaluated, and non-eligible sites. In addition, previously documented NRHP-eligible historic architectural resources have been identified within one mile of the Project and may be subject to visual effects.	The Project has been designed to avoid and minimize impacts to known cultural resources to the extent practicable through route selection and facility siting. A Level I cultural resources literature review has been completed, and a Level III Intensive Survey will be completed for portions of the Survey area that have not been surveyed within the past 10 years. Survey results, resource evaluations, and recommendations for avoidance, minimization, or mitigation will be documented in a technical report and provided to the South Dakota SHPO and participating Tribes for review and comment. Where NRHP-eligible cultural resources, unevaluated cultural resources, or resources of Tribal significance are identified, the Applicants will seek to avoid through route refinement, structure placement, or other appropriate measures to the extent practicable. The Applicants have conducted and will continue voluntary coordination with Tribes regarding resources of Tribal significance. Tribal cultural resource surveys are planned by participating Tribes. The Applicants will develop an Unanticipated Discoveries Plan in consultation with interested Tribes that establishes procedures for addressing previously unidentified cultural resources encountered during construction.

22 Environmental Information (ARSD 20:10:22:13)

ARSD 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 effect on the environment as a result of their construction or operation in the transmission site, wind energy site, or siting area.

Sections 11 through 21 provide descriptions of the existing environment at the time of Application submittal and the potential changes to the existing environment that are anticipated to result from the construction and operation of the Project. These sections also identify the irreversible changes which are anticipated to remain beyond the operating lifetime of the Project, as well as the impact avoidance, minimization, and mitigation measures that will be implemented for the Project.

The maximum estimated temporary and permanent impacts for the Project are estimated in Table 22-1, and final measurements of these areas is pending further project design. Permanent impacts include the extent of the structure foundations and substation infrastructure. Temporary impacts include the areas potentially subject to construction related disturbance which will be revegetated following construction completion.

Table 22-1 Estimate of Temporary and Permanent Project Impacts

Project Component	Temporary Impacts (acres)	Permanent Impacts (acres)
Stringing sites[1]	96.3	0
Temporary access roads	TBD[2]	TBD[2]
Laydown yards/staging areas[3]	142.5	0
345 kV Route structures[4]	130.7	0.1
765 kV Route structures[5]	2,187.8	23.6
Big Stone South Substation Siting Area[6]	0	39.4
Brookings County 345 kV Substation Siting Area[6]	0	26.2
Brookings County 765 kV Substation Siting Area[6]	0	238.7

1 Estimated based on an assumed stringing site spacing of approximately 3.0 miles along the Project and approximately 35 stringing sites. Each stringing site was assumed to occupy an area of approximately 200 feet by 600 feet (2.75 acres), resulting in an estimated temporary disturbance area of approximately 96.3 acres. Final stringing site locations and associated disturbance areas will be refined during final engineering and construction planning and may vary based on Project design, constructability considerations, landowner coordination, and access requirements.

2 Temporary access roads represent potential construction access routes located outside of the proposed Project right-of-way that may be used to access structure locations, work areas, or other construction features where use of the right-of-way is not practicable or would result in greater impacts. Temporary access roads will be identified during final engineering and construction planning and may be used to reduce travel distances, avoid sensitive resources, improve constructability, or accommodate landowner preferences. Because the need for and location of temporary access roads are dependent on final structure locations, landowner agreements, resource constraints, and construction methods, temporary impact acreages have not yet been estimated.

3 Estimated acreages assumed a need for laydown/staging areas at intervals of approximately 40 to 80 miles along the Project. The estimate is based on the maximum assumed number of laydown/staging areas and a maximum assumed disturbance area of 60 acres per site. Final laydown/staging area locations, quantities, and associated disturbance acreages will be refined during final engineering and construction planning and may vary based on Project design, constructability considerations, access requirements, landowner coordination, and environmental constraints.

4 Estimated based on an assumed total of 28 to 31 structures. Permanent impacts were calculated assuming approximately 100 square feet of permanent disturbance per structure footprint. Temporary impacts were estimated assuming a 100-foot-wide construction corridor surrounding each structure location. Final structure counts, structure footprints, and associated temporary and permanent disturbance areas will be refined during final engineering and construction planning.

5 Estimated based on an assumed 390 to 411 structures. Permanent impacts were calculated assuming approximately 2,500 square feet of permanent disturbance per structure. The 765 kV structures are assumed to be four-legged lattice structures, and the 2,500-square-foot impact area includes the area enclosed between the four structure legs. Temporary impacts were estimated assuming a 100-foot-wide construction work area surrounding each structure location. Final structure counts, structure dimensions, work area requirements, and associated temporary and permanent disturbance acreages will be refined during final engineering and construction planning and may vary based on final structure design, site conditions, and construction methods.

[6] Estimated assuming the entire substation footprint would be permanently disturbed and converted to substation use through grading, installation of foundations, placement of electrical equipment, access features, and other substation infrastructure. Permanent impact acreages were calculated using the full area of each Substation Siting Area and therefore represent a conservative maximum estimate. Final substation footprints and associated permanent impact acreages will be refined during final engineering and design.

A cumulative effects analysis that accounts for the impacts of this Project and energy conversion facilities that are operating or under construction is required (ARSD 20:10:22:13). To identify projects in the area that are currently happening or are proposed, the following resources were reviewed: county websites, including Duel, Grant, and Brookings Counties in South Dakota and Lac Qui Parle, Yellow Medicine, and Yellow Medicine Counties in Minnesota; South Dakota Public Utilities Commission and Minnesota Public Utilities Commission websites; FAA Wind Turbine Location Data; and U.S. Geological Service Solar and Wind data. Energy conversion facilities that currently exist or are planned in the vicinity of the Project are summarized in Table 22-2 and shown on Map 19.

Table 22-2 Existing or Planned Energy Conversion Facilities in the vicinity of the Project

Facility Name	Description	Location
Big Stone Power Plant	Existing 475-MW, sub-bituminous coal-fired generating facility	Brookings County; one mile north of the Big Stone South Substation and the Project.
MinnDakota Wind Farm	Existing wind farm, owned by Avangrid Inc., has a generating capacity of 54 MW of wind energy.	Brookings County
Buffalo Ridge I Wind Farm	Existing wind farm, owned by Iberdola Renewables, has a generating capacity of 50 MW of wind energy.	Brookings County
Buffalo Ridge II Wind Farm	Existing wind farm, owned by Iberdola Renewables, has a generating capacity of 210 MW of wind energy.	Brookings and Deuel Counties
Coyote Ridge Wind Farm	Existing wind farm, owned by Avangrid Inc. and WEC Energy Group, has a generating capacity of 97 MW of wind energy.	Brookings County
Tatanka Ridge Wind Farm	Existing wind farm, owned by WEC Energy Group and Avangrid Inc., has a generating capacity of 155 MW of wind energy.	Deuel County
Deuel Harvest North Wind Farm	Existing wind farm, owned by Southern Power Company and Invenergy, has a generating capacity of 301 MW of wind energy.	Deuel County
Deuel Harvest Wind Energy South	Proposed wind farm, owned by Invenergy, has a generating capacity of 260 MW of wind energy.	Deuel County

Facility Name	Description	Location
Toronto Power Plant and Transmission Line Project	Proposed 145 MW dual fuel power plant and a 345 kV generation-tie transmission line owned by Western Minnesota Municipal Power Agency and Missouri River Energy Services.	Deuel County
Big Stone South to Alexandria Transmission Line Project	Proposed 345-kV Transmission Facility and Associated Facilities by Otter Tail and Western Minnesota Municipal Power Agency.	Grant County

As noted in Table 22-2, most of the energy conversion projects in the area consist of wind energy infrastructure. The location of existing wind turbines was identified using the U.S. Wind Turbine Database (reference (58)). During Project routing, a setback of 110 percent of the turbine tip height was used from existing turbines. Projects currently under construction or proposed that are within 5 miles of the Project include a wind energy project, a power plant, and a transmission line (Table 22-2).

This Project, in combination with the energy conversion projects listed in Table 22-2, could interact to result in cumulative effects on the human and natural environment from their construction or operation. These potential cumulative effects are summarized in the sections below.

22.1 Physical Environment

As discussed in Section 11, the Project's potential impacts on geologic and soil resources are anticipated to be limited primarily to temporary construction-related activities, including excavation, grading, soil compaction, erosion, and foundation installation. Permanent impacts would be limited to transmission structures, substation infrastructure, and other permanent Project facilities.

In combination with the existing and proposed energy conversion facilities identified in Table 22-2, the Project could contribute to temporary cumulative impacts on geologic and soil resources through additional ground disturbance and construction activity. However, these impacts would generally be localized and temporary in nature. In addition, implementation of BMPs, erosion and sediment control measures, restoration of temporarily disturbed areas, and compliance with applicable permitting requirements would minimize the potential for cumulative effects. Accordingly, the Project is not anticipated to result in significant cumulative impacts to geologic or soil resources.

22.2 Hydrology

The Project's potential impacts on groundwater and surface water resources are anticipated to be minimal and primarily limited to temporary construction activities, as described in Section 12. In addition, impacts to wetlands, streams, and other aquatic resources will be avoided or minimized to the extent practicable through Project design, including spanning watercourses and wetlands where feasible. As such, the Project is not anticipated to interact with the existing and proposed energy conversion facilities identified in Table 22-2 in a manner that would result in cumulative impacts to groundwater or surface water resources.

22.3 Terrestrial Ecosystems

As discussed in Section 13, the Project would result in temporary and permanent impacts on terrestrial ecosystems, including vegetation and wildlife resources. Temporary construction-related impacts, such as vegetation disturbance, noise, and wildlife displacement, are expected to be localized and short-term and are not anticipated to interact with the existing and proposed energy conversion facilities identified in Table 22-2 to result in significant cumulative effects.

Permanent impacts from the Project could contribute to cumulative effects on terrestrial ecosystems when considered in combination with the existing and proposed energy conversion facilities identified in Table 22-2. Potential cumulative effects may include the incremental loss and fragmentation of grassland, forested, and other wildlife habitats; increased avian mortality associated with transmission lines and wind turbines; and the introduction or spread of noxious weeds and other invasive species. However, the Project has been routed and sited to avoid and minimize impacts to sensitive habitats to the extent practicable, and implementation of BMPs and other impact minimization measures described in Section 13 would reduce the potential for cumulative effects. Accordingly, cumulative impacts to terrestrial ecosystems are anticipated to be minor.

22.4 Aquatic Ecosystems

As discussed in Section 14, the Project's potential impacts on aquatic ecosystems are anticipated to be minimal and primarily limited to temporary construction-related activities. Because the Project will avoid or span watercourses and waterbodies to the extent practicable, it is not anticipated to interact with the existing and proposed energy conversion facilities identified in Table 22-2 in a manner that would result in cumulative effects on aquatic ecosystems.

22.5 Land Use

As discussed in Section 15, the Project would result in temporary and permanent impacts on land use. Temporary impacts would primarily occur during construction and would include

disturbance within workspaces, access routes, staging areas, and other construction areas. Permanent impacts would be limited to transmission structures, substation infrastructure, and other long-term Project facilities. Agricultural activities would generally be allowed to resume following construction, except within permanent Project facility footprints, including the areas occupied by transmission structures and substation infrastructure.

In combination with the existing and proposed energy conversion facilities identified in Table 22-2, the Project could contribute to the incremental conversion of agricultural or undeveloped land to energy-related uses and an increased concentration of utility infrastructure in portions of Grant, Deuel, and Brookings counties. However, the Project's contribution to cumulative land use effects is expected to be limited. During route development, existing energy infrastructure, including wind facilities, was treated as a priority avoidance consideration, and routing and structure placement were evaluated to maintain appropriate separation from existing energy facilities while minimizing conflicts with existing and planned land uses. In addition, temporary construction areas would be restored following construction, agricultural activities would generally be allowed to resume outside of permanent Project facilities, and permanent land use changes would be limited to transmission structures, substations, and associated infrastructure. Accordingly, the Project is not anticipated to result in substantial cumulative impacts to land use or alter the predominantly rural and agricultural character of the area.

22.6 Local Land Use Controls

The Project has been designed to comply with applicable existing local land use requirements in Grant, Deuel, and Brookings Counties. These requirements include zoning, building, setback, and permitting standards. The Applicants will continue coordinating with county officials and will obtain required local permits before construction.

The Project and nearby energy facilities may increase energy related development within the three counties. However, the Project is not expected to conflict with existing local zoning or planned land uses. Compliance with permit conditions would minimize potential cumulative effects on local land-use planning.

As discussed in Section 16, the Applicants will continue coordinating with local jurisdictions regarding zoning, setback, floodplain, and other permitting requirements.

In combination with the existing and proposed energy conversion facilities identified in Table 22-2, the Project could contribute to an increased concentration of energy-related infrastructure within portions of the three counties. However, the Project was routed and sited with consideration of local land use requirements, existing energy infrastructure, and planned land uses. Accordingly, the Project is not anticipated to result in significant cumulative impacts on local land use or land use planning within Grant, Deuel, or Brookings counties.

22.7 Water Quality

As discussed in Section 17, the Project's potential impacts on water quality are anticipated to be minimal and primarily limited to temporary construction-related activities. Implementation of BMPs and compliance with applicable stormwater permitting requirements would minimize the potential for erosion, sedimentation, and other water quality impacts. As such, the Project is not anticipated to interact with the existing and proposed energy conversion facilities identified in Table 22-2 in a manner that would result in cumulative effects on water quality.

22.8 Air Quality

As discussed in Section 18, the Project's potential impacts on air quality are anticipated to be minimal and primarily limited to temporary construction-related activities, including fugitive dust emissions and emissions from construction equipment and vehicles. Operational emissions associated with the Project are expected to be negligible and are not anticipated to result in exceedances of applicable air quality standards. South Dakota is currently in attainment for all National Ambient Air Quality Standards, and the Project is not anticipated to contribute substantially to regional air emissions. Accordingly, the Project is not anticipated to interact with the existing and proposed energy conversion facilities identified in Table 22-2 in a manner that would result in cumulative effects on air quality.

22.9 Community Impact

As discussed in Section 20, the Project would provide short-term economic benefits during construction through employment opportunities and spending on lodging, food, fuel, materials, and services. Construction may temporarily increase demand for housing accommodations and community services and may result in localized disruptions to agricultural operations and transportation routes. These effects would be temporary and would shift along with the Project as construction progresses. Operation and maintenance activities are expected to be limited and are not anticipated to result in long-term changes to population, housing, employment patterns, public services, community cohesion, or demographics. The Project would also provide long-term benefits through utility property tax revenues to affected taxing jurisdictions.

In combination with the existing and proposed energy conversion facilities identified in Table 22-2, the Project could contribute to temporary increases in construction employment, traffic, demand for lodging and services, and use of local infrastructure. Collectively, these facilities may also provide cumulative economic benefits through local expenditures, employment opportunities, and tax revenues. Because construction-related effects would be temporary and operation of the Project would require few permanent personnel, the Project is not anticipated to contribute substantially to adverse cumulative effects on nearby communities, public services, or community facilities.

23 Employment Estimates (ARSD 20:10:22:24)

ARSD 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.

Construction of the Project is estimated to last approximately 5 years. It is anticipated that Project construction will require the employment of approximately 110 workers for the transmission work and approximately 100 workers for construction of the substations. The majority of the positions needed during Project construction will be contracted and are expected to include, but are not limited to: project management, project assistant, safety, structure hauling, structure framing and setting, linemen, civil foundation drilling and installation, quality assurance/quality control, construction project management, inspections, design, concrete truck drivers, and an environmental manager. Additional positions expected to be involved in substation construction are anticipated to be more of a balanced blend of the Applicants' employees and contracted positions that include, but are not limited to: project management, electrical technicians, relay technicians, inspections, construction, design, construction management, and safety.

While most of the positions will require specialized skills and expertise, some positions (skilled or unskilled) may be filled by qualified individuals from South Dakota. Specialized labor may need to come from other areas of the State or from other states, as the relatively short duration of construction makes special training of local or regional labor impracticable. The contractor, who will be responsible for determining employment needs for construction, may develop plans for using and training the existing South Dakota labor market for the specialized positions and the adequacy of the local manpower to meet the temporary labor positions arising from Project construction.

The estimated number of construction jobs by classification and annual employment expenditures during construction is included in Table 23-1 and Table 23-2 for the Proposed Route and substations, respectively. It is not anticipated that the construction of the Project will create new permanent jobs, but construction will create temporary construction jobs that will provide an influx of income to the area.

Table 23-1 Anticipated Construction Jobs and Employment Expenditures for the Proposed Route

Job Classification	Number of Employees	Estimated Annual Salary[22]
Applicants' Staff		
Project Manager	1	$165,000-$215,000
Project Assistant	3	$75,000-$125,000
GIS Manager	1	$85,000-$135,000
Access Manager	1	$155,000-$205,000
Contracted Staff		
Construction Project Manager	1	$155,000-$205,000
Safety Project Manager	1	$155,000-$205,000
Safety Professional	2	$135,000-$185,000
Hauling Structure Workers	8	$155,000-$205,000
Frame Structure Workers	27	$155,000-$205,000
Structure Setting Workers	22	$175,000-$225,000
Linemen/Wire Workers	43	$175,000-$225,000

Table 23-2 Anticipated Construction Jobs and Employment Expenditures for the Substations

Job Classification	Number of Employees	Estimated Annual Salary
Applicants' Staff		
Project Managers	3	$165,000-$215,000
Electrical Technician I & II	15	$115,000-$165,000
Relay Technician	6	$125,000-$175,000
Testing/Inspection	9	$110,000-$230,000
Substation Design Engineer	14	$270,000-$390,000
Contracted Staff		
Senior Lead Construction	2	$195,000-$245,000
Lead Construction	2	$175,000-$225,000
Electrical Crew Forman	4	$135,000-$185,000
Construction Workers	45	$165,000-$215,000

[22] Estimated Annual Salary is an approximate estimate inclusive of all expenses for an individual including but not limited to salary, pensions, and payroll taxes

Job Classification	Number of Employees	Estimated Annual Salary
Design Engineers/Construction Managers	2	$195,000-$245,000
Safety Training/Inspection	2	$105,000-$155,000

The estimated number of jobs by classification and annual employment expenditures during operations are included in Table 23-3 and Table 23-4. Annual employment expenditure is anticipated to be the same for each of the first 10 years of commercial operation. It is anticipated that the Applicants will use contractors for most of the Proposed Route, but perform most of the operations activities at the substation with their own employees. As shown in Table 23-3 and Table 23-4, Project operations are not expected to require new full-time positions; rather, The Applicants will leverage existing employees within their respective organizations and contracted positions shared with other projects.

Table 23-3 Anticipated Operations Jobs and Employment Expenditures for the Proposed Route

Job Classification	Number of Employees	Estimated Annual Duration of Work	Estimated Annual Salary
Applicants' Staff			
Line Design Engineer	1	3 weeks	$135,000
Maintenance Specialist	1	3 weeks	$100,000
Contracted Staff			
Vegetation Management Workers	3	3 weeks	$98,000
Line Patrol Workers/Inspectors	2	1 week	$88,000
Lineman	4	2 weeks	$125,000

Table 23-4 Anticipated Operations Jobs and Employment Expenditures for the Substations

Job Classification	Number of Employees	Estimated Annual Duration of Work	Estimated Annual Salary
Applicants' Staff			
Electrical Technicians I & II	1	6 weeks	$114,000
Relay Technician	1	6 weeks	$122,000
Contracted Staff			
Herbicide Specialist (spraying)	1	2 weeks	$105,000

24 Future Additions and Modifications (ARSD 20:10:22:25)

ARSD 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.

As described in Section 2.3, the Project has been designed to address the transmission needs identified through MISO's LRTP Tranche 2.1 process and to provide sufficient capacity to accommodate the forecasted reliability, transfer capability, and generation integration needs evaluated as part of that process. The Applicants are not currently aware of any specific future additions, modifications, or expansions to the Project beyond the facilities described in this Application. While future transmission system needs may evolve over time, any future facilities or modifications would be evaluated through applicable transmission planning processes and, if necessary, would be subject to separate regulatory review and permitting requirements.

25 Reliability and Safety (ARSD 20:10:22:35)

ARSD 20:10:22:35. Information concerning transmission facilities. If a transmission facility is proposed, the applicant shall provide the following information:

(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.

The following sections discuss the reliability and safety of the Project.

25.1 Reliability

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first years of operation. Transmission infrastructure has very few mechanical elements, which results in reliability. It is built to withstand weather extremes that are normally encountered, apart from outages due to severe weather such as tornadoes and heavy ice storms.

NESC sets minimum clearance requirements between conductors and structures. Applicants will meet all NESC clearance requirements.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is detected on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent on high-voltage transmission lines. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

Information about the reliability needs served by the Project is detailed in Chapters 2 and 7.

25.2 Safety

25.2.1 Design

The Project will be designed according to local, state, and NESC standards regarding ground clearance, crossing utilities clearance, building clearance, strength of materials, and right-of-way widths. Construction crews and/or contract crews will comply with local, state, and NESC standards regarding facility installation and standard construction practices. Applicants' established industry safety-compliant procedures will be followed during and after installation of the transmission line, including clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if the structure or conductor falls to the ground. Protective equipment will de-energize the transmission line should such an event occur. In addition, the substation facilities will be properly fenced, have proper signage, and will be accessible only by authorized personnel.

25.2.2 Electric and Magnetic Fields

Electric and magnetic fields (EMF) are invisible forces that are present anywhere electricity is produced or used, including around electric appliances and any wire that is conducting electricity. The term EMF typically refers to electric and magnetic fields that are coupled together. However, for lower frequencies associated with distribution or transmission lines, electric and magnetic fields are relatively decoupled and should be described separately. Electric fields are the result of electric charge, or voltage, on a conductor. The intensity of an electric field is related to the magnitude of the voltage on the conductor and is typically described in terms of kV per meter (kV/m). Magnetic fields are the result of the flow of electricity, or current, traveling through a conductor. The intensity of a magnetic field is related to the magnitude of the current flow through the conductor and is typically described in units of magnetic flux density expressed as Gauss (G) or milliGauss (mG).

25.2.2.1 Electric Fields

Voltage on any wire produces an electric field in the area surrounding the wire. The voltage on the conductors of a transmission line produces an electric field extending from the energized conductors to other nearby objects, such as the ground, structures, vegetation, buildings, and vehicles. The intensity of transmission line electric fields is proportional to the voltage of the line and rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, or other solid structures nearby can also significantly reduce the magnitude of the electric field. Because the magnitude of the voltage on a transmission line is near-constant, the magnitude of the electric field will be near-constant for each of the proposed configurations, regardless of the power flowing on the line.

When an electric field reaches a nearby conductive object, such as a vehicle or a metal fence, it induces a voltage on the object. The magnitude of the induced voltage is dependent on many factors, including, but not limited to, the object's capacitance, shape, size, orientation, location, resistance with respect to ground, and the weather conditions. If the object is insulated or semi-insulated from the ground and a person touches it, a small current would pass through the person's body to the ground. This might be accompanied by an electrical discharge and mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object, like a doorknob, or another person.

The main concern with induced voltage is not the magnitude of the voltage induced, but the current that would flow through a person to the ground should the person touch the object. To ensure that any such spark discharge associated with transmission line induced voltage does not reach unsafe levels, the NESC requires that any discharge be less than 5 milliamperes (mA). The Applicants will design the Project consistent with this NESC requirement.

There is no federal standard for transmission line electric fields. The electric fields associated with the Project will not exceed 8 kV/m within the right-of-way.

25.2.2.2 Magnetic Fields

Current passing through any conductive material, including a wire, produces a magnetic field in the area around the material. The current flowing through the conductors of a transmission line produces a magnetic field that extends from the energized conductors to other nearby objects. The intensity of the magnetic field associated with a transmission line is proportional to the amount of current flowing through the transmission line's conductors and rapidly decreases with the distance from the conductors. Unlike electric fields, magnetic fields are not significantly impacted by the presence of trees, buildings, or other solid, non-ferromagnetic structures nearby. However, they are impacted by structures made of ferromagnetic materials. Because the actual power flow on a transmission line could potentially vary widely throughout the day depending on electrical system conditions, the actual magnetic field level in the vicinity of the transmission line could also vary widely from hour to hour.

EMF associated with transmission facilities have been studied extensively for decades by governmental agencies, scientific organizations, and public health institutions worldwide. Nearly five decades ago, there was speculation that magnetic fields from power lines cause childhood leukemia, a form of cancer of the blood. In the subsequent years, there were poorly conducted correlational studies that continued to raise concern. Since then, modern studies and rigorous methods of research demonstrate that EMF from transmission lines do not have any known health consequences, including childhood leukemia.

There are currently no federal or South Dakota regulations pertaining to magnetic field exposure. Because magnetic fields are dependent on the current flowing on the line,

magnetic fields were calculated using the estimated typical system conditions of the Project of 4,000 Amps for the 765 kV line. Magnetic fields calculated for the 765 kV line at the edge of the right-of-way (125-feet from the right-of-way centerline) is 134 mG. The highest calculated level within the right-of-way is 400 mG. For the 345 kV line, magnetic fields calculated at the edge of the right-of-way (75-feet from the right-of-way centerline) is 17 mG; the highest calculated level within the right-of-way of the 345 kV line is 73 mG.

For context, within six inches of a hair dryer the magnetic field is 300 mG (reference (59)). The International Commission on Non-Ionizing Radiation Protection recommends magnetic field exposures not exceed 2,000 mG for the general public.

25.2.3 Stray and Induced Voltage

Stray voltage is typically caused by a lower voltage service system serving a customer, usually a farm, but it can also be caused by customer equipment. Questions concerning stray voltage are usually best addressed by the electric distribution utility that serves the farm directly. Transmission lines can, however, induce voltage on objects parallel to and immediately under the transmission line. Appropriate measures will be taken to prevent induced voltage problems when the Project parallels or crosses objects.

25.2.4 Farming Operations, Vehicle Use, and Metal Buildings Near Transmission Lines

The Applicants will comply with the NESC with respect to grounding objects and fences within the right-of-way and will work with landowners to resolve issues that arise because of the Project.

Farm equipment, passenger vehicles, and trucks may be safely used under and near transmission lines. The Project will be designed to meet or exceed minimum clearance NESC requirements with respect to roads, driveways, cultivated fields, and grazing lands.

Vehicles or other conductive equipment under high-voltage transmission lines may become electrically charged due to induced voltage from the transmission lines. Without a continuous grounding path, this charge can provide a nuisance shock. Such nuisance shocks are typically rare, as vehicles are generally effectively grounded through tires or other means. Modern tires are produced using carbon black, a good conductor of electricity, thus providing an electrical path to ground. Additionally, metal components of farming equipment are often in contact with the ground when in operation. Therefore, unless vehicles or equipment have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground, any induced charge on vehicles or equipment will normally flow continuously to ground.

Buildings are permitted near transmission lines but are generally not permitted within the right-of-way as a structure under a transmission line may interfere with the safe operation of

the transmission facilities. In addition, the NESC establishes minimum electrical clearance zones from transmission lines to various objects, including buildings, for the safety of the general public. The Applicants will acquire easement rights that provide the necessary area to operate and maintain the Project. The Applicants may permit encroachment into these easements for specific activities when they can be deemed safe and still meet the NESC minimum requirements.

Metal buildings near the right-of-way may have unique concerns due to induction. For example, per NESC requirements, conductive buildings near transmission lines of 170 kV or greater must be properly grounded. Any person with questions about new or existing metal buildings or structures may contact the Applicants for further information about proper grounding requirements.

26 List of Potential Permits and Approvals (ARSD 20:10:22:05)

ARSD 20:10:22:05. The Application for a permit for a facility shall contain a list of each permit that is known to be required from any other governmental entity at the time of the filing. The list of permits shall be updated, if needed, to include any permit the Applicant becomes aware of after filing the Application. The list shall state when each permit Application will be filed. The Application shall also list each notification that is required to be made to any other governmental entity.

Permits and approvals potentially required to construct the Project are summarized in Table 26-1. Construction activities will not commence until applicable permits have been obtained. At the time of this application, no permit applications have been submitted to date.

Table 26-1 Potential Permits, Consultations, Approvals

Potential Permit / Consultation / Approval	Jurisdiction
Federal	
Section 404 CWA Permit	USACE
ESA / BGEPA /Migratory Bird Treaty Act Consultation	USFWS
Part 7460 Airport Obstruction Evaluation	FAA
SF-299 Application for Transportation, Utility Systems, Telecommunications and Facilities on Federal Lands and Property	Federal Land Management Agency
State	
Facility Permit	SDPUC
State Resources Coordination	South Dakota Game, Fish, and Parks
National Historic Preservation Act Consultation and cultural resources consultation	SDSHS
NPDES Construction Stormwater Permit	SDDANR
Section 401 CWA Water Quality Certification	SDDANR
General Surface Water Discharge Permit for Temporary Discharge Activities (General Permit)	SDDANR
Water Right Permit for Non-Irrigation Uses	SDDANR
Temporary Permit to Use Public Waters	SDDANR
Submittal of FAA Determinations of No Hazard	South Dakota Aeronautics Commission
Highway Access Permit Oversize/overweight Permit Permit(s) To Occupy Right of Way	South Dakota Department of Transportation

Potential Permit / Consultation / Approval	Jurisdiction
Utility Crossing Permit(s)	
Local	
CUP Building Permit Floodplain Development Permit Utility Permit Road Approach Permit Fence Permit Haul Road Permit Oversize/overweight Permit Temporary Approach, Road/right-of-way Modification, Improvement, and/or Utility Crossing Permit(s) Weed Board approval of noxious weed plan	Grant County
CUP Building Permit Floodplain Development Permit(s) Occupancy of right-of-way Driveway/Approach Permit(s) Agreement for Use and Restoration of Haul Roads Overweight and Over-dimension Loads Permit(s)	Brookings Couty
CUP Building Permit Floodplain Development Permit(s) Utility Permit(s) Road Approach Permit(s) Haul Road Agreement Oversize/overweight Permit(s) Temporary Approach, Road/right-of-way Modification, Improvement, and/or Utility Crossing Permit(s)	Deuel County
Other	
Crossing Agreements	Utility or railroad owner (BNSF)

27 Additional Information in the Application (ARSD 20:10:22:36)

ARSD 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.

27.1 Agency Coordination

Recognizing the importance of early, meaningful, and ongoing stakeholder engagement, the Applicants implemented a comprehensive outreach strategy designed to foster transparent communication and build relationships with potentially affected stakeholders throughout Project development. Engagement efforts began with the distribution of Project introduction letters to Tribes in December 2025, followed by outreach to federal and state agencies in March 2026. Building on these initial communications, the Applicants conducted extensive coordination through meetings, presentations, and follow-up discussions tailored to stakeholder interests and concerns. The Applicants met regularly with Tribal representatives from the Sisseton Wahpeton Oyate, Flandreau Santee Sioux and Yankton Sioux and maintained ongoing dialogue throughout the planning process. They also engaged proactively with federal and state agencies, participating in coordination meetings and conducting additional consultations as needed to address agency-specific questions and recommendations. At the local level, the Applicants regularly attended and provided updates at Grant County, Deuel County, and Brookings County commission meetings. For many of these engagements, the Applicants developed and presented Project overview materials to facilitate discussion and provide stakeholders with access to current Project information. Detailed records of agency and stakeholder coordination, organized by subject area, are provided in Appendix B.

27.2 Testimony and Exhibits (ARSD 20:10:22:39)

ARSD 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.

The Applicants are concurrently filing direct testimony and exhibits in support of the application.

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27.3 Applicants' Verifications

Jody Londo and JoAnn Thompson, being duly sworn, deposes and states that they are the Authorized Representatives of Xcel Energy Company and Otter Tail Power Company, respectively, and are authorized to sign this Application on behalf of the Applicants.

They further state that they do not have personal knowledge of all of the facts recited in the Application and Exhibits attached hereto, but the information has been gathered from employees and agents of the Applicants, and the information is verified by them as being true and correct on behalf of the Applicants.

Xcel Energy Company:	Jody Londo Regional Vice President, Planning and Policy		9/4/2026
	Name/Title	Signature	Date
Otter Tail Power Company:	JoAnn M. Thompson Vice President, Asset Management	Signed by: JoAnn M. Thompson 5233F02C002240F...	9/4/2026
	Name/Title	Signature	Date

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