SUMMIT CARBON SOLUTIONS

Application to the South Dakota Public Utilities Commission for a Permit for the SCS Carbon Transport LLC Pipeline Under the Energy Conversion and Transmission Facility Act

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Midwest Carbon Express Project

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Acronym List

ACRONYM/TERM	DESCRIPTION
AC	Alternating Current
APE	Area of Potential Effect
API	American Petroleum Institute
Applicant	SCS Carbon Transport LLC
ARMS	Archaeological Resources Management System
ARSD	Administrative Rules of South Dakota
ASL	Above Sea Level
ASME	American Society of Mechanical Engineers
ATWS	Additional Temporary Workspace
BA	Biological Assessment
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
CCS	Carbon Capture and Sequestration
CFR	Code of Federal Regulations
CI	Carbon Intensity
CO_2	Carbon Dioxide
COLT	Coalition of Large Tribes
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CUP	Conditional Use Permit
CWA	Clean Water Act
CWS	Canadian Wildlife Service
dB	Decibels
dBA	A-weighted Decibels
DIS	Decision Innovation Solutions
ECDs	Erosion Control Devices
ECP	Environmental Construction Plan
EI	Environmental Inspectors
EM	Emergency Managers
ERP	Emergency Response Plan
ESA	Endangered Species Act of 1973
ESC	Environmental Survey Corridor
FBE	Fusion Bonded Epoxy
FE	Federally Endangered

ACRONYM/TERM	DESCRIPTION
FERC	Federal Energy Regulatory Commission
FR	Federal Register
FT	Federally Threatened
g	Gravity
GDP	Gross Domestic Product
GIS	Geographic Information System
H_2CO_3	Carbonic Acid
HCAs	High Consequence Areas
HCO_3-	Bicarbonate
HDD	Horizontal Directional Drill
IBA	Important Bird Area
ICCP	Impressed Current Cathodic Protection
IPaC	Information for Planning and Consultation
IRS	Internal Revenue Service
LCFS	Low Carbon Fuel Standard
LEP	Linear Extensibility Percent
MCE Project	Midwest Carbon Express Project
MLV	Mainline Valve
MMTPA	Million Metric Tons Per Annum
MOP	Maximum Operating Pressure
MPS	Mainline Pump Station
NAAQS	National Ambient Air Quality Standards
NDIC	North Dakota Industrial Commission
NEFMA	Northeast Fisheries Management Area
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
O&M	Operation and Maintenance
O_2	Oxygen
OCC	Operations Control Center
OSHA	Occupational Safety and Health Administration
PEM	Palustrine Emergent
PFO	Palustrine Forested
PGA	Peak Horizontal Ground Acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLC	Programmable Logic Controller

ACRONYM/TERM	DESCRIPTION
Project	South Dakota Portion Of The MCE Project
PSIG	Pounds Per Square Inch Gauge
PSS	Palustrine Scrub Shrub
QA/QC Plan	Quality Assurance and Quality Control Plan
ROW	Right of Way
RTTM	Real Time Transient Model
SAF	Sustainable Aviation Fuel
SD	South Dakota
SE	State Endangered
SCADA	Supervisory Control and Data Acquisition
SD AIMP	South Dakota Agricultural Impact Mitigation Plan
SDARWS	South Dakota Association of Rural Water Systems
SD DANR	South Dakota Department of Agriculture and Natural Resources
SD DLR	South Dakota Department of Labor and Regulation
SDDOR	South Dakota Department of Revenue
SDGFP	South Dakota Game, Fish, and Parks
SDGS	South Dakota Geological Survey
SDSHPO	South Dakota State Historical Preservation Office
SD PUC	South Dakota Public Utility Commission
SPCC	Spill Prevention Control and Countermeasure
ST	State Threatened
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Properties
TERO	Tribal Employment Rights Office
TMDL	Total Maximum Daily Load
UDP	Unanticipated Discovery Plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WIA	Walk-In Areas
WPA	Waterfowl Production Area
WEG	Wind Erodibility Group
WRP	Wetlands Reserve Program

Administrative Rules Checklist

RULE	DESCRIPTION	SECTION
20:10:22:06	Names of participants required.	1.5, 1.6
20:10:22:07	Name of owner and manager.	1.6, 1.7
20:10:22:08	Purpose of facility.	1.1
20:10:22:09	Estimated cost of facility.	1.3
20:10:22:10	Demand for facility.	3.0
20:10:22:11	General site description.	1.2
20:10:22:12	Alternative sites.	4.0
(1)	The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for selecting these criteria;	4.1, 4.2, Appendix 11
(2)	An evaluation of alternative sites considered by the applicant for the facility;	4.0
(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.	4.3
20:10:22:13	Environmental information.	5.0
20:10:22:14	Effect on physical environment.	5.1
(1)	A written description of the regional landforms surrounding the proposed plant or wind energy site or through which the transmission facility will pass;	5.1.1
(2)	A topographic map of the plant, wind energy, or transmission site;	Appendix 5A
(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;	5.1.2
(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;	5.1.3
(5)	A description of the soil type at the plant, wind energy, or transmission site;	5.1.4, Appendices 5B and 12
(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;	5.1.4.6
(7)	Information on areas of seismic risks, subsidence potential and slope instability for the plant, wind energy, or transmission site; and	5.1.5
(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.	5.1.2
20:10:22:15	Hydrology.	5.2

RULE	DESCRIPTION	SECTION
(1)	A map drawn to scale of the plant, wind energy, or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility;	Appendix 5D, 5.2.1
(2)	Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects;	5.2.3
(3)	A map drawn to scale locating any known surface or groundwater supplies within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission;	5.2.2, 5.2.3, Appendix 5D
(4)	If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definition of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of groundwater;	N/A
(5)	A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; and	N/A
(6)	If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.	N/A
20:10:22:16	Effect on terrestrial ecosystems.	5.3
20:10:22:17	Effect of aquatic ecosystems.	5.4
20:10:22:18	Land use.	5.5
(1)	A map or maps drawn to scale of the plant, wind energy, or transmission site identifying existing land use;	Appendix 5C
(2)	Identification of the number of persons and homes which will be displaced by the location of the proposed facility;	5.5.2
(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	5.5.3
(4)	A general analysis of the effects of the proposed facility and associated facilities on land use and the planned measures to ameliorate adverse impacts.	5.5.5
20:10:22:19	Local land use controls.	5.5.3
20:10:22:20	Water quality.	5.6
20:10:22:21	Air quality.	5.7
20:10:22:22	Time schedule.	1.4
20:10:22:23	Community impact.	6.0
(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;	6.1, 6.2, 6.3
(2)	A forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions;	6.1.5, 6.1.6

RULE	DESCRIPTION	SECTION
(3)	A forecast of the impact on agricultural production and uses;	6.1.3
(4)	A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities;	6.5
(5)	A forecast of the impact on transportation facilities;	6.2.5
(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	6.4, 6.5.2, 6.5.4
(7)	An indication of means of ameliorating negative social impact of the facility development.	6.6
20:10:22:24	Employment estimates.	6.1.2
20:10:22:25	Future additions and modifications.	2.1.2
20:10:22:36	Additional information in application.	7.0
20:10:22:38	Gas or liquid transmission line description.	2.2
(1)	A flow diagram showing daily design capacity of the proposed transmission facility;	Figure 3
(2)	Changes in flow in the transmission facilities connected to the proposed facility;	Figure 3
(3)	Technical specifications of the pipe proposed to be installed, including the certified maximum operating pressure, expressed in terms of pounds per square inch gauge (psig);	2.2.1
(4)	A description of each new compressor station and the specific operating characteristics of each station; and	2.2.2
(5)	A description of all storage facilities associated with the proposed facility.	N/A
20:10:22:39	Testimony and exhibits.	7.3

1 Introduction

SCS Carbon Transport LLC (Applicant) hereby submits its application to the South Dakota Public Utilities Commission (SD PUC) for a permit under the South Dakota Energy Conversion and Transmission Facility Act, for the proposed South Dakota pipeline scope of the Midwest Carbon Express Project (MCE Project). The Applicant proposes to build and operate approximately 698 miles of carbon dioxide (CO_2) pipeline and associated facilities in South Dakota (Project) located in Beadle, Brookings, Brown, Clark, Codington, Davison, Edmunds, Grant, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Sanborn, Spink, Sully, Turner, and Union counties. The Project will capture and transport CO_2 extracted from the fermentation process from 15 ethanol plants (14 existing traditional ethanol plants and one ethanol plant associated with Gevo's proposed sustainable aviation fuel [SAF] facility[1]) in South Dakota, along with 42 other ethanol plants in adjacent states.

The MCE Project will be comprised of approximately 2,500 miles of pipeline that will transfer CO_2 from 57 partner ethanol plants located in Minnesota, Iowa, Nebraska, South Dakota, and North Dakota to the sequestration sites in North Dakota. The majority of the CO_2 volume will be transported to a sequestration area in North Dakota, where the CO_2 will be safely *and* permanently[2] *stored* more than a mile underground in saline formations utilizing separately permitted Class VI injection wells. Additionally, biogenic CO_2 from ethanol producers is highly sought after as a feedstock for production of next generation fuels such as eSAF and green methanol, as well as other industrial uses (e.g., water treatment, food processing, dry ice manufacturing). These type of industrial facilities require a consistent and reliable stream of CO_2, which only a pipeline infrastructure like the MCE Project can deliver at the necessary scale and dependability.

The Applicant's team is comprised of experienced professionals spanning all major aspects of project design, construction, and operation, with a track record of successfully delivering major projects. This experience and expertise ensure high standards in engineering design, safety, environmental compliance, project execution, and operation.

1.1 Project Purpose

The Applicant proposes to build the MCE Project to capture and transport up to 18.5 million metric tons per annum (MMTPA) of CO_2,which includes approximately 4.24 MMTPA of CO_2 that is currently contracted from the 15 partner plants in South Dakota. The Project would greatly benefit South Dakota's critical ethanol and agriculture industries, which are the largest contributors to South Dakota's annual gross domestic product (GDP). In 2023, agriculture also accounted for approximately 41% of the growth in South Dakota's GDP (U.S. Bureau of Economic Analysis, 2024), so enhancing the long-term economic sustainability of ethanol is vital to South Dakota's agricultural economy and GDP growth. Decision Innovation Solutions (DIS) conducted an analysis of the Project's economic impact on the state and determined the construction and operation of the Project would add $688.3 million and $86.4 million respectively to the State's GDP annually (**Appendix 23**).

[1] https://gevo.com/location/net-zero-1/

[2] In 2020, the U.S. Department of Energy (USDOE) released a report ("Safe Geologic Storage of Captured Carbon Dioxide: Two Decades of DOE's Carbon Storage R&D Program in Review") summarizing its research to date on CO_2 sequestration. "CCUS projects supported by USDOE and other organizations around the world, which in 2019 injected more than 25 million metric tons of CO_2, have shown no adverse impacts to human health or the environment. And no DOE supported project has observed migration of CO_2 outside of the intended storage reservoir or confining cap rock" (USDOE, 2020).

The Applicant's parent company, Summit Carbon Solutions, LLC, has long-term agreements with 57 partnering ethanol plants in the MCE Project's five-state footprint, including 15 ethanol plants in South Dakota. In aggregate, these plants currently produce approximately 5.7 billion gallons of ethanol annually with South Dakota facilities producing approximately 2 billion gallons annually (includes GEVO forecasted production). This production represents approximately 35% of the total United States (U.S.) 2023 annual production of approximately 16 billion gallons (Renewable Fuels Association N.D.). Utilizing the Project enables participating ethanol plants to reduce their carbon intensity (or carbon footprint) by approximately fifty percent (50%), putting them on the path towards producing a net-zero carbon fuel by 2030. Doing so allows the partnering ethanol plants to sell their product at a premium in the growing number of low carbon fuel markets in the U.S. and other countries that have adopted low carbon fuel standards and allows them access to emerging markets such as SAF.

In 2023, U.S. demand for aviation fuel was approximately 24 billion gallons, with global demand nearing 100 billion gallons. Despite this immense need, the U.S. currently produces just 15.8 million gallons of SAF annually (U.S. Government Accountability Office, 2023). Leading U.S. airlines like United, Delta, Southwest, and American, along with international carriers, have set ambitious targets to incorporate SAF into their fuel mix by 2030, aligning with the U.S. government's goal of producing 3 billion gallons of SAF by that same year. To meet these targets, the federal government, through the 45Z tax credit, mandates that SAF must achieve a carbon intensity (CI) score at least 50% lower than traditional jet fuel (American Carbon Alliance, n.d.). Carbon capture and sequestration (CCS) is the most effective and commercially viable solution to significantly reduce the carbon intensity of ethanol, enabling it to be used as a qualified SAF feedstock. Without CCS, ethanol-based jet fuel typically has a CI score of 65-70 (kgCO2e/mmBTU)[3], but with CCS, this can be lowered to around 38—making it eligible under the 45Z tax credit guidelines. Expanding SAF production from low carbon intensity ethanol will have a ripple effect across agriculture, benefiting farmers and the broader supply chain. By ensuring the economic sustainability of ethanol plants—the largest source of corn demand in South Dakota—this growth safeguards the future of ethanol and supports the agricultural community for the long term (DRGNews, 2024).

LanzaJet, Inc. began operation of the first ethanol-to-jet SAF production facility in the U.S. in early 2024[4]. The LanzaJet facility primarily utilizes low carbon intensity sugarcane-based ethanol manufactured in South America, which emphasizes the importance of CCS in the U.S. to enable U.S. based ethanol producers to compete with foreign manufacturers of low carbon intensity ethanol feedstock.

The Project will connect to Gevo's proposed Net-Zero 1 (NZ-1) facility in Lake Preston, which is expected to produce approximately 60 million gallons of SAF annually (GEVO, 2024). This SAF will be derived from roughly 38 million bushels of locally grown, sustainably sourced corn (GEVO, 2023). In 2023, South Dakota produced approximately 850 million bushels of corn, with around 475 million bushels—55% of the total—utilized by the Project's ethanol partners.

As corn yields and total production continue to rise annually, creating a sustainable market for South Dakota's farmers is crucial. The Project, as part of the larger MCE Project initiative, offers a critical CO_2 transportation solution that would otherwise be unavailable. Without it, South Dakota's ethanol plants would face a significant long-term disadvantage compared to those in states like North Dakota, Indiana,

[3] The CI score of 65-70kgCO2e/mmBTU was estimated using the latest version of the Argonne National Labs Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model.

[4] https://www.lanzajet.com/news-insights/lanzajet-celebrates-grand-opening-of-freedom-pines-fuels-plant-the-worlds-first-ethanol-to-sustainable-aviation-fuel-production-facility

and Illinois, where proven subsurface geologic storage formations exist—an essential infrastructure that South Dakota lacks (U.S. Geological Survey [USGS], 2013). By providing this infrastructure, the Project secures the future competitiveness of South Dakota's ethanol industry and ensures ongoing demand for the state's corn production.

The Project offers significant benefits not only to the ethanol industry but to the broader agricultural sector with which it partners. As the Applicant's 15 South Dakota ethanol partners earn more from producing low-carbon renewable fuel, it strengthens the economic stability and long-term viability of the entire ethanol industry. This, in turn, directly supports South Dakota's family farms, ethanol industry employees, service providers, and the state's economy as a whole. A healthy and stable ethanol industry provides farmers with a reliable market for their corn, reinforcing the value of South Dakota farmland.

Nationally, a near-record corn harvest of approximately 15.2 billion bushels is forecasted for 2024, while South Dakota's corn crop is expected to reach approximately 857 million bushels, an increase over 2023 (DRGNews, 2024). However, record corn production coupled with declining crop prices is squeezing margins and reducing farm incomes. Access to new and emerging markets, such as those created by the Project, is a vital opportunity to increase long-term demand and help counteract the trend of lower prices and declining farm values, ensuring greater economic resilience for South Dakota's agricultural community.

As a common carrier pipeline which will ship CO_2 on behalf of its ethanol producer partners, the Applicant has evaluated in coordination with such partners, the potential for CO_2 delivery points to facilitate utilization of CO_2 for production of green methanol and eSAF in South Dakota and surrounding states. Biogenic CO_2 from ethanol producers is highly sought after as a feedstock for production of these next generation fuels, and the MCE Project will contain and transport the world's largest supply of such CO_2. This represents a tremendous long-term opportunity for the state of South Dakota to be the development epicenter for new industries, which are poised for decades of growth. An affiliate of the Applicant has executed a Memorandum of Understanding with the developer of a green methanol production facility in South Dakota and is actively negotiating with several other developers pursuing projects in South Dakota and surrounding states. In addition to e-fuel opportunities, other industrial uses of CO_2 such as by water treatment are currently being evaluated. The viability of these CO_2 utilization projects depends on the success of the MCE Project.

In addition to these benefits, the Project will have a significant impact on the South Dakota economy that includes employment (approximately 1,086 jobs annually during construction and 260 jobs annually during operations), personal income (approximately $1.25 billion), GDP ($668.3 million annually during construction and $86.4 million annually during operations), and Gross Output ($171.8 million annually during construction and $224.3 million annually during operation) (**Appendix 23**). In addition, tax revenue during construction will contribute approximately $171.8 million over the construction period and $41.2 million annually during operations (**Appendix 23**). The Project will also contribute significant local property taxes (see Section 6.1.6 for discussion of tax benefits).

As governments and industries seek to reduce carbon emissions, a dramatic increase in CCS projects, as well as the associated pipelines, is crucial to achieving that goal (DOE, 2024; CEQ Report to Congress on CCUS, 2021; Energy Technology Perspectives, Special Report on CCUS, IEA, 2020).

Once operational, the MCE Project will provide the largest and single most meaningful technology-based reduction of carbon emissions in the world (Global CCS Institute, 2021). The MCE Project pipeline will be capable of moving up to 18.5 MMTPA of CO_2 for safe and permanent storage.

Finally, pipelines have proven to be the safest, most efficient, and most reliable form of transporting hazardous liquids (Pipeline and Hazardous Materials Safety Administration [PHMSA] Report to Congress, 2018; Bureau of Transportation Statistics, National Transportation Statistics, 2021). According to statistics compiled by the U.S. Department of Transportation (USDOT), pipelines are 99.99% reliable. Pipelines are heavily regulated and are subject to intense scrutiny and oversight.

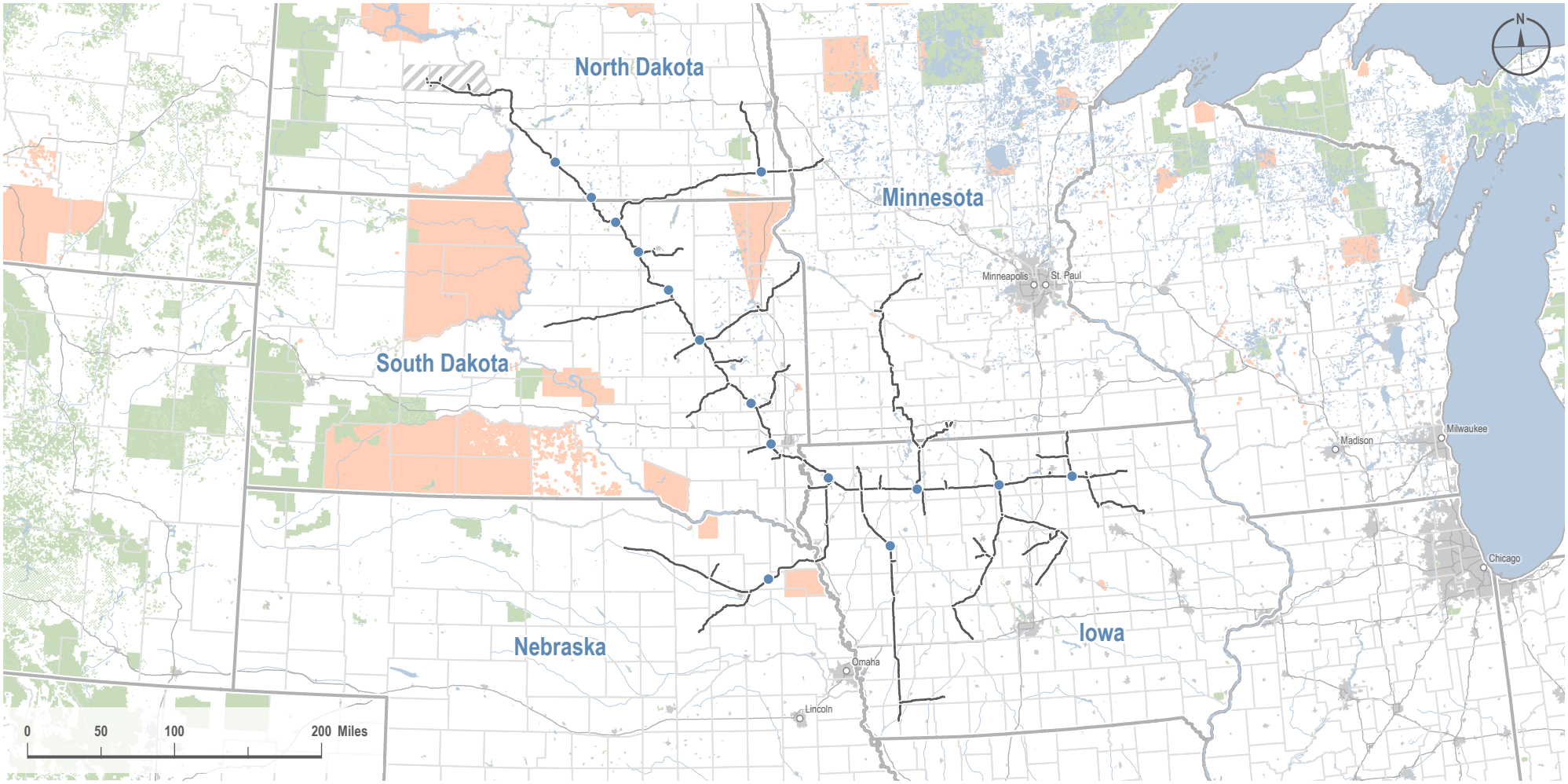
1.2 Project Overview and General Site Description

The complete MCE Project as proposed includes approximately 2,500 miles of pipelines for the transportation of CO_2 from 57 ethanol plants across its five-state footprint to North Dakota where the CO_2 will be safely and permanently sequestered (see **Figure 1**). Though all of the current agreements with the partnering ethanol plants are for the permanent sequestration of the CO_2, the MCE Project is designed to transport additional capacity beyond the current contractual agreements (up to 18.5 MMTPA) and the Applicant anticipates that in the future that a portion of the transported CO_2 will be utilized at locations along the pipeline route for industrial uses such as eSAF production. Only those portions of the MCE Project located in South Dakota (i.e., the Project), which include the pipelines, aboveground facilities (i.e., pump stations, launcher and receiver sites, mainline valve (MLV) sites), and the temporary and permanent access roads are covered by this application. This application does not cover the capture facilities located within the existing ethanol plant properties nor the sequestration facilities which will be located in Morton and Oliver counties, North Dakota and are under the jurisdiction of the North Dakota Industrial Commission (NDIC). This application also doesn't cover additional infrastructure that may be required to either connect to or establish a delivery facility for other industrial users, and if such facilities were to occur in South Dakota, then they would be permitted independently of this Project as necessary.

Within South Dakota, the Project, as proposed, includes approximately 698 miles of 6-inch to 24-inch nominal diameter carbon steel pipelines for transportation of CO_2 from 15 ethanol plants. The Project will cross Beadle, Brookings, Brown, Clark, Codington, Davison, Edmunds, Grant, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Sanborn, Spink, Sully, Turner, and Union counties across the eastern half of the state. The MCE Project enters South Dakota from Iowa at two locations, one in Lincoln County approximately 4.3 miles to the northeast of Canton, South Dakota, where the mainline (SDM-104) enters the state, and one lateral line (IAL-510) that enters in Union County, South Dakota, approximately 15 miles to the east of Beresford, South Dakota, and terminates at the POET Hudson Plant in Lincoln County, South Dakota. The MCE Project via a trunkline (NDT-211) also enters South Dakota from North Dakota in Brown County, South Dakota north of Elm Lake. The South Dakota mainline (NDM-106) exits South Dakota in McPherson County continuing into North Dakota to the proposed sequestration sites.

In South Dakota, the Project's pipelines will be installed at a minimum of four feet (top of pipe) below ground surface and will cross primarily agricultural lands, approximately 83% of the construction footprint (see Section 5.5.1 of the Application). The Project will cross roads, rivers, and other resources as they are encountered along the route. The Applicant will utilize construction workspace that is up to 110 feet wide (for 24-inch diameter pipe) and 100 feet wide (for 6- to 12-inch diameter pipe), plus additional temporary workspace (ATWS) as needed, to facilitate construction. The Applicant will obtain a 50-foot-wide permanent right-of-way (ROW) that is typically centered over the pipeline. The diagram below depicts the relationship between the pipeline, typical construction workspace, and permanent ROW for both the 100-foot construction ROW and 110-foot construction ROW.

PROJECT OVERVIEW MAP



VICINITY MAP

LEGEND

- Proposed Project Route (as of 2024-10-04)
- Pump Station
- City / Town
- State Boundary
- County Boundary
- Highway
- River / Stream
- Waterbody
- Urban Area
- Federal Land
- American Indian Reservation or Trust Land
- Sequestration Evaluation Area

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SUMMIT CARBON SOLUTIONS

REVISIONS

Date	Revised by	Checked by
2024-10-08	JC	GS

0 - Issued for SDPUC Application

Date	Revised by	Checked by

MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Project Overview Map

Figure Number:
Figure 1

Scale:
1 : 6,500,000
1 inch equals 102.59 miles

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14N

Sheet:
1
1 of 1

Drawing Number:
1002-06-35
Revision 0

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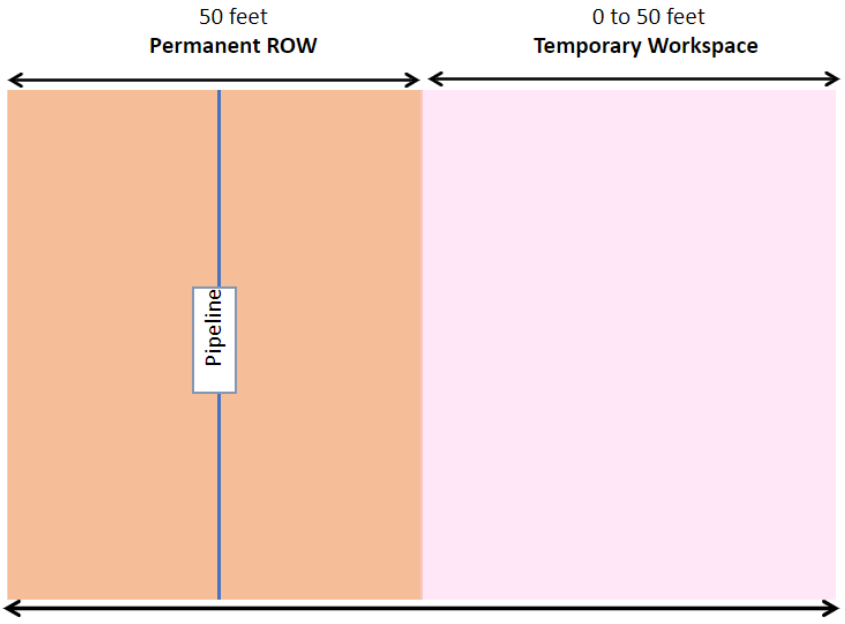
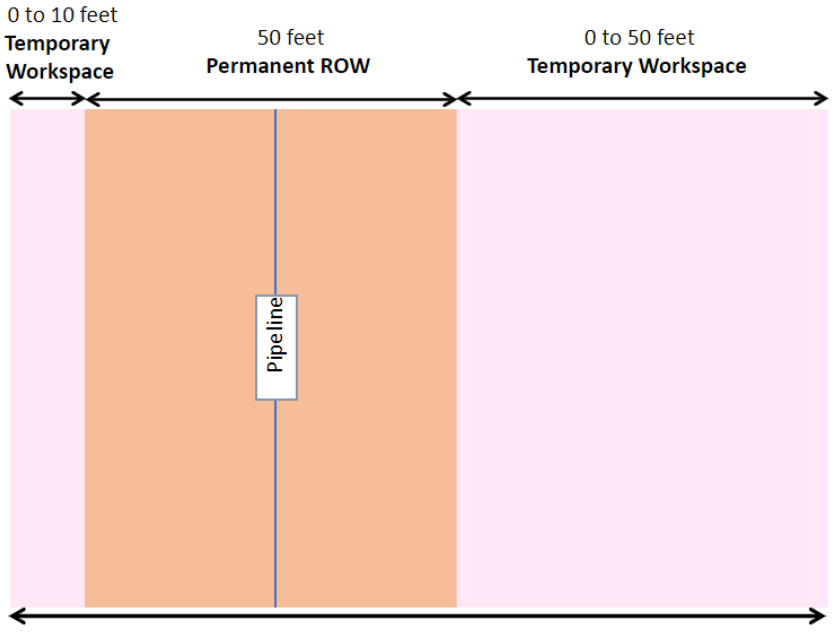


Typical 100-foot Construction Workspace



Typical 110-foot Construction Workspace

Following construction, land within the construction workspace will be restored to pre-construction conditions and will remain suitable for farming, pasture, and other activities, except at permanent aboveground facilities (i.e., MLV sites, launcher and receiver sites, and pump stations) and associated permanent access roads. Construction of permanent surface structures and tree planting over the permanent ROW will be restricted, but ranching and agricultural activities will be allowed to continue.

Associated facilities required to support the operation of the pipeline system will include:

- 6 pump stations;
- 120 MLVs;
- 15 maintenance/inspection tool launcher and receiver sites (launcher and receiver sites);
- an impressed current cathodic protection (ICCP) system and alternating current (AC) mitigation system (together, the ICCP and AC Systems) within the pipeline permanent ROW; and
- temporary and permanent access roads.

Aboveground facilities (i.e., pump stations, MLVs, launcher and receiver sites) will be fenced to facilitate safe operations and will not be physically accessible to the public. These sites will be designed and constructed to the smallest practical footprint necessary to minimize the permanent surface impacts while also ensuring safe operations. Section 2.2.1 provides additional detail regarding the specifications of the pipeline, and Sections 2.2.2, 2.2.3, and 2.2.5 discuss the aboveground facilities. The Project route and associated facilities are depicted in **Figure 2**.

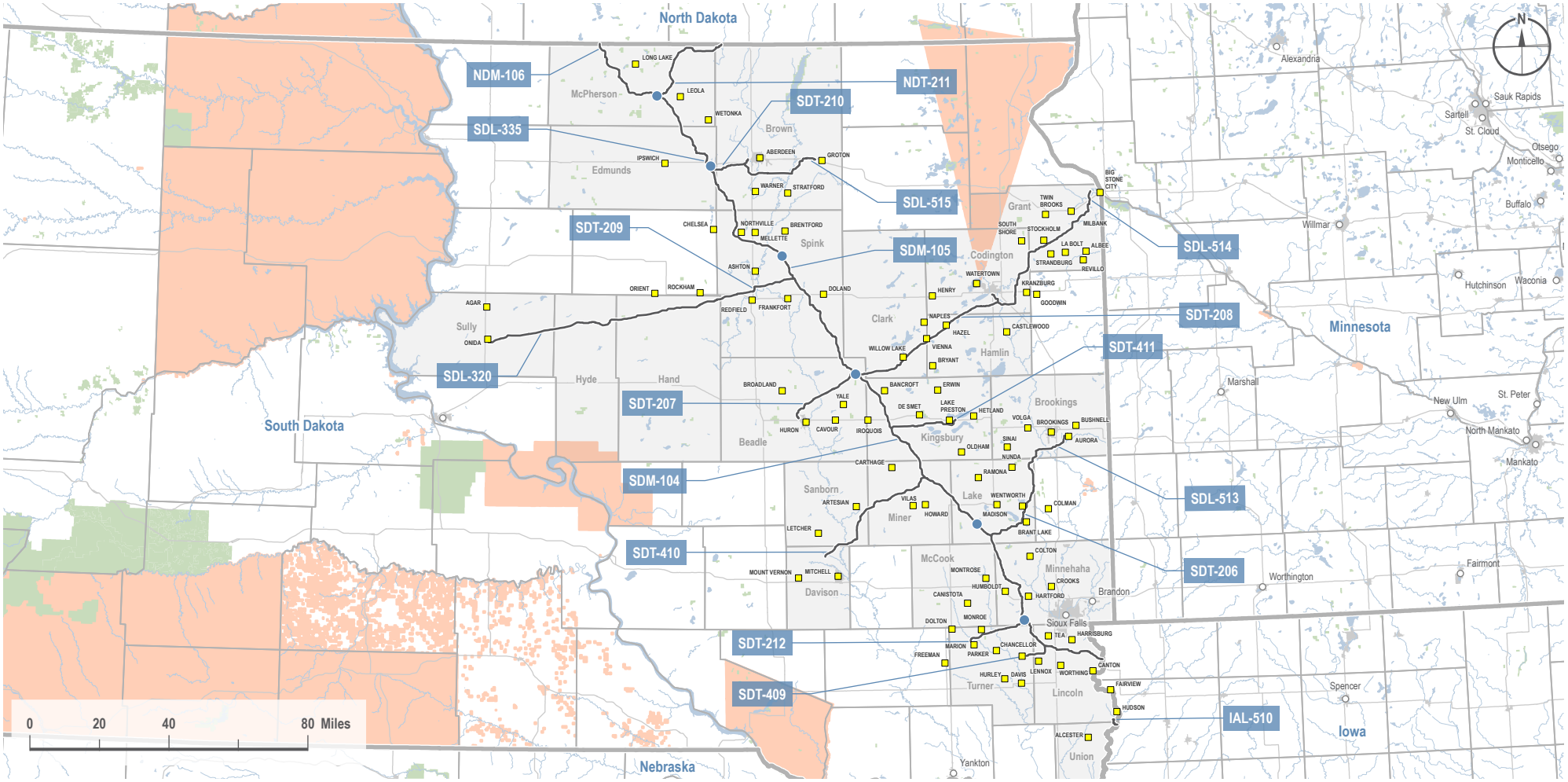
1.3 Estimated Capital Costs

The total estimated cost for the equipment and installation of the pipeline and pipeline facility scope of the Project (scope within the jurisdiction of the SD PUC as presented in this Application) is $1.35 billion. **Table 1** provides a breakdown of the estimated costs used to develop the total cost of the Project.

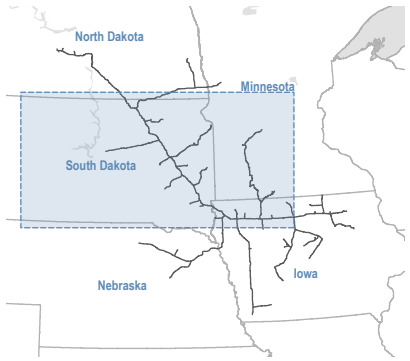
Table 1: Estimated Costs for Project Construction in South Dakota

Cost Type	Estimated Cost
Environment, Health, and Safety	$ 33,100,581
Construction Labor	$ 524,260,219
Construction Management and Inspection	$ 66,252,826
Contingency / Reserve	$ 111,693,637
Engineering	$ 14,185,460
Freight / Transportation	$ 31,100,000
Materials / Equipment	$ 253,420,169
Power and Automation	$ 20,400,000
Right-of-Way / Survey	$ 267,450,855
Tax	$ 29,700,000
Total	**$ 1,351,563,747**

PROJECT OVERVIEW MAP - SOUTH DAKOTA



VICINITY MAP



LEGEND

- Proposed Project Route (as of 2024-10-04)
- Populated Place within 10 miles of the Project
- Pump Station
- County Boundary
- State Boundary
- City / Town
- Urban Area
- Highway
- River / Stream
- Waterbody
- Federal Land
- American Indian Reservation or Trust Land

Pipeline Naming Convention
[State Abbreviation][Line Designation] - [Line Number]
(e.g. SDT-207)
-State Abbreviation: Iowa (IA), North Dakota (ND), South Dakota (SD)
-Line Designation: Lateral (L), Main (M), Trunk (T)
-Line Number: 3-digit series

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SUMMIT CARBON SOLUTIONS

REVISIONS

Date	Revised by	Checked by
2024-10-08	JC	GS

0 - Issued for SDPUC Application

Date	Revised by	Checked by

MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Project Overview Map
South Dakota

Figure Number:
Figure 2

Scale:
1 : 2,750,000
1 inch equals 43.4 miles

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14N

Sheet:
1
1 of 1

Drawing Number:
1002-06-036
Revision 0

Path: G:\Projects\TAL-21015451-00 - Summit Carbon - MCE Project\0800 GEO\10_Mapping\02 Overview\06 Regulatory\1002-06-036 SDPUC State Overview 1002-06-036 SDPUC State Overview.aprx

1.4 Project Schedule

The Applicant proposes to commence construction of the Project in South Dakota in the first quarter of 2026 and complete construction in 2027. Construction timing is contingent on receipt of required permits and authorizations. Construction in South Dakota will require all or portions of six construction spreads (i.e., Construction Spread 2, 3, 4, 7, 8, and 9). A drawing illustrating the construction spreads in South Dakota is provided in **Appendix 1**. The Applicant proposes to place its pipeline in service in 2027 which is consistent with the requirements of the shippers making the contractual commitments that underpin the MCE Project.

1.5 Project Participants

The permit Applicant is SCS Carbon Transport LLC, a limited liability company, organized under the laws of the State of Delaware, and owned by Summit Carbon Solutions, LLC, a limited liability company, organized under the laws of the State of Delaware. The Applicant's primary business address is 2321 N Loop Drive, Suite 221, Ames, Iowa 50010 (email: info@summitcarbon.com, phone number: 515-531-2635).

1.6 Individuals Authorized to Receive Communications

The following Project contact information includes those individuals authorized to receive communications relating to the application.

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1.7 Ownership and Management

The Applicant and owner of the Project is SCS Carbon Transport LLC (the Applicant), which is a subsidiary of Summit Carbon Solutions LLC. The Applicant will construct, own, and operate the Project. The Applicant and Project Chief Operating Officer is:

Mr. James Powell
Chief Operating Officer
SCS Carbon Transport LLC
2321 N Loop Drive, Suite 221
Ames, Iowa 50010
Ph: (515) 531-2603
Email: jpowell@summitcarbon.com

1.8 Other Required Permits and Approval

In addition to the siting permit under the *South Dakota Energy Conversion and Transmission Facility Act*, **Table 2** lists federal and state permits that the Applicant anticipates will be required for the construction and operation of the Project within South Dakota. Coordination is ongoing with the agencies identified below. The table also includes estimated timeframes for the formal submittal of applications, reports, requests for clearance, etc. Note that the U.S. Army Corps of Engineers (USACE) and the U.S. Fish and Wildlife Service (USFWS) are currently evaluating the Project as part of their ongoing permitting review of the larger MCE Project.

Table 2: Anticipated Permits or Reviews for the Project in South Dakota			
Agency	**Permit**	**Agency Action**	**Estimated Application Submittal Date**
Federal			
U.S. Army Corps of Engineers (USACE), Omaha District – South Dakota Regulatory Office	Sections 404 Clean Water Act for discharge of fill in water of the U.S. Nationwide Permit (NWP 58 "Utility Line Activities for Water and Other Substances"; Section 10 Rivers and Harbors Act Permit for crossing navigable waters of the U.S. Section 408 Review	Authorization of discharge of fill material into waters of the U.S. and structures crossing navigable waters Process request to make alterations to; or temporarily or permanently occupy or use, any USACE federally authorized Civil Works Project under 33 USC 408	Submitted October 2022 Addendum submitted March 2023 Addendum to be submitted 1st Quarter 2025 Submitted January 2022 USACE issued determination on May 24, 2023 – USACE determined the project will not result in alterations to, or temporarily or permanently occupy or use, any USACE federally authorized Civil Works project under 33 USC 408 (Section 408) within the Omaha District. The Missouri River crossings will not require Section 408 permission.
U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation – Endangered Species Act	Federally listed threatened and endangered species affect determination review and concurrence.	Biological Assessment to be submitted 1st Quarter 2025
State Historic Preservation Office (SHPO)	Section 106 Consultation – National Historic Preservation Act	Effects Determination and associated mitigation.	Ongoing; Submitted multiple field reports to SHPO; Concurrence with Section 106 issued with USACE NWP 58
Pipeline Hazardous Materials Safety Administration (PHMSA)	49 CFR Part 195	Integrity Management Plan and Emergency Response Plan (ERP)	Prior to operations (Draft ERP – **Appendix 9**)
U.S. Department of Agriculture – Farm Service Agency (FSA)	7 CFR Part 1410	Establishment of voluntary conservation easements through the Conservation Reserve Program (CRP)	No permit required; if an agreement is necessary with the FSA that oversees CRP, the Applicant will file for those approvals in 1st Quarter 2025, otherwise compensation to accommodate a landowner's obligations within the CRP will be made with the landowner.
Federal Highways Administration	Crossing Permit	Issuance of permits for the crossing of federally funded highways.	2nd Quarter 2025

Table 2: Anticipated Permits or Reviews for the Project in South Dakota			
Agency	**Permit**	**Agency Action**	**Estimated Application Submittal Date**
State			
South Dakota Department of Agriculture and Natural Resources	401 Water Quality Certification	Issuance of certification occurs with USACE NWP 58 issuance.	Issued with USACE NWP 58
	Surface Water Discharge General Permit for Temporary Discharge Activities and a Temporary Water Rights Use Permit (SDG070000)	Issuance of permit for hydrostatic test water discharge and construction dewatering to waters of the State, and Temporary Water Use Permit.	March 2025
	Surface Water Discharge General Permit for Stormwater Discharges Associated with Construction Activities Permit (SDR100000)	Issuance of permits for discharges associated with activity that causes land disturbance equal to or greater than one acre.	March 2025
	Standard Water Rights Permit	Review and make a recommendation for appropriation of water from a state jurisdictional waterbody during construction activities if authorization is not issued under the Temporary Water Rights Use Permit.	2nd Quarter 2025
South Dakota Department of Transportation	Application for Permit to Occupy Right-of-Way and Crossing Permits	Issuance of permits to occupy right-of-way and crossing state-owned highways.	2nd Quarter 2025
South Dakota Department of Game, Fish, and Parks	State Listed Species Review	Review and authorization.	Concurrent with USFWS review of Biological Assessment
Local			
County Road Departments	Crossing Permits	Issuance of permits for crossing county roads.	2nd Quarter 2025
	Road Haul Agreements	Negotiated agreements between counties and the Applicant.	2nd Quarter 2025
County and Local Authorities	Floodplain, Conditional Use, and building permits	Review and approval.	2nd Quarter 2025
	Municipal Water Use Agreements (if required)	Negotiated agreements between municipalities and the Applicant.	2nd Quarter 2025

Applicable local regulatory agencies will be contacted prior to any excavation, construction, and improvement activities to ensure the Project is compliant with requirements with agencies referenced in **Table 2**. The Applicant will apply for conditional use permits where applicable prior to construction.

In 2023, four counties (McPherson, Spink, Brown, and Minnehaha) passed ordinances restricting the siting of an interstate, common carrier pipeline, transporting a commodity (CO_2) that is heavily regulated by the federal government's PHMSA which is part of the USDOT. Two additional counties (Edmunds and Sanborn) passed similar ordinances in 2024. **Table 3** lists the six county ordinances and key aspects that prohibit Summit's ability to route a pipeline that's compliant with ordinances and other restrictions (avoidance areas). **Appendix 25** depicts the proposed route in each of these six counties and the corresponding restrictive areas as defined by each county's ordinance.

Local zoning and land use regulations have their place and are often beneficial to ensure economic development does not unsafely encroach on industrial areas including infrastructure corridors, but when it comes to interstate pipeline projects like the Applicant's proposed Project that crosses 23 counties in South Dakota, the South Dakota Legislature empowered the SD PUC with siting jurisdiction of CO_2 pipelines.

Pipeline routing is an iterative process, requiring that the Applicant consider many factors, including the location of grasslands, high consequence areas, environmentally sensitive areas, the location of wildlife habitat and the presence of threatened or endangered species, cultural resources, parks, cemeteries, water wells, and occupied residences, to name a few. In addition, a pipeline route best mitigates impacts, all things being equal, by traversing the shortest possible distance and affecting the fewest possible landowners. In addition, the Applicant has already obtained many voluntary easements for the pipeline route determined as part of its previous application. The Applicant also considered these easements in its current routing process. The county ordinances at issue are an additional factor, but not the only factor, that the Applicant has considered in routing the proposed pipeline.

With respect to setback as is customary with PHMSA regulated interstate transmission pipeline projects, the Applicant's routing process is compliant with the federal setback requirements set forth in 49 Code of Federal Regulations (CFR) Part 195.210 (referenced below) and as a basis, conservatively employed more stringent setback distances, with the closest residence at 353 feet from the pipeline and the overwhelming majority of residences and businesses at more than 500 feet from the pipeline.

49 CFR Part 195.210 Pipeline location.

(a) Pipeline right-of-way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly.

(b) No pipeline may be located within 50 feet (15 meters) of any private dwelling, or any industrial building or place of public assembly in which persons work, congregate, or assemble, unless it is provided with at least 12 inches (305 millimeters) of cover in addition to that prescribed in 49 CFR Part 195.248.

Table 3: Setback Requirements of County Ordinances Enacted by Brown, Edmunds, Minnehaha, McPherson, Sanborn, and Spink Counties				
County	**Ordinance**	**Date Ordinance Enacted**	**Ordinance Requirements[1]**	**Impacts of Ordinance**
Brown	Ordinance #243	April 25, 2023	**Setback:** A Pipeline Facility shall be setback a minimum of 1500 feet from the following "*cautionary uses*" (*when used in this section*) of schools, daycares, churches, residential dwelling, or any structure that has residential living quarters within. **134.** The setback distance shall be measured from the center line of the proposed pipeline to the closest measurement of a parcel property line of the "*cautionary uses*" above. i. A property owner may decide to sign a *setback waiver* to the minimum setback distance required from the piping to their property line and submit a proposed *setback waiver* to the Zoning BOA. ii. The Zoning BOA may approve or deny each individual submittal of a *setback waiver* based on project location, area, size, and the properties use. iii. If an overall pipeline facility project is approved, any *setback waiver* submitted through Zoning BOA must be filed at the Register of Deeds Office by the owner, towards each individual parcel's legal description for a *setback waiver* to be approved, final and permanent. B. The Zoning BOA may reduce minimum setbacks of a pipeline facility after a review of setback waivers and submission of project plans to the Zoning BOA ***in conjunction with an application for*** a conditional use permit.	Preclude any pipeline, along any route, to access the Glacial Lakes Aberdeen Ethanol Plant without securing multiple waivers (**See Appendix 25**). Waivers would be required from landowners whose property is not crossed by the pipeline. Preclude any pipeline, along any route, from extending from the Glacial Lakes Aberdeen Ethanol Plant to the POET Groton Ethanol Plant without securing multiple waivers (**See Appendix 25**). To be compliant with the ordinance, the Applicant would need to secure 51 setback waivers. If the Applicant is able to secure a setback waiver from a cooperating landowner, the validity of the waiver is at the discretion of the Zoning BOA, which results in undue uncertainty.

Table 3: Setback Requirements of County Ordinances Enacted by Brown, Edmunds, Minnehaha, McPherson, Sanborn, and Spink Counties				
County	**Ordinance**	**Date Ordinance Enacted**	**Ordinance Requirements[1]**	**Impacts of Ordinance**
Edmunds	Ordinance 2024-3-1	May 7, 2024	**Setbacks:** ▪ ½ mile from schools, daycares, churches, residential dwellings, or any structure with residential living quarters, or any livestock facilities. ▪ 1 mile from county-designated High Consequence Areas. ▪ 500 feet from wells, which are not located or adjoining any of the structures or areas listed hereinbefore. **County Defined High Consequence Areas:** All municipalities as defined by SDCL 9-2-1, lakefront residents, and town districts. The developer may apply for a reduction of the minimum setback, in the form of a setback waiver or setback variance which must be secured by the Applicant from the landowner. No setback waiver or setback variance allowed for High Consequence Areas.	Preclude any pipeline, along any route, to access the Glacial Lakes Mina Ethanol Plant without securing multiple waivers (**See Appendix 25**). For the current route to be compliant, the Applicant would need to get multiple setback waivers or setback variances approved which is at the discretion of the County, which results in undue uncertainty. To be compliant with the ordinance, the Applicant would need to secure 12 setback waivers from landowners.
Minnehaha	Ordinance MC16-179-23	June 6, 2023	Requires filing an application with the County within 30-days of submitting and application with the SD PUC. Multiple application requirements in the ordinance, and county application is required to allow the county to determine if the transmission pipeline has complied with the conditions of the ordinance.	Theoretically, an ordinance compliant route could be developed, but the route abandons a high percentage of landowners that have executed easements with the Applicant and reroute onto landowners who may not support the Project. Such a reroute would cost the

Table 3: Setback Requirements of County Ordinances Enacted by Brown, Edmunds, Minnehaha, McPherson, Sanborn, and Spink Counties				
County	**Ordinance**	**Date Ordinance Enacted**	**Ordinance Requirements[1]**	**Impacts of Ordinance**
			Setbacks: ▪ 330 feet from property lines of dwellings, churches, and businesses. ▪ 1,000 feet from public parks and schools ▪ 1 mile from municipal boundaries with a population of 5,000 or more. ▪ ¾ mile from municipal boundaries with a population between 500 and 5,000. ▪ ½ mile from municipal boundaries with a population of fewer than 500. A landowner may grant a waiver of the minimum setback distance	Applicant millions of dollars expended on abandoned easements (See **Appendix 25).** To be compliant with the ordinance, the Applicant would need to secure 30 setback waivers from landowners.
McPherson	Ordinance 23-1	September 14, 2023	Setbacks: ▪ 1-mile setback from any occupied dwelling, mobile home, or manufactured home. ▪ The pipeline must not pass within 500 feet of any adjoining property line of a non-participating landowner. ▪ The pipeline must not pass within 1,000 feet of any water well documented with the South Dakota Department of Natural Resources Water Well Completion Reports. Depth of cover – at least 6 feet from the ground surface to the top of pipe.	Preclude any pipeline, along any route, from connecting to NDM-106 route in North Dakota that has been permitted by the ND Public Service Commission (PSC) without securing multiple waivers (**See Appendix 25**). Preclude the current siting of pump station MPS-09 and precludes any pipeline, along any route, from connecting to MPS-09 without securing multiple waivers (**See Appendix 25**). Preclude any pipeline, along any route, from connecting from MPS-09 to NDT-211 route in North Dakota that has been permitted by the ND

Table 3: Setback Requirements of County Ordinances Enacted by Brown, Edmunds, Minnehaha, McPherson, Sanborn, and Spink Counties				
County	**Ordinance**	**Date Ordinance Enacted**	**Ordinance Requirements[1]**	**Impacts of Ordinance**
			Pump stations and any related facilities must be located at least one thousand (1,000) feet from any public right of way and at least five hundred (500) feet from any property line. A landowner may grant a waiver of the minimum setback distance (pipeline and pump station)	PSC without securing multiple waivers (**See Appendix 25**). To be compliant with the ordinance, the Applicant would need to secure 49 setback waivers from landowners.
Sanborn	Ordinance 2024-15	July 2, 2024	**Setbacks:** ▪ 1,500 feet from dwellings, churches, businesses, public parks, and schools. ▪ 1,500 feet from cities, towns, and unincorporated areas. ▪ 1,500 feet from animal confinement facilities no less than 999 animals A landowner may grant a waiver of the minimum setback distance	Project would be required to secure two waivers to comply with the ordinance. Both waivers would be with landowners that are supportive of the Project.
Spink	Title 17.29-2023	August 8, 2023	**Setbacks:** ▪ ½ mile from schools, daycares, churches, residential dwellings, livestock facilities, or any structure with residential living quarters. Distance measure from pipeline centerline to closest measurement of a parcel's property line	Preclude any pipeline, along any route, to access the Redfield Energy Ethanol Plant without securing multiple waivers (**See Appendix 25**). Preclude any pipeline, along any route, traversing the county from the north to south borders or from east to west borders without securing multiple waivers. (**See Appendix 25**).

Table 3: Setback Requirements of County Ordinances Enacted by Brown, Edmunds, Minnehaha, McPherson, Sanborn, and Spink Counties				
County	**Ordinance**	**Date Ordinance Enacted**	**Ordinance Requirements[1]**	**Impacts of Ordinance**
			▪ 2-mile setback from the property lines of county-designated High Consequence Areas. **County Defined High Consequence Areas:** Structures containing 10 or more persons with limited mobility (e.g., nursing homes and hospitals). Structures with permitted occupancies of 100 or more persons (e.g., schools, churches, shopping, and entertainment facilities). File for Conditional Use Permit – setbacks/waiver are component of the CUP	To be compliant with the ordinance, the Applicant would need to secure 73 setback waivers from landowners.

Note:

[1] There are additional ordinance requirements that are not listed in this table. The table focuses on the setback requirements.

County ordinances referenced above in **Table 3** are dissimilar and include varying setback requirements, definitions of a high consequence area that deviate from federal regulations, and some require approval of a Conditional Use Permit (CUP) which is at the sole discretion of county officials. As applied to the proposed route, some of these ordinances may be unduly restrictive within the context of other siting considerations. The county's purpose in enacting the setbacks must also be considered, for example, safety, protecting economic development, or protecting agricultural practices and uses. To the extent that the purpose is to safety driven, whether the ordinance is unduly restrictive must be considered in the context of existing proven safety technology, the documented safety performance of existing regulated pipelines, and plume dispersion analysis to determine whether the setback distances are unduly restrictive. Whether the setback distances are based on evidence related to the purpose of the restriction should also be considered.

As is evident from the political processes that resulted in the enactment of these ordinances, they were enacted with not all pipelines in mind, but appear to target CO_2 pipelines. While a county may exercise zoning authority to protect life and property, the Commission should consider the restrictions imposed by any given ordinance have the effect of precluding the Applicant from routing the pipeline through the county. And to the extent that the ordinances are not uniform, the Applicant's ability to route from one county to the next, and to the ethanol plants intended to be served by the pipeline, is relevant.

The Applicant has considered these ordinances in its routing process and has worked with each county in an effort to route the pipeline. In some cases, consideration of all of the routing factors mentioned above makes it infeasible to route the pipeline through the county without violating some of the setback distances. To the extent that the applicable county ordinance provides for a waiver process, the Applicant will attempt to secure necessary waivers. To the extent that waivers cannot be obtained, the Applicant asks the Commission to exercise its statutory authority under SDCL 49-41B-28 to supersede and preempt the county ordinances in part, meaning to the extent that the ordinance is unduly restrictive with respect to the routing in particular locations.

In September 2023, the Applicant heard the SD PUC's challenge to attempt to work with the four counties that had enacted ordinances at that time to chart a path through each respective county. Over the last 14-months, the Applicant has attended and presented at numerous county commissioner meetings, to date has conducted 40 meetings with emergency managers (EMs) and first responders (**Table 40**), conducted seven safety meetings open to the public (see Section 6.5.2), and met with other county stakeholders (mayors, economic development leaders, first responders, business owners, etc.). Additionally, the Applicant met with planning and zoning personnel and the county commissioners to explore the options of working together to develop ordinance that would acknowledge that routing involves all of the factors mentioned above and in some cases the required setbacks are counterproductive.

Equally important, the Applicant has met with hundreds of landowners to listen to and address their concerns. Although the Applicant's current pipeline route as depicted and referenced in this Application is not fully compliant with county ordinances (**Table 3**), the current pipeline route has support from affected landowners in every county and especially in counties that enacted ordinances. The route offered herein is fully compliant with federal requirements, increased the setback distance where possible, and complies with ordinance requirements to the extent practical. No route could be constructed which is fully compliant with all enacted county ordinances. And should the Applicant comply where possible, the Applicant would have no leverage to obtain waivers and ultimately, granted waivers are at the discretion of the permitting entity. Routes compliant to the extent possible would be significantly longer and involve more landowners, and require the Project to abandon 3 of the 15 South Dakota ethanol plants and their markets.

The Project is designed to meet or exceed state and federal safety requirements and, at a minimum, will be designed in accordance with 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline. The Applicant will comply with federal Emergency Response requirements set forth in 49 CFR Part 195.402(e); a draft Emergency Response Plan (ERP) is provided in **Appendix 9.** The draft ERP will be finalized prior to placing the Project in service and shared with County EMs of the counties crossed by the Project. The Applicant's personnel will be trained in the emergency response procedures and will coordinate with local first responders utilizing tabletop exercises to ensure preparedness prior to operations. See Section 6.5.2 for additional details regarding public safety regulations.

The Applicant will negotiate road haul agreements with counties impacted by construction use and assume responsibility for restoring all impacted roads to pre-construction or better condition. The Applicant will secure aa construction bond with the State to cover the potential impacts to public roads.

2 Project Description

2.1 Nature of Proposed Project

2.1.1 Facility Description Overview

The Project will include approximately 698 miles of pipelines (mainline, trunklines, and laterals) in South Dakota as well as 6 pump stations, 120 MLVs, 15 launcher and receiver sites, and 15.9 miles of temporary and permanent access roads (see **Table 4**).

Table 4: Project Facilities in South Dakota

ID	Facility Type	Length (Miles)	Nominal Diameter (Inches)	County	Beginning Milepost	End Milepost	Associated Pipeline
Pipelines							
IAL-510	Lateral	1.42	6	Lincoln	0.00	1.42	-
IAL-510	Lateral	1.53	6	Union	1.42	2.96	-
NDM-106	Mainline	27.74	24	McPherson	0.00	27.74	-
NDT-211	Trunkline	2.04	12	Brown	89.77	91.81	-
NDT-211	Trunkline	28.41	12	McPherson	91.81	120.22	-
SDL-320	Lateral	19.80	6	Sully	0.00	19.80	-
SDL-320	Lateral	19.46	6	Hyde	19.80	39.25	-
SDL-320	Lateral	31.34	6	Hand	39.25	70.59	-
SDL-320	Lateral	10.91	6	Spink	70.59	81.51	-
SDL-335	Lateral	0.44	6	Edmunds	0.00	0.44	-
SDL-513	Lateral	14.80	6	Brookings	0.00	14.80	-
SDL-513	Lateral	17.89	6	Lake	14.80	32.69	-
SDL-514	Lateral	29.05	6	Grant	0.00	29.05	-
SDL-514	Lateral	22.85	6	Codington	29.05	51.91	-
SDL-515	Lateral	25.93	6	Brown	0.00	25.93	-
SDM-104	Mainline	23.84	24	Lincoln	27.14	50.98	-

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
SDM-104	Mainline	3.43	24	Turner	50.98	54.42	-
SDM-104	Mainline	27.62	24	Minnehaha	54.42	82.04	-
SDM-104	Mainline	2.24	24	McCook	82.04	84.28	-
SDM-104	Mainline	18.92	24	Lake	84.28	103.20	-
SDM-104	Mainline	15.43	24	Miner	103.20	118.63	-
SDM-104	Mainline	29.85	24	Kingsbury	118.63	148.49	-
SDM-104	Mainline	4.15	24	Beadle	148.49	152.64	-
SDM-105	Mainline	7.41	24	Beadle	0.00	7.41	-
SDM-105	Mainline	60.41	24	Spink	7.41	67.82	-
SDM-105	Mainline	10.63	24	Brown	67.82	78.46	-
SDM-105	Mainline	22.90	24	Edmunds	78.46	101.36	-
SDM-105	Mainline	12.42	24	McPherson	101.36	113.78	-
SDT-206	Trunkline	14.50	6	Lake	0.00	14.50	-
SDT-207	Trunkline	23.78	6	Beadle	0.00	23.78	-
SDT-208	Trunkline	14.21	8	Codington	0.00	14.21	-
SDT-208	Trunkline	13.20	8	Hamlin	14.21	27.41	-
SDT-208	Trunkline	22.00	8	Clark	27.41	49.41	-
SDT-208	Trunkline	2.54	8	Beadle	49.41	51.95	-
SDT-209	Trunkline	12.65	8	Spink	0.00	12.65	-
SDT-210	Trunkline	10.58	6	Brown	0.00	10.58	-
SDT-210	Trunkline	2.61	6	Edmunds	10.58	13.19	-
SDT-212	Trunkline	15.15	6	Turner	0.00	15.15	-
SDT-212	Trunkline	2.95	6	Minnehaha	15.15	18.10	-
SDT-409	Trunkline	1.99	6	Turner	0.00	1.99	-
SDT-409	Trunkline	5.93	6	Lincoln	1.99	7.92	-
SDT-410	Trunkline	5.51	8	Davison	0.00	5.51	-
SDT-410	Trunkline	16.33	8	Sanborn	5.51	21.84	-
SDT-410	Trunkline	20.60	8	Miner	21.84	42.44	-
SDT-411	Trunkline	20.55	6	Kingsbury	0.00	20.55	-
Pump Stations							
MPS-04	Pump Station	-	-	Minnehaha	56.86	56.86	SDM-104

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
MPS-05	Pump Station	-	-	Lake	91.75	91.75	SDM-104
MPS-06	Pump Station	-	-	Beadle	0.04	0.04	SDM-105
MPS-07	Pump Station	-	-	Spink	44.31	44.31	SDM-105
MPS-08	Pump Station	-	-	Edmunds	84.50	84.50	SDM-105
MPS-09	Pump Station	-	-	McPherson	113.77	113.77	SDM-105
Mainline Valves (MLV)							
MLV-510-01*	MLV	-	-	Lincoln	0.00	0.00	IAL-510
MLV-510-02	MLV	-	-	Union	1.45	1.45	IAL-510
MLV-106-01*	MLV	-	-	McPherson	0.04	0.04	NDM-106
MLV-106-02-A	MLV	-	-	McPherson	8.95	8.95	NDM-106
MLV-106-02-B	MLV	-	-	McPherson	20.13	20.13	NDM-106
MLV-211-09	MLV	-	-	Brown	90.70	90.70	NDT-211
MLV-211-09-A	MLV	-	-	McPherson	106.49	106.49	NDT-211
MLV-211-09-B	MLV	-	-	McPherson	116.45	116.45	NDT-211
MLV-211-10*	MLV	-	-	McPherson	120.17	120.17	NDT-211
MLV-320-01*	MLV	-	-	Sully	0.00	0.00	SDL-320
MLV-320-01-A	MLV	-	-	Sully	3.59	3.59	SDL-320
MLV-320-02	MLV	-	-	Hyde	22.89	22.89	SDL-320
MLV-320-02-A	MLV	-	-	Hyde	35.47	35.47	SDL-320
MLV-320-03	MLV	-	-	Hand	43.28	43.28	SDL-320
MLV-320-04	MLV	-	-	Hand	61.98	61.98	SDL-320
MLV-320-05*	MLV	-	-	Spink	81.51	81.51	SDL-320
MLV-335-01*	MLV	-	-	Edmunds	0.00	0.00	SDL-335
MLV-335-02*	MLV	-	-	Edmunds	0.41	0.41	SDL-335
MLV-513-01*	MLV	-	-	Brookings	0.00	0.00	SDL-513
MLV-513-02	MLV	-	-	Brookings	4.13	4.13	SDL-513
MLV-513-03	MLV	-	-	Brookings	7.53	7.53	SDL-513
MLV-513-04	MLV	-	-	Brookings	9.51	9.51	SDL-513
MLV-513-05	MLV	-	-	Brookings	10.55	10.55	SDL-513

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
MLV-513-06	MLV	-	-	Lake	18.50	18.50	SDL-513
MLV-513-07	MLV	-	-	Lake	28.42	28.42	SDL-513
MLV-513-08	MLV	-	-	Lake	32.65	32.65	SDL-513
MLV-514-01*	MLV	-	-	Grant	0.00	0.00	SDL-514
MLV-514-02	MLV	-	-	Grant	2.35	2.35	SDL-514
MLV-514-03	MLV	-	-	Grant	3.44	3.44	SDL-514
MLV-514-04	MLV	-	-	Grant	4.47	4.47	SDL-514
MLV-514-05	MLV	-	-	Grant	19.89	19.89	SDL-514
MLV-514-06	MLV	-	-	Codington	32.60	32.60	SDL-514
MLV-514-07	MLV	-	-	Codington	40.65	40.65	SDL-514
MLV-514-08	MLV	-	-	Codington	49.03	49.03	SDL-514
MLV-514-09*	MLV	-	-	Codington	51.89	51.89	SDL-514
MLV-515-01*	MLV	-	-	Brown	0.00	0.00	SDL-515
MLV-515-02	MLV	-	-	Brown	9.80	9.80	SDL-515
MLV-515-03	MLV	-	-	Brown	11.46	11.46	SDL-515
MLV-515-04	MLV	-	-	Brown	19.55	19.55	SDL-515
MLV-515-05	MLV	-	-	Brown	21.63	21.63	SDL-515
MLV-515-06*	MLV	-	-	Brown	25.93	25.93	SDL-515
MLV-104-06	MLV	-	-	Lincoln	27.40	27.40	SDM-104
MLV-104-06-A	MLV	-	-	Lincoln	30.88	30.88	SDM-104
MLV-104-06-B	MLV	-	-	Lincoln	39.02	39.02	SDM-104
MLV-104-07*	MLV	-	-	Lincoln	45.51	45.51	SDM-104
MLV-104-07-A	MLV	-	-	Lincoln	50.96	50.96	SDM-104
MLV-104-08-A*	MLV	-	-	Minnehaha	56.89	56.89	SDM-104
MLV-104-08-B	MLV	-	-	Minnehaha	63.00	63.00	SDM-104
MLV-104-08	MLV	-	-	Minnehaha	70.40	70.40	SDM-104
MLV-104-09*	MLV	-	-	Lake	86.38	86.38	SDM-104
MLV-104-09-C*	MLV	-	-	Lake	91.69	91.69	SDM-104
MLV-104-09-D*	MLV	-	-	Lake	91.78	91.78	SDM-104
MLV-104-09-A	MLV	-	-	Lake	95.22	95.22	SDM-104
MLV-104-09-B	MLV	-	-	Lake	102.39	102.39	SDM-104
MLV-104-10-B*	MLV	-	-	Miner	113.12	113.12	SDM-104

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
MLV-104-11	MLV	-	-	Kingsbury	119.77	119.77	SDM-104
MLV-104-11-A*	MLV	-	-	Kingsbury	132.18	132.18	SDM-104
MLV-104-11-B*	MLV	-	-	Beadle	151.99	151.99	SDM-104
MLV-104-12*	MLV	-	-	Beadle	152.59	152.59	SDM-104
MLV-105-13*	MLV	-	-	Beadle	0.06	0.06	SDM-105
MLV-105-01-C	MLV	-	-	Spink	8.45	8.45	SDM-105
MLV-105-01	MLV	-	-	Spink	18.92	18.92	SDM-105
MLV-105-01-B	MLV	-	-	Spink	27.91	27.91	SDM-105
MLV-105-10*	MLV	-	-	Spink	36.40	36.40	SDM-105
MLV-105-01-A*	MLV	-	-	Spink	36.43	36.43	SDM-105
MLV-105-02-A*	MLV	-	-	Spink	44.30	44.30	SDM-105
MLV-105-02-B*	MLV	-	-	Spink	44.31	44.31	SDM-105
MLV-105-03	MLV	-	-	Spink	48.79	48.79	SDM-105
MLV-105-04	MLV	-	-	Spink	50.95	50.95	SDM-105
MLV-105-04-A	MLV	-	-	Spink	57.38	57.38	SDM-105
MLV-105-04-B	MLV	-	-	Spink	60.44	60.44	SDM-105
MLV-105-04-C	MLV	-	-	Spink	63.89	63.89	SDM-105
MLV-105-05	MLV	-	-	Brown	78.43	78.43	SDM-105
MLV-105-06*	MLV	-	-	Edmunds	84.52	84.52	SDM-105
MLV-105-07*	MLV	-	-	Edmunds	86.53	86.53	SDM-105
MLV-105-08	MLV	-	-	Edmunds	93.18	93.18	SDM-105
MLV-105-08-A	MLV	-	-	McPherson	105.99	105.99	SDM-105
MLV-105-09*	MLV	-	-	McPherson	113.74	113.74	SDM-105
MLV-206-01*	MLV	-	-	Lake	0.00	0.00	SDT-206
MLV-206-02	MLV	-	-	Lake	2.94	2.94	SDT-206
MLV-206-03	MLV	-	-	Lake	4.64	4.64	SDT-206
MLV-206-03-A	MLV	-	-	Lake	7.18	7.18	SDT-206
MLV-206-04*	MLV	-	-	Lake	14.49	14.49	SDT-206
MLV-207-01*	MLV	-	-	Beadle	0.00	0.00	SDT-207
MLV-207-01-A	MLV	-	-	Beadle	3.92	3.92	SDT-207
MLV-207-02	MLV	-	-	Beadle	8.95	8.95	SDT-207
MLV-207-03	MLV	-	-	Beadle	12.84	12.84	SDT-207

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
MLV-207-04*	MLV	-	-	Beadle	23.74	23.74	SDT-207
MLV-208-01*	MLV	-	-	Codington	0.00	0.00	SDT-208
MLV-208-01-C	MLV	-	-	Codington	9.91	9.91	SDT-208
MLV-208-01-A	MLV	-	-	Hamlin	14.75	14.75	SDT-208
MLV-208-01-B	MLV	-	-	Hamlin	22.52	22.52	SDT-208
MLV-208-02	MLV	-	-	Hamlin	26.82	26.82	SDT-208
MLV-208-02-A	MLV	-	-	Clark	28.88	28.88	SDT-208
MLV-208-02-B	MLV	-	-	Clark	32.55	32.55	SDT-208
MLV-208-03-A	MLV	-	-	Clark	40.47	40.47	SDT-208
MLV-208-03	MLV	-	-	Clark	42.19	42.19	SDT-208
MLV-208-04*	MLV	-	-	Beadle	51.93	51.93	SDT-208
MLV-209-01*	MLV	-	-	Spink	0.02	0.02	SDT-209
MLV-209-02	MLV	-	-	Spink	2.22	2.22	SDT-209
MLV-209-03*	MLV	-	-	Spink	12.64	12.64	SDT-209
MLV-210-01*	MLV	-	-	Brown	0.00	0.00	SDT-210
MLV-210-03*	MLV	-	-	Brown	1.80	1.80	SDT-210
MLV-210-01-A	MLV	-	-	Brown	6.86	6.86	SDT-210
MLV-210-02*	MLV	-	-	Edmunds	13.18	13.18	SDT-210
MLV-212-01*	MLV	-	-	Turner	0.00	0.00	SDT-212
MLV-212-02	MLV	-	-	Turner	8.19	8.19	SDT-212
MLV-212-03	MLV	-	-	Turner	10.32	10.32	SDT-212
MLV-212-04*	MLV	-	-	Minnehaha	18.03	18.03	SDT-212
MLV-409-01*	MLV	-	-	Turner	0.00	0.00	SDT-409
MLV-409-02*	MLV	-	-	Lincoln	7.90	7.90	SDT-409
MLV-410-01*	MLV	-	-	Davison	0.00	0.00	SDT-410
MLV-410-02	MLV	-	-	Sanborn	6.42	6.42	SDT-410
MLV-410-03	MLV	-	-	Sanborn	8.57	8.57	SDT-410
MLV-410-04	MLV	-	-	Miner	28.03	28.03	SDT-410
MLV-410-05*	MLV	-	-	Miner	42.43	42.43	SDT-410
MLV-411-01*	MLV	-	-	Kingsbury	0.00	0.00	SDT-411
MLV-411-02	MLV	-	-	Kingsbury	7.94	7.94	SDT-411
MLV-411-03	MLV	-	-	Kingsbury	11.14	11.14	SDT-411

Table 4: Project Facilities in South Dakota							
ID	**Facility Type**	**Length (Miles)**	**Nominal Diameter (Inches)**	**County**	**Beginning Milepost**	**End Milepost**	**Associated Pipeline**
MLV-411-04*	MLV	-	-	Kingsbury	20.55	20.55	SDT-411
Launcher and Receivers Sites							
REFO LR	Launcher-Receiver	-	-	Sully	0.00	0.00	SDL-320
GLEM – LR	Launcher-Receiver	-	-	Edmunds	0.00	0.00	SDL-335
PLR-15	Launcher-Receiver	-	-	Edmunds	0.42	0.42	SDL-335
DELW – LR	Launcher-Receiver	-	-	Lake	32.68	32.68	SDL-513
PLR-55	Launcher-Receiver	-	-	Brown	25.93	25.93	SDL-515
PLR-42	Launcher-Receiver	-	-	Lincoln	45.51	45.51	SDM-104
PLR-05	Launcher-Receiver	-	-	Lake	86.39	86.39	SDM-104
PLR-40	Launcher-Receiver	-	-	Miner	113.11	113.11	SDM-104
PLR-46	Launcher-Receiver	-	-	Kingsbury	132.18	132.18	SDM-104
PLR-04	Launcher-Receiver	-	-	Beadle	152.01	152.01	SDM-104
PLR-02	Launcher-Receiver	-	-	Spink	36.41	36.41	SDM-105
GLEH L/R	Launcher-Receiver	-	-	Beadle	0.00	0.00	SDT-207
GLEW – LR	Launcher-Receiver	-	-	Codington	0.00	0.00	SDT-208
PLR-54	Launcher-Receiver	-	-	Codington	3.40	3.40	SDT-208
GLEA – LR	Launcher-Receiver	-	-	Brown	0.00	0.00	SDT-210

Notes:
There are 70 temporary access roads for construction and 92 permanent access roads for operation totaling 15.95 miles.
[1] Mainlines are pipelines that carry CO_2 from trunklines to the sequestration facility; Trunklines are pipelines that carry CO_2 from ethanol plants to mainlines or from lateral pipelines to the mainline; Laterals are pipelines that carry CO_2 from ethanol plants to trunklines.
[2] Lengths are rounded for presentation purposes.

*Indicates valves located within pump stations, launcher and receiver sites, or capture facilities. Forty-eight valves are located within footprints of pump stations, launcher and receiver sites, or capture facilities.

The Project will require approximately 9,284 acres for construction and 4,248 acres for operations (see **Table 4** below and **Figure 2** above). Detailed Project facility land requirements are included in Section 5.5 Land Use and Local Land Controls. A summary of land requirements for all construction and operation Project components is included in **Table 5**.

Table 5: Land Requirements for the Project (Acres)

Facility	Construction [1]	Operations [2]
Pipelines	8,332.81	4,207.59
Pump Stations	22.50	22.50
MLVs	4.16	4.16
Launcher-Receivers	5.43	5.43
Access Roads	44.11	8.53
ATWS	875.09	-
TOTAL	**9,284.09**	**4,248.21**

Key:
ATWS – additional temporary workspace
MLV – mainline valve
Notes:
[1] Acreage for construction includes both construction (temporary) and operations (permanent) footprint.
[2] Acreage for operations includes only permanent footprint.

2.1.2 Future Expansion and Other Industrial Facilities

The MCE Project as depicted in **Figure 1** and Sections 1.1 and 1.2 of this application will have a total system capacity up to 18.5 MMTPA of CO_2. Within South Dakota, the Project as described in this application will capture and transport approximately 4.24 MMTPA of CO_2 that is currently contracted from the 15 partner plants in South Dakota to the sequestration facilities proposed in North Dakota. The Applicant continues to discuss commercial opportunities for industrial uses of CO_2; however, there are no additional facilities contemplated as of the filing of this Application. If future expansion associated with these commercial opportunities materializes, the additional facilities would be considered as a separate development phase of the MCE Project and would be permitted independently of this Project as necessary.

2.2 Engineering Design

The proposed pipeline and associated facilities will be designed, constructed, inspected, tested, and operated in accordance with applicable requirements and regulations, including PHMSA's regulations contained in 49 CFR, Part 195, Transportation of Hazardous Liquids by Pipeline, American Society of Mechanical Engineers (ASME) Standard B31.4, and other standards, practices, and guidelines incorporated by reference by the USDOT, PHMSA, and ASME. The PHMSA Compliance Table found in **Appendix 2**, is a table that identifies the voluntary compliance measures that the Applicant has implemented into the design of the MCE Project that exceed PHMSA requirements identified within 49 CFR Part 195.

Under the Pipeline Safety Act, 49 U.S. Code 60101 et seq., Congress has invested PHMSA with the authority to administer a comprehensive national pipeline safety regulatory and enforcement program. Under this program, PHMSA's cradle-to-grave authority as empowered by Congress includes comprehensive regulations covering the pipe manufacture, design, construction, and pre-operation phases mentioned above and must provide permission before the pipeline may be placed into operation.

These regulations and standards specify pipeline material and qualification; minimum design and operating requirements; inspection and testing requirements; protection from internal, external, and atmospheric corrosion; and other controls to minimize and/or mitigate the risk of a pipeline incident.

To comply with the regulations, standards, and the Applicant's internal quality standards, the Applicant will implement a quality assurance and quality control plan(s) (QA/QC Plan(s)). The QA/QC Plan(s) will establish technical inspection policies and procedures during manufacturing and construction activities, as well as delineate the duties and responsibilities of each QA/QC inspector assigned to the Project. The Applicant's QA/QC Plan(s) will include periodic audits by technical representatives and construction management to confirm that inspections are being properly performed and documented. In addition, Operating and Maintenance (O&M) procedures will be developed for the MCE Project's Operations Control Center (OCC) and field personnel prior to commencement of operation.

Access roads for construction will follow existing public and private roads where possible, and placement of new permanent access roads for MLVs or other aboveground facilities will be negotiated with landowners and minimize disruptions to use of the land.

Typical workspace configurations and layouts are provided for aboveground facilities (i.e., pump stations, MLVs, launcher and receiver facilities, and ICCP) in **Appendix 3** and for the pipeline ROW in Appendix B of the Project's Environmental Construction Plan (ECP) found in **Appendix 4** of this application. The workspace configuration drawings in **Appendix 3** and the ECP are typical drawings which are applicable to a variety of pipeline diameters.

2.2.1 Pipeline

The pipeline component of the Project receives CO_2 from industrial facilities and transports the CO_2 to sequestration facilities proposed in North Dakota or other delivery points for industrial use via a series of laterals, trunklines, and mainlines (see **Figure 2**). Mainlines are pipelines that carry CO_2 from trunklines to proposed delivery points sand trunklines are pipelines that carry CO_2 from ethanol plants to mainlines or from lateral pipelines to the mainline. Laterals are pipelines that carry CO_2 from ethanol plants to trunklines. The pipelines will be constructed of high-strength carbon steel pipe, that meet or exceed the American Petroleum Institute (API) 5L Pipe Specification (API 5L). Based upon volume requirements and pressure service, pipe segments will range in size from 6- to 24-inches nominal diameter and have a wall thickness ranging from 0.203 inches to 0.750 inches. Pipe wall thicknesses are standard for conventional pipeline installation (Design Factor 0.72), road crossings (Design Factor 0.6), railroad crossings (Design Factor 0.5), and horizontal directional drills (HDDs) (Design Factor 0.5 or 0.6 depending on site specific design). To protect against corrosion, the Applicant will apply a fusion bonded epoxy (FBE) coating to the exterior surface of the pipeline in addition to employing an ICCP system. Pipeline installed in HDDs and road crossings will also have an Abrasion Resistant Overcoat installed as a secondary coating over the FBE to protect the pipe from damage during construction and corrosion.

The pipeline has been designed as follows:

- Maximum operating pressure (MOP): 2,183 pounds per square inch gauge (psig).
- Maximum operating temperature: 120 degrees Fahrenheit.
- Maximum design flow rate: 962 million standard cubic feet per day which is approximately equivalent to 18.5 MMTPA of CO_2.

Figure 3 is a system schematic for the overall system. The design of the pipeline system is based on a maximum discharge pressure of 2,160 psig at each pump station, with a 2,183 psig MOP of the pipeline. The maximum discharge pressure of the pipeline is based on a steady state and transient analysis to identify pressure requirements under normal and abnormal operating conditions.

The normal operating temperature within the various sized pipelines will range from 30 to 115 degrees Fahrenheit depending on specific location and season. Generally, the CO_2 entering the pipeline at the capture facilities will be the warmest and will cool towards ground temperature as it is transported within the pipeline.

All Project pipelines will have a design factor of 0.72, except at road, railroad, and waterbody crossings where more conservative design factors are applied, as discussed above. The design factor for hazardous liquid pipelines is a safety factor which controls the operating pipelines at stress levels below a certain range of the specified minimum yield strength of the pipe material. The design factor is one of several key components used to calculate the internal design pressure of a pipeline and is defined in 49 CFR Part 195.106.

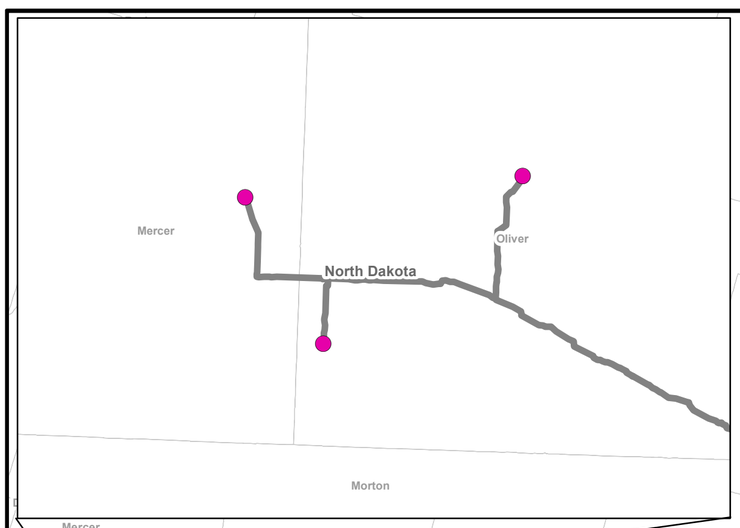
The Applicant has evaluated the potential use of a fiber optic leak detection system and has decided not to install such a system during construction of the Project based on several factors. Widespread adoption of a digital acoustic sensing leak detection system is the exception, not the rule, in the U.S. Technology is still in its infancy and very few new pipelines have taken on the risk of installing fiber. A fiber optic leak detection system is subject to damage during construction; therefore, it would be installed after pipeline installation which would prolong the construction-related disruption to landowners and would require future excavation for inspection and maintenance due to installation in close proximity to the pipeline. Additionally, when the fiber line is broken or there is discontinuity in the fiber line, gaps in the system's detection capabilities may be present and potentially unrecognized. Fiber optic system sensitivities are difficult to effectively tune which can lead to nuisance alarms that challenge control personnel and potentially distract from overseeing pipeline operations. The Applicant plans to utilize a state of the art computational leak detection system as described in Section 2.3.1.

All pipeline segments will allow the passage of internal inspection devices (commonly referred to as "smart pigs"), which are designed to detect certain internal and external anomalies in the pipe such as corrosion, dents, and metal loss. Launchers and receivers are designed to launch and receive these internal inspection devices along with other types of pigs (e.g., maintenance pigs). The launchers and receivers will be located within pump stations and at stand-alone sites, generally spaced as needed along the pipeline length as identified in **Figure 3**.

The Applicant also evaluated the potential use of warning tape and does not intend to install warning tape. The depth of the warning tape would present a challenge as the Applicant intends to rip the subsoil to a depth of 18-24 inches after installation of the pipeline and farmers who own land in agriculture use may also rip or deep plow the topsoil. To avoid interference with this type of farming practice, placement of warning tape would have to be closer to the top of pipe which may not provide a suitable gap to prevent third party excavation damage. Compliant with PHMSA requirements, the Applicant will employ a robust damage prevention program that includes, but is not limited to, aerial patrol every two weeks, weather permitting, and not less than 26 times annually, supported by a dedicated damage prevention team that will monitor and respond to 811 One Call notifications and physically inspect areas with known or planned construction activity.

MIDWEST CARBON EXPRESS PROJECT

SUMMIT CARBON SOLUTIONS



NDT-211 12"
SDM-105 24"
SDT-210 6"
SDL-335 6"
SDL-515 6"
SDL-514 6"
SDT-208 8"
SDL-320 6"
SDT-209 6"
SDT-207 6"
SDT-411 6"
SDT-410 8"
SDL-513 6"
SDT-206 6"
SDM-104 24"
SDT-212 6"
SDT-409 6"
IAL-510 6"

NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
MINNESOTA
IOWA

(NOTE 4)

Not for Construction

LEGEND:

PIPELINE
- PIPELINES
- 6"
- 8"
- 12"
- 24"

- CAPTURE FACILITY
- SEQUESTRATION SITE

NOTES:

1. COORDINATE SYSTEM IS BASED ON NAD83, UTM ZONE 14 NORTH, U.S. FEET.
2. THE ENTIRE SYSTEM MOP IS 2183 PSIG.
3. DATA DISPLAYED IS CURRENT AS OF 09/20/24 (REV 10).

0 5 10 20 30 MILES

NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
3	ISSUED FOR USE	GIE	11/14/24	VK	YK
2	ISSUED FOR USE	GIE	10/02/24	VK	YK
1	ISSUED FOR USE	GIE	06/06/24	VK	YK

GULF INTERSTATE ENGINEERING

DWN. BY: PJ	DATE: 11/14/24
CHK. BY: VK	11/14/24
PROJ. ENGR: YK	11/14/24
PROJ. MGR: DA	11/14/24
CLIENT APP: LM	

SUMMIT CARBON SOLUTIONS

MIDWEST CARBON EXPRESS PROJECT

SOUTH DAKOTA SYSTEM SCHEMATIC

DWG NO: 1927-000-PL-DWG-7005 | SHT: 1 OF 1 | REV: 3

Document Path: P:\1927\GIS\MapFiles\Overall Maps\CO2 Pipeline System Schematic\1927-000-PL-DWG-7005_3.mxd

2.2.2 Pump Stations

The six pump stations in South Dakota (Mainline Pump Stations [MPS] -04, -05, -06, -07, -08, and -09) will be located in Minnehaha, Lake, Beadle, Spink, Edmunds, and McPherson counties and their locations are depicted on the route maps provided in **Figure 2**.

Pump station sites will be acquired by the Applicant in fee, where possible. Construction of pump stations would start with civil and site work, followed by foundation installation, mechanical and electrical equipment installation, and finally commissioning activities. Pump stations will have security fence around the perimeter with network cameras positioned to continuously monitor access and a security gate with controlled access, all monitored by the MCE Project's OCC. All pumps and major equipment will be installed within an enclosed shelter.

Pump stations would be accessed using temporary access roads during construction and permanent access roads during operations. Pump stations will be designed and constructed to meet the requirements of the National Electric Code and Federal regulation 49 CFR Part 195. Each pump station will be fenced and contain up to four pumps driven by electric motors, an electrical building, electrical substation (where applicable), a pump shelter building, communications equipment, and parking area for station personnel. Some pump stations may not be required to have pumping equipment to meet system hydraulic needs during early operations. These stations will be set up for future expansion but may not have all equipment listed above installed during initial operation. All equipment within the pump station will be electric and the Applicant will purchase electricity for its pump stations from local power providers, and it is anticipated that the installed horsepower will range between 6,000 and 14,000, including a fully redundant hot spare pump and motor. Actual power use will range between 2,000 and 7,800 horsepower, requiring 1,500 to 5,900 kilowatt of electricity.

Pump stations will utilize electricity for all pumps, lights, valves, instrumentation, and other supporting equipment. Pump stations will be fully automated for unmanned operation via the OCC. The Applicant will maintain both a primary and secondary OCC for redundancy. Remote start/stop set point controls, unit monitoring equipment, and other data collection equipment will be installed at each location. The pipe entering and exiting the pump station sites will be located below grade; however, some of the piping within the pump station yard (after entering and prior to exiting the pump station facilities) will be aboveground.

Backup power at the pump stations will consist of batteries to maintain power to communications equipment for communications between the pump station and the OCC and to provide lighting and power for minor facility procedures if the local utility power supply is disrupted. Backup power is not designed to keep the pumps operating.

There will be MLVs within each fenced pump station facility. In some cases, launchers and receivers and deep well anode ground beds for the ICCP will also be located within the fenced pump station facility. Additionally, stand-alone launcher, receiver, and MLV facilities will be fenced on a permanent easement or land purchased from landowners on or near the pipeline routes (see description of launchers and receivers below). This would include any permanent access to the sites.

The Applicant is currently evaluating communication systems. It is anticipated that valve sites will utilize a cell modem with satellite backup for communications back to the pipeline control center. The preferred method for pump stations would be through a local Internet Service Provider, where applicable, with cell modem or satellite backup. It is expected that reliable communications can be established without the use of any communications towers greater than 50 feet.

2.2.3 Mainline Valves

The Applicant plans to construct a total of 120 MLVs, 48 of the MLVs will be located within the operational footprint of pump stations, capture facilities, and launcher and receiver facilities, and 72 will be standalone intermediate mainline valves. The standalone intermediate MLVs will be sectionalizing block valves constructed within a 50-foot-wide by 50-foot-long site located within the 50-foot-wide, permanently maintained pipeline ROW. These intermediate valve sites will be located within a permanent aboveground easement obtained from landowners. The spacing intervals between the MLVs along the ROW will be in accordance with 49 CFR Part 195.260. This includes, but is not limited to, valve requirements for waterbody crossings, pump stations, high consequence areas (HCAs), and locations along the pipeline system to minimize safety risks, property damage, or environmental harm from accidental CO_2 discharges**. Appendix 10** identifies the location of the HCAs and the associated MLVs that were sited to protect the HCA.

The purpose of MLV is to isolate segments of the pipeline to facilitate maintenance, and in the unlikely event of an incident, contain CO_2 mitigating risk and limiting potential impact. All MLVs will be remotely activated valves and do not require on-site operations personnel. In the unlikely event of an emergency, the valves can be remotely or manually operated to isolate sections of the pipeline to minimize potential discharge. All mainline valves will be electrically actuated, have upstream and downstream pressure transmitters, redundant communications, and a local Programmable Logic Controller (PLC). Pipeline operations will be controlled via the OCC which will be man-operated 24/7, 365 days a year. See Section 2.3.1 of this application for a detailed description of the supervisory control and data acquisition (SCADA) system. The valve closure times range from approximately 15 to 120 seconds, depending on pipe size. However, valve closure will consider operational conditions to ensure safe closure without impacting pipeline integrity.

In compliance with 49 CFR Part 195.420 (Valve Maintenance), each operator must, at least twice each calendar year, but at intervals not exceeding 7.5 months, inspect and cycle each MLV to determine that it is functioning properly.

2.2.4 ICCP and AC Systems

The Applicant will install an ICCP system along the buried pipelines to mitigate the threat of external soil corrosion on the pipe. The ICCP system involves multiple sacrificial anodes installed in deep well ground beds along the pipeline that are connected to external power. The power provides the current needed to drive an electrochemical reaction whereby the anodes corrode instead of the pipeline. Except for a junction box and small diameter vent pipe posted above deep well ground beds, the ICCP system will be buried. Data will be remotely collected continuously from the ICCP system to ensure the appropriate level of protection. A typical drawing of these components is provided in **Appendix 3**. The ICCP system components will be located within the permanent ROW and within the capture facilities. The ICCP system will be continuously monitored and maintained for the life of the pipeline system.

Depending on the final design and onsite testing, the Applicant may need to install ACC mitigation where necessary to protect the pipelines and the ICCP system from the corrosive electromagnetic voltage and stray current from nearby, overhead electric powerlines. AC mitigation systems, if required, will be installed below ground within the permanent ROW with aboveground equipment at the MLV sites.

2.2.5 Launchers and Receivers

The Applicant will install 15 launcher/receivers as part of the Project. All pipeline segments will allow the passage of internal or inline inspection devices (commonly referred to as “smart pigs”), which are

designed to travel through the pipeline to detect internal and external anomalies in the pipe such as corrosion, dents, and other imperfections. Launcher and receivers are designed to launch and receive these internal inspection devices as well as pigs used for maintenance of the pipeline. All launcher and receivers will be aboveground fabricated settings which will have a design factor of 0.6 with appropriate pipe wall thickness. As mentioned above, some launcher and receiver sites will be located within the fenced pump station facility.

Other, standalone launcher and receiver sites will be fenced on permanent easements or land purchased or leased from landowners on or near the pipeline ROW. See **Appendix 3** for a typical drawing for a launcher and receiver site.

2.2.6 Access Roads

The Project pipeline will require 70 temporary access roads for construction and 92 permanent access roads for operations. When possible, existing public or private access roads will be used as temporary access roads to access the construction workspace. If new temporary access roads need to be constructed following pipeline and aboveground facility construction, temporary access roads will be removed in their entirety and the footprint restored to previous land uses, unless otherwise agreed upon with individual landowners.

Permanent access roads will provide access to 72 standalone MLVs, 15 launcher and receiver sites, and 6 pump stations. Access roads will be up to 30 feet wide, depending on the facility type. These will be constructed by grading and applying gravel as required to provide a drivable surface and to prevent erosion. The permanent roads will be designed, constructed, and maintained to comply with county/township standards and state requirements, where applicable.

2.2.7 General Construction Procedures

The ECP (**Appendix 4**) and the Applicant's South Dakota Agricultural Impact Mitigation Plan (SD AIMP [**Appendix 6**]) provide Project procedures to reduce the occurrence of off-site sedimentation and erosion and to increase the success and efficiency of revegetation and restoration methods on lands crossed by the Project. The ECP identifies industry recognized best management practices (BMPs) that will be implemented to minimize and mitigate impacts, particularly to wetlands, waterbodies, and agricultural areas. Mitigation measures for agricultural impacts are covered in the SD AIMP and Section 3.0 of the ECP. Topics included in the SD AIMP include, but are not limited to, erosion prevention and sediment control; topsoil segregation, storage, and replacement; rock removal; identification and repair of drain tile; prevention of compaction and rutting; and ingress and egress.

Areas to be cleared and graded will be flagged; this includes the pipeline ROW, aboveground facilities, access roads, and ATWS. The construction ROW width will vary with pipe diameter but will generally be 100 or 110 feet wide depending on pipe diameter, with 50 feet of this maintained and acquired as permanent easement for pipeline operations (see the workspace diagram in Section 1.2). Qualified inspection personnel will inspect the clearing and grading activities to ensure the contractor stays within the authorized limits of disturbance.

Agricultural areas with crops present will be mowed or disced to ground level unless the landowner requests the crops be removed. Bushes and trees will be felled or sheared to prevent damage to adjacent trees and structures. On agricultural lands, if trees are to be removed from the easement, the Applicant will consult with the landowner to determine if there are trees of commercial or other value to the landowner and will then remove the trees in accordance with Section 6.2 of the SD AIMP. Bushes and

trees may be disposed of, burned, or chipped and spread over the ROW outside of wetlands and active agricultural fields. Burning may be conducted in accordance with all permits, regulations, and approvals.

In addition, agricultural areas that have terraces will be surveyed to determine pre-construction contours to ensure restoration will be successful when establishing original contours and drainage patterns. The applicant will restore the slope, contour, grade, and drainage pattern of the disturbed area as nearly as possible to its pre-construction condition in accordance with Section 6.13 of the SD AIMP. Individual landowners will be compensated for use of the temporary construction workspace on their land, crop losses and other damage caused by construction activities, as well as for the Applicant's permanent ROW to operate the pipeline.

If damage occurs to drain tiles encountered in the project profile, repair of those tiles will occur in accordance with Section 6.7 of the SD AIMP.

The pipeline will be installed to provide a minimum of 48 inches depth of cover over the top of the pipe. Additional conditions may be implemented if requested by local, state, or federal agencies in areas adjacent to wetlands or waterbodies or in sensitive habitat. Depth of cover surveys will occur post-installation of the pipeline to ensure that the depth of cover meets state and federal requirements.

To allow the passage of wildlife, livestock, and to facilitate the natural drainage pattern, spoil piles will have gaps that align with the breaks of the strung pipe. Bridges may also be constructed to allow the passage of wildlife and livestock. At this point, the Applicant does not anticipate blasting to be required; however, if blasting is required to excavate the trench, a Blasting Plan will be developed, to include procedures, safety, use, storage, transportation and implemented and submitted to the SD PUC for review prior to any blasting if necessary. See Section 2.2.8 below for special construction procedures. Trenching procedures will be followed to minimize the length of time the trench is left open.

If required, dewatering will occur in accordance with state regulations and the BMPs stated in Section 6.2 of the ECP and Section 6.6 of the SD AIMP. The trench will be backfilled using the excavated and separated material from the trenching process and then stabilized as soon as possible. Stream bottoms will be restored to as near pre-construction conditions as possible during the backfilling process, with no impediments to normal water flow. Final grading will occur to ensure that the pre-construction contours are matched with the surrounding topography and that the disturbed area is stabilized.

Agricultural land compacted by heavy project equipment, including off ROW access roads, will be tilled to alleviate soil compaction upon completion of construction on the property. In areas where topsoil was removed, tillage will precede replacement of topsoil.

In accordance with the SD AIMP, construction activities on agricultural lands in wet soil conditions will not be undertaken at times when or locations where the passage of heavy construction equipment may cause rutting to the extent that the topsoil and subsoil are mixed, or underground drainage structures may be damaged. Rutted land will be graded and tilled until restored as near as practical to its pre-construction condition. On land where topsoil was removed, rutting will be remedied before topsoil is replaced. To facilitate construction in wet soil, the Applicant may elect to remove and stockpile the topsoil from the traveled way, install mats or padding, or use other acceptable methods.

If any excess subsoil remains after the backfilling process, it will be removed and disposed of at an approved location in accordance with the ECP. Subsoil will not be placed on topsoil in accordance with Section 6.4 of the SD AIMP. Cleanup will immediately follow the backfilling operation as weather conditions allow. Waste will be disposed of in a manner that meets regulations, and the conditions listed

in Section 9 of the ECP. Temporary erosion and sediment control structures will be removed in stabilized areas and permanent structures will be installed, if necessary.

Following the cleanup procedure, seed bed preparation will begin. Restoration and seeding are included in Section 6 of the ECP. Revegetation of untilled land is included in Section 6.11 of the SD AIMP.

2.2.8 Special Construction Procedures

Where required, the HDD and bore crossing methods will be utilized for designated major or sensitive waterbodies, USFWS-protected wetlands, USFWS grassland easements, and other features where surface disturbance is to be avoided or reduced. The Contractor will construct each directional drill waterbody crossing in accordance with a site-specific plan. A typical configuration of an HDD crossing is provided in Appendix B of the ECP (**Appendix 4)**. Construction of the HDD method includes staging the drilling equipment on one or both sides of the stream/river/feature and the made-up pipe string for the crossing length on the other side. After the hole has been drilled and prepped for installation, the welded pipe string will be pulled through the hole by the drill rig to complete the crossing. Water for mud make up and hydrotesting of the pipe string may be acquired from the stream/river crossed or an alternate source.

Bored crossings will be conducted by creating a shaft/tunnel for the pipe to be installed to avoid surface or in-stream disturbance. This is accomplished by bore pits on each side of the feature. The bore pit is excavated to a depth slightly deeper than the elevation of the boring, a boring machine is then lowered to the bottom of the bore pit to tunnel below the feature using a cutting head mounted on an auger. The auger rotates through a bore tube, both of which are pushed forward as the hole is cut. The pipeline is then installed through the bored hole and welded to the adjacent pipeline.

Appendix 7 is the Applicant's South Dakota Inadvertent Return Plan, which outlines operating procedures and responsibilities for prevention, containment, and clean-up of inadvertent returns associated with the HDD process.

In the event that an inadvertent release were to occur within an aquatic resource, the Applicant will implement the mitigation measures outlined in the South Dakota Inadvertent Return Plan (**Appendix 7**), the measures outlined in the ECP (**Appendix 4**), as well as complying with all applicable federal and state permits and authorizations.

For HDDs and bores of waterbodies where there will not be a travel lane within the ROW (i.e., use of a bridge) there will be no clearing over the HDD path. The Applicant may trim vegetation using hand tools where necessary to access a water source to withdraw water for HDD operations and/or hydrostatic testing of the pipeline and/or to place the HDD guidewires.

The Contractor will establish a travel lane within the construction workspace, which can include the use of construction mats when crossing wetland areas. Bridges, when permitted, will be installed at waterbody crossings to create a single travel lane up and down the construction workspace. The Contractor will properly install temporary erosion control devices (ECDs) and/or maintain redundant sediment control as outlined in ECP (**Appendix 4**).

If blasting is required for a stream crossing, the Applicant will ensure that the Project will be in compliance with local, state, and federal regulations during the blasting process. In the event blasting is necessary, the Applicant will prepare a Blasting Plan for the Project to include procedures, safety, use, storage, and transportation of equipment as required by the ECP. The Contractor and its blasting supervisor will be licensed and thoroughly familiar with and comply with the rules and regulations of Occupational Safety and Health Administration (OSHA) and all federal, state, county and local regulations governing blasting

operations. Blast materials will be contained and collected to ensure proper disposal of the materials. Containers used will be covered to prevent impacts to stormwater runoff.

Typical drawings for construction of the pipeline ROW, waterbody and other sensitive area crossings, and water withdrawals are provided in Appendix B of the ECP (**Appendix 4**).

2.3 Operation and Maintenance

The Project will meet or exceed state and federal safety requirements and, at a minimum, will be designed in accordance with 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline. For more information, please see the PHMSA Compliance Table found in **Appendix 2,** which identifies the voluntary compliance measures that the Applicant has implemented into the design of the MCE Project that exceed PHMSA requirements identified within 49 CFR Part 195.

2.3.1 Normal Operations and Routine Maintenance

The Project will include a primary and secondary OCC located separately and within the footprint of the MCE Project. The OCC will utilize the best available technology for data acquisition and control. The OCC will employ experienced and trained staff who will continuously monitor and control pipeline operations 24 hours per day and 7 days a week. A SCADA system will communicate with all field sites and provide real time status from every facility and/or data collection point along the pipeline system. Data such as pressure, temperature, and flow will be monitored to ensure pipeline operation is maintained within established, safe operating parameters.

The SCADA system polls data (such as pressures from the pressure transmitters) at intervals from 3 to 9 seconds. The transmitters will have rate of change alarms as well as low- or high-pressure alarms. In the event of a leak (and associated pressure drop), an alarm will be sent to the pipeline controller which will notify the controller of an upset condition, and in the event of a pressure drop of 10% or more within 15 minutes or less, an alarm will trigger to prompt the controller to take immediate action to shut down and isolate the pipeline segment.

OCC personnel will have the authority and capability to remotely shut down pump stations and close MLVs as necessary to isolate pipeline segments in the event abnormal operating conditions are observed.

The Applicant will use a computational leak detection system (i.e., the Real Time Transient Model [RTTM]) that incorporates real time data measured on the pipeline, including line balance, pressure wave detection, and system hydraulics response coupled with statistical modeling of system operations. The system supports compliance with API 1130, API 1175, API 1155, and API 149. **Appendix 8** is a document titled "*Control Center Management and Leak Detection Overview*", which provides additional information on the strategy the Applicant will employ for pipeline leak detection and the general control center responses for alarms and emergency conditions.

The RTTM is a real time hydraulic model of the pipeline system that runs in parallel. If the behavior of the pipeline does not match the hydraulic model, the OCC is notified that an issue must be analyzed. Alarms will be established for pipeline controllers when this analysis detects a potential leak profile.

O&M procedures will be developed for OCC and field personnel prior to commencement of operation. These O&M procedures will include both normal and abnormal operating conditions.

Maintenance will include regular inspection and surveillance of the pipeline and appurtenances in accordance with the O&M procedures referenced above and requirements set forth in 49 CFR Part 195. The permanent pipeline ROW will be patrolled and visually inspected every two weeks, weather permitting, and not less than 26 times annually. Aerial patrol will check for abnormal conditions including

unauthorized activity such as disturbed soil, new structures (fencing, trees, roads, etc.), and encroachment by third parties onto the ROW. Aerial surveillance will also look for abnormal color of vegetation, disturbance in waterbodies (e.g., bubbles), or frozen soil in non-winter months that may be an indication of a CO_2 release.

2.3.2 Abnormal Operations

The Project will comply with federal Emergency Response requirements set forth in 49 CFR 195. An ERP will be finalized by the Applicant prior to placing the Project in service in accordance with 49 CFR Part 195.402. A draft ERP is provided in **Appendix 9**. The draft ERP discusses the actions the Applicant and local first responders will engage in to minimize human health and safety impacts in the event of release of CO_2. Potential incidents vary in type, scope, size, and risk. Therefore, the ERPs provide guidance and structure for a quick, effective, and coordinated response to protect the public, all responders, and the environment.

Summit Carbon Solutions Field personnel will be trained in emergency response procedures and will coordinate with local first responders and local authorities to conduct tabletop exercises and training to ensure preparedness. The Applicant will conduct public education engagement programs, including damage prevention programs that meet or exceed industry requirements concerning public awareness of pipelines and pipeline operation.

The Applicant has/will implement risk mitigating measures including, but not limited to, utilizing Overland Flow modeling to complement the Canary dispersion model. Although PHMSA only requires modeling to be conducted near HCAs (**Appendix 10**), the Applicant has completed vapor dispersion modeling along the entire pipeline route, exceeding these requirements. The Applicant has also elected to increase the pipeline depth of cover, non-destructively test 100% of girth welds, and install and commission an impressed cathodic protection system when the pipeline initiates operation (regulation requires the ICCP to be operational in 1-year). These measures, in combination with the Project's PHMSA Compliance Table (**Appendix 2**), provide additional conservatism to the Applicant's risk mitigation efforts.

The Applicant completed a comprehensive surge analysis on the entire MCE Project to ensure compliance with the PHMSA regulations, specifically 49 CFR Part 195.406(b), which requires system pressures not exceed 110% of the system's MOP during transient or other abnormal activities. The Applicant evaluated scenarios in which communications were active as well as inactive. While communications are inactive, the only available overpressure protection are local alarms/shutdowns at each pump station. If communications are active, it is assumed the SCADA system can communicate and remotely shut down the pump stations along the pipeline system as a first form of protection when a surge initiation action occurs.

The surge analysis was conducted using actual proposed operating conditions and design - flow rates, pipe sizes, elevation changes, pump curves, product composition, valve closure times, and a variety of other factors. The analysis determined that the MCE Project was adequately protected from overpressure in all inadvertent valve closure scenarios, as well as mainline pump power loss, meaning that the system cannot be over pressured by MLV shutting either normally or abnormally. Even though the analysis did not identify a risk of overpressure, the Applicant will implement surge mitigating automation such as automatic pump station shut down with pump discharge valve closure.

The Applicant will voluntarily apply its Integrity Management Plan to the entire MCE Project system, even though it is only required for pipeline segments that could affect HCAs as defined and required by PHMSA.

The damage prevention program will be supported by a field-based team and includes, but is not limited to, aerial patrol, public awareness, and adherence to the 811 One Call system.

PHMSA does not require odorants for CO_2 pipelines and to the Applicant's knowledge, none of the approximately 5,300 miles of existing CO_2 pipeline utilizes an odorant. PHMSA also does not require the use of odorants for most natural gas transmission lines and it's typically utilized where natural gas enters a local distribution system. CO_2 is an inert, nonflammable gas and the primary component in many odorants is methyl mercaptan, which is a hazardous, flammable substance. Introducing odorant into a CO_2 stream potentially adds risk in the transportation of CO_2. If federal regulations are amended in the future to require the use of an odorant in CO_2 pipelines, the Applicant believes that mandate will be preceded by research to establish the combination of CO_2 and commercially available odorants that would not compromise the integrity of the pipeline system.

2.3.3 Decommissioning

Though the anticipated physical life of the Project will be indefinite with proper construction, operations, inspection, maintenance, and repairs, as necessary, the Applicant may need to decommission the Project in the future. Decommissioning the Project will involve ensuring that the line is disconnected from the CO_2 source at each ethanol plant; depressurizing the line; removing capture facility infrastructure; removing all pipeline aboveground facilities and isolating MLVs; disconnecting the ICCP system; isolating and sealing the ends of pipeline segments; removing permanent access roads; and restoration activities. The Applicant is proposing to leave the underground pipeline in place in the event of decommissioning; and in compliance with PHMSA, the pipeline would be cleaned, filled with an inert gas (e.g., CO_2), and capped to seal. However, in some cases, the Applicant may remove the pipeline at the request of a landowner or regulatory agency. The Applicant will patrol and monitor the pipeline left in place as required by regulatory requirements after decommissioning.

The Applicant will comply with PHMSA requirements for reporting (e.g., 49 CFR Part 195.59, 49 CFR Part 195.64, National Pipeline Mapping System Operator Standard) and field procedures and activities (e.g., 49 CFR Part 195.402) associated with pipeline abandonment.

In addition to complying with all federal, state, and local regulations, the Applicant will abandon the Project in accordance with industry standards, including ASME B31.4 (ASME, 2019).

3 Demand for Facility

The Project seeks to fill a demand by midwestern ethanol producers to access; (i) growing low carbon fuel markets, (ii) geographically disadvantaged industrial markets such as municipal water treatment, (iii) federal tax incentives, (iv) future market opportunities, such as SAF and other E-Fuel producers. Lowering carbon intensity scores for ethanol greatly benefits South Dakota's ethanol and agriculture industries, enhancing their long-term economic sustainability. Utilizing the Project to capture and permanently store their CO_2 emissions enables participating ethanol plants to reduce their carbon footprint by as much as fifty percent (50%), putting them on the path towards producing a net-zero carbon fuel. Doing so greatly improves ethanol's ability to compete in low carbon fuel markets, which have increasingly stringent carbon reduction goals. Those markets represent a significant growth opportunity for low carbon fuels into the future. Along with the existing low carbon fuel standards in California, Oregon, Washington, New Mexico, and Canada, similar programs are being contemplated in New York, Minnesota, Colorado, and other jurisdictions. In addition, the Inflation Reduction Act, enacted in 2022, created the 45Z Clean Fuel Production Credit, which incentivizes decarbonizing transportation based on carbon intensity of the fuel source, agnostic of the technology. Furthermore, demand continues to increase worldwide for SAF, for

which ethanol is an eligible feedstock, provided the ethanol's carbon intensity is low enough to qualify. The only viable way for most ethanol plants to have such a sufficiently low carbon intensity score is through carbon capture and sequestration. The Project will also catalyze new development, such as Gevo's planned SAF plant in South Dakota, which is only viable with a low CI ethanol feedstock which is directly dependent upon the MCE Project. Additionally, SAF is expected to increase the value of American agricultural fuel feedstocks by $1.25 to $2 per gallon, benefiting farmers and the entire agricultural supply chain. This translates to at least $125-$200 million annually for a typical 100 million gallons per year ethanol plant (American Carbon Alliance, n.d.).

Without the Project pipeline, the 15 partner ethanol plants in South Dakota (i.e., the 14 existing traditional ethanol plants and one ethanol plant associated with Gevo's proposed SAF facility) would lack a viable option to capture and permanently store their CO_2 emissions because South Dakota does not have proven subsurface geologic formations capable of economically storing the volume of CO_2 the plants produce. The Project is necessary for these ethanol plants because it provides a CO_2 transportation solution, which otherwise would not exist, and without which South Dakota's ethanol plants would be at a significant long-term disadvantage to ethanol plants in states like North Dakota, Indiana, Wyoming, and Illinois, which contain proven subsurface geologic storage formations. The Project pipeline provides benefits not only for the ethanol industry, but for an even broader segment of the public - the agriculture industry with which it partners. As the Applicant's South Dakota ethanol partners earn more for producing low-carbon renewable fuel, it strengthens the economic prosperity and long-term viability of ethanol, and as a result, benefits South Dakota's family farms, and by extension, the entire state. The ethanol industry is the largest purchaser of South Dakota corn, consuming more than 50% of South Dakota's corn crop each year. A stable ethanol industry provides South Dakota's farmers with a reliable market for their corn and underpins the value of South Dakota farmland. The Project has, and will continue to offer, carbon transportation and storage services to a variety of industrial facility owners in South Dakota and surrounding states, which for the first time gives them a viable opportunity to reduce their carbon emissions.

As governments, industries, and consumers seek to reduce carbon emissions, a dramatic increase in CCS is crucial to achieving that goal[5][6]. The Project is capable of moving up to 18.5 MMTPA of CO_2 for safe and permanent storage. Once operational, the Project will provide the largest and single most meaningful technology-based reduction of carbon emissions in the world.

The Applicant has long-term agreements with CO_2 suppliers, such as the 15 ethanol plant partners in South Dakota, to commence capture of CO_2 within a certain period from the date the agreements were executed. Delays in construction would detrimental economic and environmental consequences as revenue generation begins only after commencement of CCS operations (i.e., operation of the MCE Project). Additional approvals and verification dependent upon commencement of operation are required to comply with Internal Revenue Service (IRS) section 45Q and 45Z tax credits, as well as to generate carbon removal credits and to participate in low carbon fuel markets. Construction delays may therefore have a compounding effect on economic outcomes for the Applicant.

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[5] Infrastructure Investment and Jobs Act, Pub. L. No. 117-58 (2021), https://www.govinfo.gov/app/details/PLAW-117publ58.; CO2 Transport and Storage. IEA (International Energy Agency) available online at https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage/co2-transport-and-storage

[6] Department of Energy's Carbon Management Strategy - https://www.energy.gov/fecm/does-carbon-management-strategy

4 Proposed Route and Alternative Routes

The purpose of the Project in South Dakota is to capture CO_2 from partnering ethanol facilities and transport it via pipeline efficiently and safely to emerging intermediate delivery points, ultimately terminating at injection sites in North Dakota ions where it can be safely and permanently sequestered in North Dakota. The geologic formations proposed for sequestration in North Dakota are well known and proven suitable for subsurface geologic storage. Without the Project, the ethanol facilities in South Dakota lack a viable option to capture, transport, and permanently store their CO_2 emissions because there are not proven subsurface geologic formations in South Dakota that can economically store the volume of CO_2 the South Dakota ethanol facilities produce (USGS, 2013).

When developing the Project, the Applicant followed a rigorous and iterative route development process, which included consideration of state and federal regulations as well as environmental, engineering, constructability, and economic factors. The Project objectives as first defined set the framework for the routing process, including the study area to inform the routing. Then the Applicant evaluated route options that considered geographic variables, environmental variables, stakeholder input, and other routing criteria such as constructability. Ultimately, the Applicant developed a route that meets the Project need, is constructable, is financially viable, reflects landowner input and preferences, minimizes impacts to communities, the environment, and culturally sensitive areas, and complies with PHMSA and state of South Dakota regulations.

System alternatives such as the transport of CO_2 by tanker truck and rail tankers is technically feasible but is better suited for the movement of small quantities. Using the maximum anticipated transport capacity for the Project of 18.5 MMTPA of CO_2, this would equate to 1,697,248 to 8,149,780 tanker truck loads or 219,454 rail tankers per year. These surface transport systems may be practical for small volumes of CO_2 for industrial use but are not practical or cost-effective for the large-scale capture and storage of CO_2 required to meet the Project's purpose and need.

4.1 Route Development Process

In South Dakota, the Applicant employed an industry-accepted iterative routing framework for the development of the proposed route for the Project. The initial route was developed using PIVVOT, which is a Geographic Information System (GIS) based routing computer program. PIVVOT utilized inputs that included aerial imagery and publicly available and purchased datasets to produce a preliminary route that collocated with existing utilities, avoided sensitive areas, minimized crossings of large waterbodies, and minimized impact on environmental features while avoiding populated areas to the extent practical. Input examples included existing infrastructure (pipelines, railroads, and powerlines); environmentally sensitive areas (critical habitat, wetlands, national wildlife refuges, state parks, and eligible sites under the National Register of Historic Places); and land use features (airports, cemeteries, schools, mines, and economic development areas). Datasets were evaluated with an ultimate desire to collocate the pipeline with certain features (low risk) or avoid others (high risk). For example, the dataset of existing pipelines was considered low risk, so the program followed existing pipelines to the extent possible; whereas an example of a high-risk feature is national parks which were excluded because Congressional approval is required for ROW within a national park.

Optimizing the proposed Project route was informed by results of constructability reviews, integrating feedback from local, state, and federal agencies, environmental and cultural field data, field identified engineering constraints, and landowner input. The information gathered during this step was intended to identify where to avoid or minimize impacts to:

- Home/farm sites;
- USFWS grassland easements and USFWS Protected Wetlands;
- South Dakota Department of Game, Fish, and Parks Lands;
- Other environmental features such as wetlands and waterbodies;
- Cultural and Heritage resource sites identified from field surveys;
- Incompatible land uses (e.g., recently expanded quarries or landfills);
- Routing on landowner that expressed opposition to the Project;
- Other buildings, irrigation systems, power poles/towers and other structures, trees planted for windbreaks, and property corners and other resources identified by landowners, where possible.

4.2 The Preferred Route

The proposed route presented in this Application is the culmination of all the routing efforts that the Applicant has undergone since the original development of the route prior to the Applicant's initial permit application with the Commission filed on February 7, 2022 (Docket HP22-001). The proposed route achieves the purpose and need of the Project while maximizing the route on acquired parcels and landowners that are supportive of the Project, minimizing the potential for the need for eminent domain, and avoiding and minimizing impacts to environmental and culturally sensitive resources that have been identified along the route.

For the development of the proposed route, the Applicant started with the pipeline footprint presented to the Commission on August 31, 2023 (Docket HP22-001). Since that time, the Applicant has continued to modify the route utilizing the criteria identified in Section 4.1 and added 7 additional ethanol plants and the associated laterals and trunklines. The following are route alternatives that were considered but were not incorporated into the route proposed in this Application. The proposed routes were selected over the following alternatives because one or more of the following criteria:

- Maximized the siting of the route on landowners that support the Project;
- Maximized the siting of the route on landowners with executed easements in place;
- Avoided or reduced the routing on landowners that expressed opposition to the Project;
- Reduced the potential for the use of eminent domain;
- Integrated input from local and county government officials;
- Avoided and minimized impacts to known environmental, cultural, and Tribal resources; and
- Avoidance of ground disturbance to USFWS Grassland Easements and USFWS Protected Wetlands.

Alternative 1 – McPherson County (SDM-105/NDM -106/NDT-211) Alternative

Alternative 1 is a potential reroute for a portion of the preferred alignments of mainlines SDM-105 and NDM-106 and trunkline NDT-211 located in McPherson County. Alternative 1 includes an alternative location for pump station MPS-09, which is the terminus of SDM-105 and NDT-211 and the start of NDM-106. Alternative 1 deviates from the preferred route of mainline of SDM-105 at approximately milepost 116.5 and does not rejoin SDM-105, but rather it rejoins further to the north along the preferred route NDM-106 at milepost 25.1, as SDM-105 and NDM-106 are continuous mainlines that flow in and out of

pump station MPS-09. Alternative 1 also includes a deviation from the preferred route of NDT-211 at approximately milepost 116.5 and would rejoin the preferred route at pump station MPS-09.

The SDM-105 portion of Alternative 1 is similar in length to the preferred route for NDM-106, 2.0 miles versus 2.3 miles respectively and the NDM-106 portion of Alternative 1 is shorter than the preferred route, 23.6 versus 25.2 miles, respectively. The SDT-210 portion of Alternative 1 is 1.3 miles shorter than the preferred route of SDT-211, 5.3 miles versus 6.6 miles, respectively. See **Appendix 11** for a map of Alternative 1. A comparison of NLCD landcover types crossed by the two routes shows that the preferred route and Alternative 1 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops and grassland habitat.

Alternative 1 was rejected, because the preferred route is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 1 route based on the landowner coordination conducted by the Applicant. The preferred route is also preferred as it reduces the number of cultural and tribal significant sites crossed by the route when compared to Alternative 1.

Alternative 2 – McPherson and Brown County (NDT-211) Alternative

Alternative 2 is a potential reroute for the preferred alignment of trunkline NDT-211 and deviates from the preferred route of trunkline NDT-211 at approximately milepost 90.8 and rejoins the preferred route of NDT-211 at approximately milepost 114.8 within McPherson and Spink counties. Alternative 2 is four miles shorter the preferred route of NDT-211, 20.0 miles versus 24.0 miles, respectively. See **Appendix 11** for a map of Alternative 2.

Alternative 2 is 4 miles shorter than the preferred route of NDT-211, 20.0 miles versus 24.0 miles, respectively. A comparison of NLCD landcover types crossed by the two routes shows that the Alternative 2 route crosses a high percentage of cultivated crops and hay/pasture lands compared to the preferred route, while the preferred route crosses higher percentage of grassland habitats compared to Alternative 2. Alternative 2 crosses a higher number of parcels owned by State of South Dakota School and Public Lands.

Alternative 2 was rejected, because the preferred route is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 2 route based on the landowner coordination conducted by the Applicant.

Alternative 3 – Edmunds and Brown County (SDT-210/SDM-105) Alternative

Alternative 3 is a potential reroute for a portion of the preferred alignment of trunkline SDT-210 and mainline SDM-105 within Edmunds and Brown counties. Alternative 3 deviates from the preferred route of trunkline SDT-210 at approximately milepost 5.1 and rejoins the preferred route of SDT-210 at approximately milepost 13.2 and deviates from the preferred route of SDM-15 at approximately milepost 80.3 and joins the preferred route of SDM-105 at approximately milepost 83.0. See **Appendix 11** for a map of Alternative 3.

The SDT-210 portion of Alternative 3 is 1.3 miles shorter the preferred route of SDT-210, 5.3 miles versus 6.6 miles respectively and the SDM-105 portion of Alternative 3 is similar in length to the preferred route for NDM-106, 2.5 miles versus 2.7 miles, respectively. The preferred route and Alternative 3 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops and hay/pasture lands.

Alternative 3 was rejected, because the preferred route avoids crossing SDGFP lands and is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 3

route based on the landowner coordination conducted by the Applicant. Additionally, the preferred route moves SDT-211 further to south which increases the distance from Mina Lake.

Alternative 4 – Brown and Spink County (SDM-105) Alternative

Alternative 4 is a potential reroute for the preferred alignment of mainline SDM-105 and deviates from the preferred route of SDM-105 at approximately milepost 44.3 and rejoins the preferred route of SDM-105 at approximately milepost 77.6 within Brown and Spink counties. Alternative 4 is approximately 3.3 miles shorter than the preferred route of SDM-105, 30.0 miles versus 33.3 miles, respectively. See **Appendix 11** for a map of Alternative 4.

The preferred route and Alternative 4 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops.

Alternative 4 was rejected, because the preferred route is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 4 based on the landowner coordination conducted by the Applicant.

Alternative 5 – Spink County (SDT-209) Alternative

Alternative 5 is a potential reroute for the preferred alignment of trunkline SDT-209 and deviates from the preferred route of SDT-209 at approximately milepost 0.0 and rejoins the preferred route of SDT-209 at approximately milepost 3.7 within Spink County. Alternative 5 is similar in length to the preferred route for SDT-209, 3.5 miles versus 3.7 miles, respectively. See **Appendix 11** for a map of Alternative 5.

The preferred route and Alternative 5 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops.

Alternative 5 was rejected, because the preferred route avoided a high density of culturally significant sites that were located along Alternative 5.

Alternative 6 – Hyde County (SDL-320) Alternative

Alternative 6 is a potential reroute for the preferred alignment of lateral SDL-320 and deviates from the preferred route of SDL-320 at approximately milepost 31.0 and rejoins the preferred route of SDL-320 at approximately milepost 37.7 within Hyde County. Alternative 6 is 0.6 miles shorter than the preferred route of SDL-320, 6.3 miles versus 6.9 miles, respectively. See **Appendix 11** for a map of Alternative 6.

The preferred route and Alternative 6 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops and grassland habitats.

Alternative 6 was rejected, because the preferred route is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 6 based on the landowner coordination conducted by the Applicant.

Alternative 7 – Codington County (SDT-208) Alternative

Alternative 7 is a potential reroute for the preferred alignment of trunkline SDT-208 and deviates from the preferred route of SDT-208 at approximately milepost 1.6 and rejoins the preferred route of SDT-208 at approximately milepost 5.9 within Codington County. Alternative 7 is approximately 1.3 miles shorter than the preferred route of SDT-208, 3.1 miles versus 4.4 miles, respectively. See **Appendix 11** for a map of Alternative 7.

The preferred route and Alternative 7 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops.

Alternative 7 was rejected, because the preferred route is sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 7 based on the landowner coordination conducted by the Applicant.

Alternative 8 – Minnehaha County (SDM-104) Alternative

Alternative 8 is a potential reroute for the preferred alignment of mainline SDM-104 and deviates from the preferred route of SDM-104 at approximately milepost 64.0 and rejoins the preferred route of SDM-104 at approximately milepost 68.2 within Minnehaha County. Alternative 8 is similar in length to the preferred route for SDM-104, 4.4 miles versus 4.3 miles, respectively. See **Appendix 11** for a map of Alternative 8.

The preferred route and Alternative 8 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops and hay/pasture lands.

Alternative 8 was rejected, because the preferred route sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 8 route based on the landowner coordination conducted by the Applicant. Additionally, the preferred route moves SDM-104 further to the west, increasing the distance between from the City of Hartford.

Alternative 9 – Lincoln County (SDM-104) Alternative

Alternative 9 is a potential reroute for the preferred alignment of mainline SDM-104 and deviates from the preferred route of SDM-104 at approximately milepost 27.2 and rejoins the preferred route of SDM-104 at approximately milepost 46.0 within Lincoln County. Alternative 9 is 0.6 miles shorter than the preferred route of SDM-104, 16.7 miles versus 17.3 miles, respectively. See **Appendix 11** for a map of Alternative 9.

The preferred route and Alternative 9 would both have minimal and similar impacts to resources, as the routes are sited primarily on cultivated crops.

Alternative 9 was rejected, because the preferred route sited across a higher percentage of landowners that are supportive of the Project when compared to the Alternative 9 route based on the landowner coordination conducted by the Applicant.

4.3 Collocation

The preferred route is collocated with existing linear infrastructure such as roads, overhead powerlines, and existing pipeline ROWs for approximately 19% of the Project route (**Table 6**).

Table 6: Collocation of Pipelines in South Dakota

Route	Pipeline Length (Miles)	Collocation Length (Miles)	Percent Collocated
SDL-320	81.51	3.38	4%
SDL-335	0.44	0.15	34%
NDT-211	30.45	6.17	20%
SDT-206	14.49	1.77	12%
SDT-207	23.78	1.82	8%
SDT-208	51.95	23.78	46%
SDT-209	12.65	0.78	6%

Table 6: Collocation of Pipelines in South Dakota			
Route	**Pipeline Length (Miles)**	**Collocation Length (Miles)**	**Percent Collocated**
SDT-210	13.19	1.51	11%
SDM-104	125.49	58.63	47%
SDM-105	113.77	10.12	9%
NDM-106	27.74	1.74	6%
IAL-510	2.94	1.08	37%
SDL-513	32.69	3.22	10%
SDL-514	51.9	3.67	7%
SDL-515	25.93	8	31%
SDT-212	18.1	0.45	2%
SDT-409	7.92	0.89	11%
SDT-410	42.44	2.27	5%
SDT-411	20.55	5.22	25%
ALL PIPELINES	**697.93**	**134.65**	**19%**

5 Environmental Information and Impact on Physical Environment

This section provides a description of the existing environment at the time of the submission of this application and estimates potential short-term and long-term benefits and adverse impacts that may result from construction and operation of the Project pipelines in South Dakota. During the development of the Project, and prior to conducting studies to determine the characteristics of the Project's physical environment and the potential for effects to that environment, the Applicant consulted with USACE; the USFWS; the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS); South Dakota Department of Agriculture and Natural Resources (SD DANR); South Dakota Game, Fish, and Parks (SDGFP); and a number of local agencies such as county weed control administrators to receive their input regarding potential resources found along the route and recommended measures to mitigate potential impacts to those resources.

The Applicant has conducted environmental studies of the pipeline route that include both field surveys and desktop studies. Prior to implementing species field surveys, the Applicant reviewed various sources of data to determine the federally and state listed threatened and endangered and protected species that could potentially inhabit or make use of the Project area. Those data sources included the USFWS Information for Planning and Consultation (IPaC) System, the SDGFP State and Federally Listed Threatened, Endangered, and Candidate Species Documented in South Dakota By County, the South Dakota 2024 Threatened and Endangered Status Reviews, the South Dakota Environmental Review Tool, the South Dakota Wildlife Action Plan Explorer, and the South Dakota Natural Heritage Program Database. At the time of this filing, the Applicant conducted species field surveys on all segments of the route in South Dakota for which access has been granted. In areas where access has not been available or there have been seasonal constraints, the Applicant has conducted desktop studies and relied on the data sources listed above to determine the potential for threatened and endangered species and their habitat to occur. Surveys of remaining tracts will take place as soon as access is granted.

Prior to implementing wetland and waterbody field surveys, the Applicant reviewed data sources including current and historic aerial photography, USFWS National Wetlands Inventory data, U.S. Geological Survey (USGS) National Hydrography Dataset, USDA NRCS Web Soil Survey, and USGS 7.5-minute topographic quadrangle maps. At the time of this filing, the Applicant conducted wetland and waterbody delineation field surveys on approximately 51% of the Project's Environmental Survey Corridor (ESC). In March 2024, the Applicant confirmed with the USACE that for the permitting of impacts to water of the U.S., that desktop studies, using USACE guidance and the data sources listed above, are suitable alternative to identify and delineate wetlands and waterbodies features crossed by the Project for remaining portions of the ESC that have not been field delineated.

Vegetation communities and land cover and land use types were identified during species and wetland and waterbody surveys and by a desktop assessment of the USGS National Land Cover Database (NLCD) where survey access was not available. Various digital information for geology, groundwater, water quality, fisheries, wildlife, air quality, and other environmental resources was also reviewed from publicly available, or agency supplied data.

Summaries of potential environmental impacts as a result of the construction and operation of the Project pipeline in South Dakota can be found in subsequent sections of this application. Most impacts are anticipated to occur during construction and would be minor and temporary. General mitigative measures and BMPs to avoid, minimize, and mitigate impacts to the physical environment are discussed within each section.

5.1 Physical Environment

5.1.1 Landforms and Topography

The Applicant has conducted a Phase I geohazards assessment of the Project area (**Appendix 24**). Information presented in Sections 5.1.1 and 5.1.2 is largely taken from that assessment. The Project's physical environment can be divided into physiographic regions according to landforms (geomorphology) and topography. South Dakota is divided into two physiographic provinces, the Great Plains, and the Central Lowlands. In the Project area, the two physiographic provinces are divided into six subdivisions, the Missouri Coteau division of the Great Plains province; and the James River Lowland, Lake Dakota Plain, Prairie Coteau, Red River Lowland, and the Loess Hills subdivisions of the Central Lowlands province. **Table 7** provides the subdivisions intersected by each pipeline route.

The Red River Lowland subdivision is characterized as a broad, gently rolling valley-like area with elevations ranging from 900 to 1,100 feet above sea level (asl). This division's most distinctive feature is Mount Tom, a large moraine deposited during glacial retreat. The region is economically important due to the presence of high-quality granite bedrock (typically approximately several thousand feet deep) that outcrops in some locations and is commercially quarried for building stone.

The Prairie Coteau subdivision is a highland area which is part of a plateau that extends north through North Dakota into Canada. The division slopes gently to the south and west; elevations range from 1,600 feet to 2,000 feet asl, and the division drains to the south via the Big Sioux River. West of the river the surface is dotted with lakes and depressions; east of the river few lakes occur. The division is characterized by surficial deposits of glacial drift 100 to 400 feet deep over Pierre Shale bedrock.

The James River Lowland subdivision is a broad gently rolling lowland plain drained from north to south by the James River. The division lies between the Prairie Coteau subdivision to the east and the Missouri Coteau subdivision to the west at generally lower elevations ranging from 1,300 to 1,400 feet asl. Most of the topographic features of this region are the result of glacial activity that deposited up to 300 ft deep.

The Lake Dakota Plain subdivision is bounded by the James River Lowland subdivision and is characterized by a nearly level surface formed by sediment deposition when Glacial Lake Dakota was filled with water during the last glacial retreat. The mainly featureless plain exhibits a change in relief of less than 10 feet with elevation at approximately 1,300 feet asl.

The Missouri Coteau subdivision is a highland occurring in a north/south band through South Dakota, separated from the main body of the Missouri Plateau by the Missouri River which forms the division's western boundary. The topography of the subdivision is highly variable due to deposits of glacial drift underlain at great depth by Pierre Shale and older formations. Elevations range from approximately 1,750 feet asl to approximately 2,200 feet asl. Broad sags traversing the coteau are evidence of ancient stream valleys; however, no major streams currently drain the Missouri Coteau.

The Loess Hills subdivision forms a narrow band of sharply dissected uplands along the east edge of the Missouri River valley. The loess uplands formed as glacial meltwater deposited fine sediment into the Missouri River valley which was carried east by wind activity and deposited as dune-like accumulations of clay, silt, and fine sand along the slope of the east valley wall. The loess deposits are generally loose, porous, easily eroded, and vulnerable to collapse when wet but cohesive when dry and form near vertical faces and columns as they erode.

Table 7: Physical Subdivisions of the Physiographic Regions Encountered by the Project Pipelines

ROUTE ID	Loess Hills	Missouri Coteau	Lake Dakota Plain	James River Lowland	Prairies Coteau	Red River Lowland
IAL-510[1]	X					
NDM-106[1]		X				
NDT-211[1]		X		X		
SDL-320		X	X	X		
SDL-335				X		
SDL-513					X	
SDL-514					X	X
SDL-515			X			
SDM-104[1]				X	X	
SDM-105		X	X	X		
SDT-206					X	
SDT-207				X		
SDT-208				X	X	
SDT-209			X			
SDT-210			X	X		
SDT-212				X	X	
SDT-409					X	
SDT-410				X		

Table 7: Physical Subdivisions of the Physiographic Regions Encountered by the Project Pipelines

ROUTE ID	Loess Hills	Missouri Coteau	Lake Dakota Plain	James River Lowland	Prairies Coteau	Red River Lowland
SDT-411				X	X	

Notes:
[1]Routes entering or exiting South Dakota from or to adjoining states. Only the portions of the routes within South Dakota are presented here.
Source: Geosyntec Phase I Geohazards Assessment, South Dakota, Rev 3 (**Appendix 24)**

Aerial photography and USGS topographic-based maps showing the Project pipeline route in South Dakota are provided in **Appendix 5A.**

5.1.1.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Impacts to landforms and topography from pipeline construction will include disturbances from clearing and trenching which could change the elevation and contours. Construction of permanent facilities such as pump stations, mainline valves, and permanent access roads will result in minor permanent alterations to landforms and topography within the specific facility's footprint due to leveling the land and the introduction of impervious surfaces such as concrete and asphalt or semi-permeable surfaces such as gravel. Although not anticipated, there may be a few instances (e.g., steep stream banks) where construction will make minor permanent alterations to the terrain to ensure slope stability and successful slope revegetation.

In general, pipeline construction impacts to landforms and topography will be minor and temporary since the Applicant will employ BMPs described in the ECP (**Appendix 4**) and will, at the conclusion of construction, restore topographic contours and drainage patterns as closely as possible to pre-construction conditions before reclamation efforts are undertaken.

Pump stations will be sited and constructed to ensure that the surface drainage patterns are shunted to stormwater facilities to mitigate erosion. Other facilities, MLVs, and permanent access roads will follow the contours of the land and reclamation measures and BMPs described in the ECP will be used to prevent erosion.

Operation Impacts and Mitigation

Impacts to landforms and topography from operational activities will be minor. If pipeline inspections indicate that corrosion or damage may be present, excavation may be required to expose and repair the pipe. Pipeline operations excavations for repairs will occur in previously disturbed areas and, as during construction, disturbed areas will be returned to their original contours as outlined in the ECP (**Appendix 4**).

5.1.2 Geology and Paleontology

Surficial overburden deposits expected to be found at the trench depth across glaciated Eastern South Dakota are composed primarily of Quaternary age (2.6 million years ago to present) alluvium, lacustrine sediments, moraine (till), and outwash. Alluvium consists of clay to boulder sized rocks deposited by streams and is typically black or dark-brown and rich in organic matter. Lacustrine sediments accumulate in areas that contained ponded glacial meltwater and are often found with outwash deposits. Lacustrine sediments range in grain size from clay to silt and include minor amounts of sand and gravel. The sediments range in color from green to gray to black to white to possibly pink. Moraine (till) is relatively

flat to gently rolling surface formed of debris released from beneath a glacier. Till consists of a silt/clay matrix with sand to boulder-sized rocks. Outwash is glaciofluvial in origin and consists of very deep deposits of sand and gravel, with minor amounts of silt and clay (Geosyntec, 2024 [**Appendix 24**]).

Beneath the surficial overburden, which can range from a thin veneer to 1,000 feet thick, lies lithic bedrock. Lithic bedrock in the Project area consists primarily of Late Cretaceous and Early Proterozoic rocks. The primary and uppermost bedrock unit found in the Project area is the Pierre Shale. The Pierre Shale is fissile and blocky with persistent beds of bentonite, black organic shale, and light-brown chalky shale up to 2,700 feet thick and considered to have high shrink-swell potential (Tomhave et al., 2004). Shrink-swell potential is further discussed in Section 5.1.5. Approximately 0.9-mile of the proposed pipelines are underlain by bedrock that is less than five feet below ground surface. Approximately 1.8 mile of lateral SDL-514 (in the Red River Lowlands subdivision) is underlain by granite bedrock (**Appendix 24**); however, the granite bedrock is unlikely to be encountered within trench depth. Minor lower units include the Niobrara Formation, the Carlile Shale, undifferentiated Cretaceous units, and the Sioux Quartzite (Martin et al., 2004; Tomhave et al., 2004).

Appendix 12 contains the soil map units crossed by the Project, including depth to bedrock for each soil map unit.

5.1.2.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Impacts from pipeline construction will include disturbance to the surficial geology during grading and trenching. Since bedrock that could be encountered would likely consist of Cretaceous-aged shale that tends to be weak and easily erodible, excavations would be conducted using standard pipeline construction techniques. Blasting, though not anticipated, could be required in areas where shallow bedrock or boulders cannot be removed by conventional construction techniques. In the event blasting is necessary, the Applicant will prepare a Blasting Plan for the Project and acquire any necessary permits. All excavated areas, no matter the excavation technique, will be returned to preconstruction contours and elevations.

Permanent facilities will be sited and constructed using practices to reduce environmental impacts, including minimizing ground disturbance, implementing blasting controls, managing dust, preserving topsoil, and limiting excavation depths as much as possible. Construction of permanent facilities such as pump stations, mainline valves, launchers and receivers, and permanent access roads will likely result in minor permanent alterations to surface geology within the specific facility's footprint due to removal of topsoil and grading. The acreage anticipated to be permanently altered during construction of permanent facilities is negligible compared to the extent of the Project area.

Operation Impacts and Mitigation

Impacts to geology from operational activities may include exposing the pipe within the trench to make repairs if inspections detect corrosion or damage. If excavation of the pipe for repairs is required, it will occur in previously disturbed areas and, as during original construction, disturbed areas will be returned to their original condition.

5.1.3 Rock, Sand, Gravel, and Economic Mineral Deposits

Of South Dakota's primary non-fuel resources, approximately 42% of the total non-fuel production value in 2019, the latest year for which statistics are available, derives from a combination of cement, clay (common), feldspar, gemstones (natural), gypsum (crude), lime, mica (crude), sand and gravel (industrial),

silver, and stone (dimension). These non-fuel resources are grouped together by USGS. Crushed stone accounts for approximately 13% of the state's non-fuel production value and gold amounts to approximately 31% of the state's non-fuel production value, while the remaining 14% comes from construction sand and gravel (USGS, 2019).

According to South Dakota's Construction Aggregate and Mining database, there are thirty construction aggregate and mining sites within a quarter mile of the Project footprint (State of South Dakota, 2021); however, none are crossed by or will otherwise be impacted by the Project. A review of the SD DANR's Oil and Gas Well database (2024a) shows that there are no oil and gas wells within a quarter mile of the Project footprint.

5.1.3.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

It is anticipated that construction will have no impact on current mineral extraction activities since no mines or wells will be crossed by the Project. There is the potential for construction sand and gravel from local, existing commercial sources for use such as pipe padding, road base, or aboveground facility pads. If sand and gravel from local, existing commercial sources are required, the short-term, minimal, localized need will not substantially affect the availability of construction materials in the area or require new or additional mine sites to be developed.

The Applicant will access the South Dakota 811 Call Before You Dig system to locate all underground utilities and pipelines and will contact all utility owners and all pipeline gathering/transmission/ distribution system owners prior to construction activities. If necessary, utility and pipeline crossing agreements will be developed with the owners.

Operation Impacts and Mitigation

Because no mines or oil and gas wells will be impacted during construction, there will be no impact from pipeline operation.

Any need for sand and gravel during operations would be infrequent, minimal, and localized and would not substantially affect the availability of construction materials in the area or require new or additional mine sites to be developed.

5.1.4 Soils

The majority of the Project is located in physiographic regions marked by soil series which belong to Udic Haploboroll, Typic Argiboroll, and Glossic Natriboroll subgroups in the north; and Typic Argiustoll, Typic Haplustoll, Pachic Haplustoll, Pachic Argiustoll, and Typic Natrustoll subgroups in the south. The remaining areas of the Project are located in areas marked by soil series which belong to Udic Haplustolls, Typic Calciboroll, Typic Endoaquoll, and Udertic Haploboroll taxonomic subgroups and soil series with deep, silty profiles within Mollic Udifluvent, Vertic and Aerie Fluvaquent, and Vertic Endoaquoll subgroups.

The majority of the Project encounters soils classified as fine-loamy (41.1%), fine (26.1%), and fine-silty (24.9%). Fine-loamy soils are defined as having a clay content between 18% and 35% with sand and silt making up the remainder; fine soils are defined as having 35% to 60% clay in the subsoil; and fine-silty soils are defined as having a clay content between 18% and 35%, less than 15% sand that is coarser than very fine, and the remainder is silt. The remaining areas of the Project consist of various soil texture classifications.

Soil characteristics relevant to the assessment of impacts from construction and operation of the Project include prime farmland status, farmland of statewide importance status, hydric properties, salinity, sodicity, compaction potential, erosion potential, presence of restrictive soil layers, presence of shallow bedrock, and revegetation properties. A summary of the acres of soils within the Project footprint with these characteristics is provided in **Table 8**. Project Maps depicting the limits of the soil map units within the Project area as delineated by the NRCS are provided in **Appendix 5B**. A list of soil types within the Project footprint is provided in **Appendix 12** and includes the acreage of each soil type. An analysis of the impacts of the heat generated by the pipelines as they transport the CO_2 is provided in **Appendix 13** (Soil Heat Transfer Study). The study found that the pipelines during operation will have minimal thermal influence on the surficial soils or planting zone above the pipeline.

Table 8: Potential Soil Hazards Summary Table

Soil Characteristic	Construction Footprint (Acres)[1,2]			Operations Footprint (Acres)[1]		
	Pipeline	Aboveground Facilities	Access Roads	Pipeline	Aboveground Facilities	Access Roads
Prime Farmland	2,459.1	8.7	14.1	0.0	8.7	3.6
Farmland of Statewide Importance	2,099.4	9.3	7.7	0.0	9.3	1.3
Prime Farmland if Irrigated or Drained	1,930.7	3.8	5.4	0.0	3.8	1.7
Hydric	581.2	1.5	3.2	0.0	1.5	1.1
Saline	173.2	0.2	1.0	0.0	0.2	0.3
Sodic	110.3	--	1.4	0.0	--	--
Poor Revegetation Potential	1,451.3	7.4	12.5	0.0	7.4	1.8
Severe Wind Erosion	31.5	--	0.8	0.0	--	--
Severe Water Erosion	3,533.6	14.4	15.2	0.0	14.4	3.2

Notes:
[1] Acres are rounded up for presentation purposes.
[2] Construction footprint includes impacts from both construction and operation.
-- = No acreage

5.1.4.1 Prime Farmland

The USDA defines prime farmland as “land best suited to food, feed, forage, fiber, and oilseed crops” (7 CFR Part 657.5(a)). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few to no rocks, is permeable to water and air, is not excessively erodible or saturated with water for extended periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage). In addition, the USDA defines farmland of statewide importance as farmland for the “production of food, feed, fiber, forage, and oil seed crop” and “those that are nearly prime farmland and that produce high yields of economic important crops when treated and managed according to acceptable farming methods” (7 CFR Part 657.5(b)).

For soil discussion purposes, prime farmland soils, soils considered to be prime farmland if irrigated or drained, and all farmland of statewide importance are addressed as a single category, prime farmland soils.

5.1.4.1.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Construction impacts to prime farmland soils could include loss of topsoil, compaction of soils, mixing of topsoil with subsoil, or contamination due to fuel or lubricant spills or leaks. Approximately 2,481.9 acres (26.7%) of the lands crossed by the Project during construction have soils identified as prime farmland, and approximately 2,116.4 acres (22.8%) are identified as farmland of statewide importance. Another 1,939.9 acres (20.9%) of the footprint have soils considered to be prime farmland if irrigated or drained (NRCS, 2024). These impacts may temporarily alter the capability of prime farmland following construction. To avoid these impacts the following mitigation measures would be implemented.

ECDs will mitigate erosion and sedimentation during construction. Configuration and placement of ECDs will vary depending on topographic conditions. Devices used in erosion-prone settings include trench breakers, mulch, slope breakers, trench plugs, and sediment barriers. These devices and their placement are described in the ECP (**Appendix 4**). Construction impacts to prime farmland soils will be minimized and mitigated by implementing measures detailed in the ECP (**Appendix 4**) and the SD AIMP (**Appendix 6**). During construction topsoil will be stripped to a maximum depth of 12 inches, segregated, and handled separately from subsoil for all upland and non-saturated areas within the construction footprint. Within the construction footprint, topsoil will be stripped over the pipeline trench and the adjacent subsoil storage areas based on landowner stipulations, the ECP (**Appendix 4**), the SD AIMP (**Appendix 6**), and any required federal and state permits or authorizations. Segregated topsoil will be returned following backfilling of the subsoil and re-establishment of pre-construction contours, ensuring preservation of topsoil within the construction area.

Deep tillage of subsoil (subsoiling) will be utilized as required to improve soil health by increasing air spaces, reducing soil density and strength, and improving moisture infiltration and retention. A subsoiler, plow, or another implement will be used. Subsoiling will be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling will not be done in slip-prone areas (e.g., traversing steep slopes), where soil preparation should be limited to what is necessary for establishing vegetation.

Any fuel or lubricant leak or spill will be cleaned up immediately according to the instructions in the ECP (**Appendix 4**) to avoid long term impact to soils. All construction machinery will carry spill cleanup kits so that clean up can be conducted in a timely manner.

Following the completion of construction, areas of prime farmland disturbed by the installation of the pipelines and temporary access roads will be restored to pre-construction conditions; therefore, construction activities in these areas will not adversely impact prime farmland.

Operation Impacts and Mitigation

The footprint associated with permanent aboveground facilities (pump stations, mainline valves, launcher and receivers, and permanent access roads) would occupy 28.4 acres of soils identified as prime farmland, farmland of statewide importance, and prime farmland if irrigated or drained and represents a permanent loss of prime farmland soils. However, this impact is negligible in the context of the extent of prime farmland in South Dakota and the landowner is compensated for the use of the land. Impacts to prime farmland soils from operational pipeline maintenance activities could include exposing and repairing pipe if inspections indicate corrosion or damage.

Where required, permanent trench breakers consisting of sandbags, foam, sand/cement bags, bentonite bags, or similar materials will be installed in the trench to mitigate trench line erosion on steep slopes. Topsoil will not be used for permanent trench breakers. If pipeline inspections find corrosion or damage

to the pipeline and trenching to expose the pipeline is necessary, measures, as described above, would be implemented to mitigate disturbance and the ROW would be returned to pre-construction conditions.

5.1.4.2 Hydric Properties and Compaction Potential

Hydric soils are defined as "soils that formed under conditions of saturation, flooding, or ponding long enough during growing season to develop anaerobic conditions in the upper part" (USACE, 1987). Soils that are artificially drained or protected from flooding (i.e., by levees) are still considered hydric if the soils are poorly or very poorly drained. Due to extended periods of saturation, hydric soils can be prone to compaction and rutting, particularly if the operation of heavy equipment occurs when soils are saturated. Fine texture along with poor drainage are the primary factors that contribute to compaction in soils.

5.1.4.2.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Approximately 585.9 acres (6.3%) of the lands that would be disturbed during construction have soils rated as hydric and approximately 352.7 acres (3.8%) of lands crossed by the project are hydric and have fine textured and poorly drained to very poorly drained soils making them prone to compaction. Soil compaction and rutting have the potential to occur during construction with the movement of heavy construction vehicles along the pipeline ROW and on temporary access roads. Compaction can damage soil structure, reduce infiltration, and increase runoff and erosion. The degree of compaction will depend on the moisture content and texture of the soil at the time of construction. Compaction will be most severe where heavy equipment operates on moist to wet soils with fine textures and where multiple passes are made by heavy equipment. If soils are moist or wet where trench-line only topsoil removal has occurred, topsoil will likely adhere to tires and/or tracked vehicles in other areas and be carried away.

Rutting occurs in wet conditions when the soil strength is not sufficient to support the applied load from vehicle traffic. Ruts that exceed topsoil depth can mix topsoil with subsoil, thereby reducing soil productivity. Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically cuts plant roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting also disrupts natural surface water hydrology by damming surface water flows, creating increased soil saturation upgradient from ruts, or by diverting and concentrating water flows creating accelerated erosion.

For construction in hydric soils that are saturated, the Applicant will install timber mats to allow construction crews to traverse the construction ROW without rutting, while preventing the need to strip the saturated topsoil.

For installation of the pipe in areas with shallow groundwater, there are a number of mitigation measures that can be implemented. One option would be to install a submersible pump to dewater the ditch onto the ROW or to use lay-flat hose to dewater from the trench to the nearest bar ditch. Alternatively, the contractor may choose to install wellpoint dewatering systems that involve the use of small-diameter, shallow wells strategically spaced throughout the construction area. The wellpoints are interconnected through a main pipe system that is connected to a high-efficiency pump that dewaters to the ROW or the closest bar ditch. The contractor may also choose to install sheet piling to contain groundwater away from the construction area. Buoyancy control measures will be installed as required to prevent the pipe from floating up post installation. Any dewatering activities will be in compliance with applicable state and federal permits and authorizations.

In the event of wet weather, the Applicant may cease work on the Project until it is deemed safe to continue work without causing more than minimal rutting to areas where topsoil has not been stripped. The Applicant and Contractors will restrict certain construction activities in cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction as detailed in the SD AIMP (**Appendix 6**).

To minimize potential impact to soil resources, soil will be prepared after final grading to facilitate revegetation in undeveloped areas. This could include grading and tilling compacted soil until restored as near as practical to its pre-construction condition as detailed in the SD AIMP (**Appendix 6**) and the ECP (**Appendix 4**).

Operation Impacts and Mitigation

Impacts to hydric soils from maintenance activities will be minor since disturbances for repairs or maintenance will be isolated, short-term, and infrequent. Vegetation maintenance on the permanent pipeline ROW will periodically involve mowing through areas of hydric soils if the land is not in active agricultural production.

The same mitigation measures discussed above for construction would be applied to maintenance activities that may impact hydric soil.

5.1.4.3 Saline and Sodic Soils

Salinity is caused by the concentration of soluble salts (ionic charged particles) in the soil and is measured by electrical conductivity. Electrical conductivity values in excess of 8 Deci Siemens per meter indicate saline soil conditions. Sodic soils are caused by the lack of neutral soluble salts, thereby allowing exchangeable sodium to occupy more than 15 percent of the total exchange capacity, also known as exchangeable sodium percentage. Sodicity is measured using the sodium adsorption ratio, the ratio between sodium and other exchangeable soluble salts. A soil is considered sodic if the sodium adsorption ratio is greater than 13. Sodic soils are detrimental to plant productivity due to the toxicity of sodium and hydroxyl ions. **Appendix 12** identifies soil map units that are saline and sodic within the Project area. Soil units are mapped in **Appendix 5B**.

5.1.4.3.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

A review of the 2024 SSURGO database indicates that approximately 174.4 acres (1.9%) of soils crossed by the Project are considered saline and approximately 111.7 acres (1.2%) are considered sodic both occurring within the top six feet. While it is unlikely that saline or sodic soils will be significantly impacted by construction, the success of stabilization and restoration efforts in sodic and/or saline soils may be limited unless additional treatments and practices are employed to offset the adverse physical and chemical characteristics of the soils.

In areas with the potential to find saline or sodic soils at trench depth, preconstruction testing will be performed to identify the presence and extent of such soils. A triple lift soil excavation technique will be used to first strip and segregate the topsoil, followed by stripping and segregating the saline or sodic soil zone, then excavation of the subsoil. After construction, the soil layers will be returned to the trench in reverse order to prevent soil mixing and increase the likelihood of successful reclamation.

Operation Impacts and Mitigation

There will be negligible impacts to saline or sodic soil from operation of the Project since these soils would only be encountered if pipeline inspections required excavation and repair of the pipeline where there were saline or sodic soils. The same mitigation measures applied to construction will be put in place if saline or sodic soils are encountered during operational activities.

5.1.4.4 Restrictive Soil Layers and Shallow Bedrock

Restrictive layers and bedrock in the soil profile have potential to introduce stones or rocks to surface layers which may reduce the capacity of the soil to retain moisture, resulting in a reduction of soil productivity. The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile. A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil, restrict roots, or otherwise provide an unfavorable root environment (NRCS, 2024). Restrictive soils include hardpan, claypan, fragipan, and caliche.

Geosyntec (2024) determined that approximately 0.9 mile of project pipeline crosses shallow bedrock defined as bedrock less than five feet below ground surface. The depth to bedrock is assumed to be deeper than five feet for the remainder of the Project. As discussed in Section 5.1.2, bedrock in Eastern South Dakota is typically overlain by surficial glacial deposits up to 1,000 feet in depth. **Appendix 12** identifies the depth to bedrock for each of the soil map units and soil map units are depicted on maps in **Appendix 5B**.

5.1.4.4.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

No restrictive soils are mapped within the project footprint; therefore, no impacts to restrictive soils are anticipated. Areas with shallow depth to bedrock (less than five feet) are identified as areas that have potential to introduce rock to topsoil from construction activities. Introducing stones or rocks to surface layers may reduce the capacity of the soil to retain moisture, resulting in a reduction of soil productivity.

In areas of shallow bedrock (relative to the trench excavation depth), excavation may be conducted by blasting or by using rock saws: either method creates the potential for introducing rock to the surface or within the trench backfill at levels that will limit the success of vegetation restoration efforts.

As stated in the ECP (**Appendix 4**) and SD AIMP (**Appendix 6**), extraneous vegetative, rock, and other natural debris will be removed from the construction footprint before the completion of cleanup. Any removed rock will be replaced with soil from approved sources. Construction impacts to shallow bedrock are anticipated to be minimal since only 0.9 mile of pipeline is potentially underlain by bedrock less than five feet in depth.

Operation Impacts and Mitigation

No permanent facilities are proposed in areas where a shallow depth to bedrock has been identified; therefore, no impacts are anticipated. In the event shallow bedrock is encountered, the mitigation measures detailed above for pipeline construction will be used for soil disturbance during operations that may introduce rock to the surface.

5.1.4.5 Revegetation Potential

The crop productivity index rating provides a relative ranking for crop production and is used here to determine revegetation potential. Assumptions made in the crop productivity index are adequate management, natural weather conditions (no irrigation), artificial drainage where required, no frequent flooding on lower lying soils, and no land leveling or terracing. The index ranges from 0 to 100, with higher values indicating higher production, therefore greater revegetation potential. For the purposes of this evaluation, a crop productivity index less than 50 is considered to have poor revegetation potential. More than 80% of the soil within Project footprint has a crop productivity index rating equal to or greater than 50. Detailed information regarding revegetation potential for each map unit crossed by the Project is provided in **Appendix 12** and mapped in **Appendix 5B**. Successful restoration and revegetation of the Project workspace is important for the Applicant, landowner relations, maintaining productivity, and protecting the underlying soil from potential damage.

5.1.4.5.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Construction could negatively impact revegetation and restoration potential by causing the loss of topsoil, mixing of topsoil with subsoil, introducing rock to the surface, or accelerating erosion, all of which can reduce soil fertility and negatively impact revegetation potential. Construction also has the potential to damage existing irrigation and tile drainage systems in use as farmland management tools. While not anticipated, there is a possibility that preexisting contaminated soils could be exposed during construction.

As indicated in the sections above, the Applicant will minimize or mitigate potential construction impacts to soils that would negatively impact restoration and revegetation potential by implementing the soil protection measures identified in the ECP (**Appendix 4**) and the SD AIMP (**Appendix 6**). The measures include procedures for segregating and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices such as installation of seeding nets. In addition, the Applicant will work closely with landowners and soil conservation agencies to identify and implement recommended soil conservation practices in specific areas where they are needed. Damaged irrigation and tile drainage systems will be repaired in accordance with the ECP (**Appendix 4**) and the SD AIMP (**Appendix 6**).

If hydrocarbon contaminated soils are encountered during trench excavation, the appropriate federal and state agencies will be contacted, and a remediation plan of action will be developed in consultation with those agencies. Depending on the level of contamination found, affected soil may be removed to an approved landfill for disposal and replaced with uncontaminated soil.

Operation Impacts and Mitigation

Operation of permanent aboveground facilities will result in loss of soil resources for vegetation within the specific facilities' footprints. However, the acreage of the aboveground facilities is negligible compared to the extent of the Project footprint. Impacts to revegetation potential from maintenance activities in the permanent ROW will include potential excavation to expose the pipeline if inspections determine there is corrosion or damage. The same mitigation measures described above for construction would be used to ensure revegetation is successful in any areas of soil disturbance during operations. An analysis of the impacts of the heat generated by the pipelines as they transport the CO_2 is provided in **Appendix 13** (Soil Heat Transfer Study). The study found that the pipelines during operation will have minimal thermal influence on the surficial soils or planting zone above the pipeline.

5.1.4.6 Erosion and Sedimentation

Erosion is a continuing natural process that can be accelerated by human disturbances. Factors that can influence the degree and rapidity of erosion include soil texture, structure, length and percent of slope, vegetative cover, as well as rainfall and wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion occurs when strong winds physically move lighter, less dense soil particles such as organic matter, clay, and silt particles. Very fine particles may be suspended in the airstream and carried long distances. Slightly larger soil particles may hop along the surface. Wind erosion processes are less affected by slope angles than water erosion. Characterization of erosion potential includes both water and wind as agents of erosion.

Soils that are classified as having high erosion potential can be highly erodible but do not always exhibit this condition because of the multitude of parameters that require evaluation. Typically, field determinations of the length of the slope class crossed are needed before a soil can be definitively identified as having high water erosion potential. For example, a soil map unit may have a slope class of two to five percent. If most of the map unit crossed actually has a slope of two percent, the soils will most likely not have high water erosion potential. However, if most of the map unit being crossed have actual slopes of five percent, the soils will most likely be considered as having high water erosion potential.

The Kw Factor was used to determine areas along the Project pipeline route with soils susceptible to sheet and rill erosion by water. The Kw Factor quantifies the susceptibility of soil particles to detachment and movement by water. Soil properties affecting the Kw Factor include soil texture, organic matter content, structure, and saturated hydraulic conductivity (NRCS, 2019). Kw Factor values range from 0.02 for the least erodible soils to 0.64 for the most erodible soils, with 0.02 to 0.25 considered resistant, 0.25 to 0.40 considered moderately susceptible, and 0.40 to 0.64 considered highly susceptible to erosion.

The soil characteristic Wind Erodibility Group (WEG) was used to determine the susceptibility of soils in the Project footprint to wind erosion. The WEG groups soils into one of eight groups based on properties of the soil surface that make them susceptible to wind erosion such as texture, organic matter content, calcareous content, rock fragment content, and mineralogy (NRCS, 2019). Soil assigned to groups one and two are considered highly susceptible to erosion by wind, groups three through six are considered moderately susceptible, and groups seven and eight are considered the least susceptible to wind erosion.

5.1.4.6.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Clearing, grading, excavation, and equipment movement during Project construction have the potential to accelerate water and wind erosion processes. Construction impacts could result in discharge of sediment to waterbodies and wetlands and soil loss that could reduce soil fertility and impair revegetation. Although accelerated erosion due to construction-related soil disturbance could occur at any stage of construction, the greatest potential for erosion within the construction ROW is expected after final grading has occurred but before a vegetation cover had been reestablished.

Approximately 3,563.2 acres (38.4%) of soil along the Project pipeline route have Kw Factor values greater than 0.4 indicating high susceptibility to water erosion. **Appendix 12** includes a table of the soils in the project footprint determined to be susceptible to erosion by water (Kw Factor greater than 0.40).

Approximately 32.3 acres (<1%) of soil along the Project footprint are in WEG group two, indicating high susceptibility to erosion by wind. **Table 9** below provides a list of the soils in the project footprint determined to be susceptible to erosion by wind (WEG 1 and 2).

Table 9: Areas of Soils in the Project Area with High Susceptibility to Wind Erosion

Soil Type	WEG [1]	Facility	Pipeline ID	Milepost [2]	Length [3] (Feet)	Area [3] (Acres)
Doger loamy fine sand	2	Pipeline	SDT-207	3, 5	539.9	1.3
Elsmere loamy fine sand, loamy substratum	2	Pipeline	SDT-207	5	842.2	2.1
Forestburg-Doger loamy fine sands, 0 to 3 percent slopes	2	Pipeline	SDT-207	5, 6, 7	2,855.9	6.2
Shue loamy fine sand	2	Pipeline, Access Road	SDT-207	5, 6	6,678.9	14.2
Loup loamy fine sand	2	Pipeline	SDT-207	2, 4	456.6	1.1
Telfer-Lihen loamy fine sands, 9 to 15 percent slopes	2	Pipeline	NDM-106	25	249.1	0.6
Maddock loamy fine sand, 6 to 25 percent slopes	2	Pipeline, Access Road	SDL-514	4, 5	3,033.8	6.8

Notes:
[1] WEG = wind erodibility group
[2] Approximate milepost, soils are scattered in the area.
[3] Approximate total length (feet) and area (acres). Acres are rounded.

Erosion control mitigation measures to curtail water and wind erosion during construction are detailed in the ECP (**Appendix 4**) and the SD AIMP (**Appendix 6**) and include installation of ECDs such as silt fencing or staked hay straw bales and measures to control topsoil loss such as sediment barriers, mulch, temporary seeding, or tackifiers.

The Project will require a general Stormwater Permit for Construction Activities from the SD DANR that will apply to the entire project construction footprint. Monitoring and maintenance of erosion and sediment control devices during and after construction will be pursuant to all required permit conditions stipulated in the stormwater permit.

The Applicant will retain Environmental Inspectors (EI) during construction to monitor the effectiveness of erosion mitigation measures and to oversee and report on all construction environmental compliance. Effective erosion mitigation measures will maximize revegetation efforts following construction.

Operation Impacts and Mitigation

Impacts from operations maintenance activities that have the potential to create water and wind erosion may include clearing and excavation of pipeline segments for repairs if inspections determine that there is corrosion or damage to the pipeline. These potential operations impacts are expected to be isolated, short-term, and infrequent.

Erosion control devices as described above will be used to mitigate erosion from water and wind during any soil disturbance activities such as pipeline repairs. The Applicant's operating personnel will routinely monitor the pipeline ROW to identify areas where erosion may be occurring and will address surface erosion issues as described above. The effectiveness of revegetation and permanent ECDs installed at the close of construction will be monitored by the Applicant's operating personnel during the long-term operation and maintenance of the Project.

5.1.5 Seismic, Subsidence, and Slope Stability Risks

A Phase I Geohazard Assessment for the pipeline footprint in South Dakota was issued in October 2024 (Geosyntec, 2024), see **Appendix 24** for the report.

The assessment used a variety of sources and data sets which were approved by South Dakota's State Geologist and Program Administrator, Tim Cowman. The analysis was conducted to identify and assess potential geological hazards that could adversely affect construction and operation of the Project so that mitigation measures can be put in place to ensure safe and reliable construction and operation. The geohazard analysis involved compiling and synthesizing the data sets to create a comprehensive geohazard map for the proposed pipeline routes. GIS technology was used to overlay data, identify potential hazard zones, and analyze spatial relationships between the pipeline route and identified geohazards. Data from the analysis were used to inform the following geohazard information.

Seismic hazards include ground motion, surface faulting, and soil liquefaction. Potential hazards from strong ground motion are measured by peak horizontal ground acceleration (PGA) and expressed as a percentage of Earth's gravitational acceleration (g). Ground shaking threat categories: high potential = greater than 0.34 g, medium potential = 0.18 to 0.34 g, low potential = less than 0.18. The proposed Project lies entirely in areas with g values of less than 0.02. Surface faulting causes permanent ground deformation, exerting force on structures, both on the surface and subsurface. The Geohazard Assessment identified no Quaternary faults crossed by or within 500 feet of the proposed pipelines. Seismic soil liquefaction is a condition that occurs when loose, saturated soil is subjected to vibration or shockwaves, from a seismic event and transforms from a solid to a liquid state. Areas that are frequently or permanently saturated near the ground surface (e.g., groundwater less than 5 feet below ground surface) that are interpreted to contain relatively young (i.e., Holocene) alluvium, lacustrine (i.e., lakebed) deposits, or similar, that appear to consist of loose to moderately dense granular soils are assumed to have liquefaction potential if subjected to strong ground motion. Glacial deposits (outwash deposits, till, etc.) have liquefaction potential similar to sand. While nearly the entire Project is underlain by potentially liquefiable material, only approximately 60% appears to be underlain by shallow groundwater creating conditions for liquefaction. Liquefaction threat categories: higher liquefaction potential = areas where PGA is greater than 0.34 g, medium liquefaction potential = areas where PGA is 0.18 g to 0.34 g, and lower liquefaction potential = areas where PGA is less than 0.18 g. The entire Project is rated as less than 0.18 g indicating a low risk for soil liquefaction. In general, South Dakota historically has little earthquake activity that would be considered threatening or cause damage to property (SDGS, 2024a). The low probability of a seismic event occurring within the Project area makes the occurrence of soil liquefaction unlikely.

Land subsidence is the sinking of the Earth's surface, either gradually or suddenly, due to the subsurface movements of materials such as water or soil. Subsidence can also be induced by karst features and practices such as underground mining and fluid withdrawal. Areas with karst terrain are more susceptible to subsidence events (Galloway et al., 2005). Karst terrain results from the dissolution of highly soluble carbonate rock such as limestone and dolomite often creating sink holes. Portions of the Project are underlain by the carbonate rocks of the Niobrara Formation; however, the data reviewed suggested that the carbonate rocks are mantled by more than 50 feet of glacial deposits (Weary and Doctor, 2014). Sections of the Project underlain by the Niobrara Formation were reviewed for karst-related features using publicly available LiDAR data and Google Earth™. No surficial indications of karst-related features were observed crossing the Project. Therefore, the Niobrara Formation poses a low potential for karst-related land subsidence along the Project footprint. Voids left by underground mining can also produce sinkholes if the overburden collapses into the mine or the mine itself collapses. No mapped underground mines are documented within 250 feet of the proposed pipelines. Fluid withdrawal (oil, gas, water) can also create subsidence. Typically, fluid withdrawal subsidence occurs when the volume of fluids being removed from a subsurface aquifer is greater than the volume of fluids recharging. The Dakota aquifer underlies much of the Project. No instances of subsidence from groundwater withdrawal from the aquifer were identified. No areas of oil and gas production are located in the Project area.

Approximately 26.1% (2,427 acres) of the soils along the Project pipeline route contain clay minerals such as smectite or montmorillonite. With exposure to repeated cycles of wetting and drying, clay soils swell and shrink, and the soil fluctuates in volume and strength. Linear Extensibility Percent (LEP) represents the potential for a soil to undergo volume changes in response to wetting and drying. A soil LEP greater than six indicates higher shrink/swell capacity, LEP from three to six indicates medium capacity, and a soil LEP less than three indicates lower capacity for shrink/swell. Approximately 6% of the Project lies within medium capacity soils while most of the remaining Project area exhibits a soil LEP greater than six, indicating a high shrink/swell capacity. **Appendix 12** identifies soils along the Project pipeline route which are clay-rich. These soils are mapped in **Appendix 5B**.

Slope instability occurs when unconsolidated soils and sediments located on steep slopes become saturated, usually following a precipitation event, potentially leading to a landslide. Evaluation of the Project footprint did not identify any previously mapped landslides and there were no observable indicators of landslides identified within 250 feet of the Project based on a review of aerial imagery and LiDAR (Geosyntec, 2024).

5.1.5.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

The main geohazard of concern during construction of the pipeline will be unintentional undercutting of slopes or construction on steep slopes resulting in instability that could lead to landslides. Other hazards may result from construction on soils with shrink-swell potential since the high swelling hazard may cause slope instability during periods of precipitation and construction in areas of karst topography where subsidence may be encountered.

When selecting the proposed pipeline route, the Applicant attempted to minimize the number of steep slopes crossed by the pipeline. In areas where geologic conditions such as ground swelling or slope instability could pose a potential threat the Applicant will conduct pre-construction site assessments and design facilities to account for various ground motion hazards as required by federal regulations. Special

pipeline construction practices described in the ECP (**Appendix 4**) will minimize slope stability concerns during construction.

Construction landslide hazards can also be mitigated by:

- Returning disturbed areas to pre-existing conditions or, where necessary, reducing steep grades during construction;
- Preserving or improving surface drainage;
- Preserving or improving subsurface drainage during construction;
- Removing overburden where necessary to reduce weight of overlying soil mass; and
- Adding fill at toe of slope to resist movement.

The Applicant will design facilities to current Uniform Building Code standards and will account for swelling soils as appropriate. Portions of the pipeline routes, a single launcher and receiver and two permanent access roads are underlain by clay-rich soils which have shrink-swell properties that may cause impacts to those facilities during operations. Pipelines are less susceptible to damage by shrinking and swelling soil, but surface structures may be vulnerable. Permanent facilities built on soils with shrink-swell potential will excavate and remove such soils and replace them with clean fill to provide a stable foundation for the structures.

The Applicant will conduct pre-construction training to educate construction personnel on the identification of karst features during excavation. If karst features are identified along the route, the Applicant will take steps to ensure the integrity and safety of the pipeline, which may include realignment or specialized construction techniques. In addition to the mitigation methods outlined in the ECP (**Appendix 4**), the Applicant would:

- Direct runoff away from known and/or identified karst features during construction;
- Investigate and remediate any subsidence, cavities, or other incipient features if they present themselves during construction;
- Have a Professional Engineer/Geologist, specializing in Geotechnical Engineering and with local sinkhole experience, evaluate potential sinkhole locations;
- Fill any subsidence or holes with soil if they appear during construction as recommended by the Geotechnical Engineer/Geologist;
- Conduct additional evaluations using geophysical methods such as Ground Penetrating Radar or Electrical Resistivity Imaging and perform subsurface exploration consisting of Standard Penetration Test Method borings or Cone Penetration Test soundings as recommended by the Geotechnical Engineer; and
- Perform additional remedial repair or subsoil stabilization as directed by the Geotechnical Engineer/Geologist.

Operation Impacts and Mitigation

Since the project operations footprint is located entirely in areas rated as low risk for landslides, once construction is complete, the potential for impacts from landslide during operations will be negligible. In operations areas where karst topography is present there is the possibility of subsidence during operations as dissolution is an ongoing process. During operations, regular inspections of all above ground facilities and pipelines will be conducted to determine whether there have been impacts due to subsidence.

5.2 Hydrology

The Land Use Map Book in **Appendix 5C** depicts land use as mapped in the national land use database. **Appendix 5D** contains the field and desk top analysis to provide wetlands and waterbodies crossed by the Project, water wells in proximity to the routes, and surface groundwater aquifers. There is no surface groundwater flow information that is digitized or available in maps that can be digitized.

5.2.1 Surface Water Drainage

The Project footprint lies within five South Dakota River basins. Construction of the Project will involve 50 perennial stream crossings. **Table 10** provides the locations and lengths of the perennial stream crossings along with their crossing methods. Some perennial streams, such as the Big Sioux River, are crossed multiple times. Project construction will involve 276 additional crossings of other types of waterbodies including intermittent and ephemeral streams, ponds, and open water. A listing of all waterbody crossings is provided in **Appendix 14**. Additional information on potential impacts to these crossings is provided in Section 5.6, Water Quality. Typical drawings of waterbody crossing types can be found in Appendix B of the ECP (**Appendix 4**).

Table 10: Perennial Streams Crossed by the Project Centerline by Basin

Basin[1]	Perennial Stream	Line	Milepost	Crossing Length[2] (Feet)	County	Crossing Method[3]
Big Sioux	Big Sioux River	IAL-510	2.96	240.48	Union	HDD
James	Webber Gulch	NDT-211	90.01	161.60	Brown	HDD
Fort Randall Reservoir	Medicine Knoll Creek	SDL-320	17.72	26.46	Sully	HDD
Big Sioux	Deer Creek	SDL-513	3.80	51.51	Brookings	HDD
Big Sioux	Big Sioux River	SDL-513	8.67	41.31	Brookings	HDD
Big Sioux	Big Sioux River	SDL-513	8.70	29.32	Brookings	HDD
Big Sioux	Big Sioux River	SDL-513	8.73	105.95	Brookings	HDD
Big Sioux	Trib. to Lake Campbell Outlet	SDL-513	9.93	119.68	Brookings	HDD
Big Sioux	Battle Creek	SDL-513	19.86	21.67	Lake	WOC
Big Sioux	Bachelor Creek	SDL-513	29.38	21.64	Lake	WOC
Minnesota	Whetstone River	SDL-514	1.90	119.95	Grant	HDD
Minnesota	North Fork Yellow Bank River	SDL-514	12.92	46.22	Grant	HDD

Table 10: Perennial Streams Crossed by the Project Centerline by Basin						
Basin[1]	**Perennial Stream**	**Line**	**Milepost**	**Crossing Length[2] (Feet)**	**County**	**Crossing Method[3]**
Minnesota	North Fork Yellow Bank River	SDL-514	12.95	43.53	Grant	HDD
Big Sioux	Willow Creek	SDL-514	38.78	22.73	Codington	BORE
Big Sioux	Trib. to Big Sioux River	SDL-514	45.11	2.31	Codington	WOC
Big Sioux	Big Sioux River	SDL-514	50.54	75.38	Codington	HDD
James	James River	SDL-515	10.17	106.44	Brown	HDD
James	Moccasin Creek	SDL-515	20.11	125.34	Brown	BORE
James	Moccasin Creek	SDL-515	20.14	61.09	Brown	BORE
Big Sioux	Big Sioux River	SDM-104	27.16	92.66	Lincoln	HDD
Big Sioux	Trib. to Beaver Creek	SDM-104	47.85	4.00	Lincoln	WOC
Big Sioux	Trib. to Skunk Creek	SDM-104	55.04	7.96	Minnehaha	WOC
Lewis and Clark Lake	East Fork Vermillion River	SDM-104	97.42	54.61	Lake	HDD
James	Redstone Creek	SDM-104	129.91	53.38	Kingsbury	Bore
James	Shue Creek	SDM-105	3.07	13.30	Beadle	Bore
James	Trib. to Shue Creek	SDM-105	4.30	34.32	Beadle	WOC
James	Timber Creek	SDM-105	31.70	76.53	Spink	HDD
James	Dry Run	SDM-105	41.34	82.05	Spink	WOC
James	James River	SDM-105	50.16	68.70	Spink	HDD
James	Snake Creek	SDM-105	58.48	60.61	Spink	WOC
James	Snake Creek	SDM-105	61.49	94.03	Spink	HDD

Table 10: Perennial Streams Crossed by the Project Centerline by Basin						
Basin[1]	**Perennial Stream**	**Line**	**Milepost**	**Crossing Length[2] (Feet)**	**County**	**Crossing Method[3]**
James	Snake Creek	SDM-105	78.23	17.82	Brown	WOC
James	Trib. to James River	SDT-207	0.19	4.03	Beadle	Bore
James	James River	SDT-207	11.17	1996.67	Beadle	HDD
James	Shue Creek	SDT-207	18.01	70.99	Beadle	Bore
Big Sioux	Big Sioux River	SDT-208	0.15	251.71	Codington	HDD
Big Sioux	Big Sioux River	SDT-208	0.18	64.19	Codington	HDD
Big Sioux	Big Sioux River	SDT-208	0.72	52.97	Codington	HDD
Big Sioux	Trib. to Big Sioux River	SDT-208	9.45	29.64	Codington	WOC
James	James River	SDT-209	1.44	114.03	Spink	HDD
James	Dry Run	SDT-209	9.87	99.28	Spink	HDD
Lewis and Clark Lake	West Fork Vermillion River	SDT-212	1.09	54.98	Turner	Bore
Lewis and Clark Lake	East Fork Vermillion River	SDT-212	8.94	94.13	Turner	HDD
Lewis and Clark Lake	Elce Creek	SDT-212	10.14	18.78	Turner	Bore
Lewis and Clark Lake	Long Creek	SDT-212	13.16	18.51	Turner	Bore
Big Sioux	Beaver Creek	SDT-409	6.46	30.55	Lincoln	WOC
James	Dry Run	SDT-410	0.67	26.86	Davison	Bore
James	James River	SDT-410	7.36	159.27	Sandborn	HDD
James	Rock Creek	SDT-410	33.21	12.65	Miner	Bore
James	Redstone Creek	SDT-411	19.76	70.09	Kingsbury	HDD

[1] Hydrologic Unit Code (HUC) 6

[2] Crossing lengths represent the distance of the centerline across the waterbody

[3] HDD - Horizontal Directional Drill, WOC - Wet Open Cut

The Applicant was able to obtain information on springs from the USGS; however, the information is only a reflection of spring location information that has been reported to the agency rather than data that has been obtained during surveys specifically conducted to obtain spring information. A digital map of the

surficial aquifer was also obtained from the South Dakota Geological Survey (SDGS). **Appendix 5D** provides the location of water wells, and surface hydrology features (perennial, intermittent, and ephemeral drainages) as mapped in the field by the Applicant or via a desktop review for those parcels which survey access was denied (note that the background imagery will not represent hydrology features present during surveys). The USACE is reviewing all drainage features as part of their review of the Project's Nationwide Permit (NWP) 58 permit application.

In addition, research and discussions with the USGS, State of South Dakota, and SD DANR did not yield any georeferenced information on groundwater flows, wellhead protection areas, or springs or seeps. Wellhead protection areas are not digitized, and paper maps are not georeferenced (SD DANR, 2023). **Appendix 5D** provides the surficial aquifers that were identified using information from federal and state agencies. Surface drainages were mapped in the field by the Applicant or via a desktop review for those parcels where survey access was denied. Wetlands crossed by the Project are discussed in Section 5.4 Aquatic Ecosystems. Please also note that this is not an oil/refined products pipeline, and surface drainage features mapped outside those that are crossed are irrelevant to the review and analysis of this proposed Project.

5.2.1.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Potential impacts to surface water drainage from Project construction could include altering surface contours which could alter surface water runoff paths; creating compaction or rutting, altering the volume and rate of surface water runoff; damaging existing drainage channels such as agricultural drainage tiles and culverts which could diminish surface drainage capabilities and result in ponding or flooding; and altering stream banks and beds which could encourage sedimentation or change the stream's scour pattern resulting in changes to runoff and discharge.

The following measures will be implemented during construction to reduce impacts to surface hydrology:

- Identify drain tile systems within the pipeline ROW prior to construction and install erosion and sediment control devices for those with potential to receive stormwater discharge during construction. If drain tile systems are damaged during construction, the Applicant will implement repairs.
- Conduct civil surveys prior to construction to document terrace elevations and contours. Preserve terrace drainage patterns and reduce terrace erosion during construction by installing ECDs as detailed in the ECP (**Appendix 4**). Return all terraces to pre-construction conditions.
- Construct permanent slope breakers as detailed in the ECP (**Appendix 4**) across the ROW (except in actively tilled agricultural fields) where necessary to limit erosion. Slope breakers will divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices.

The pipeline will be constructed under river channels with potential for lateral scour. Engineering design will ensure that the pipeline will be buried at an adequate depth under channels, adjacent floodplains, and flood protection levees to avoid pipe exposure caused by channel degradation and lateral scour. Determination of the pipeline burial depth will be based on site-specific channel and hydrologic investigations were deemed necessary.

Mitigation measures used at stream crossings include using the HDD crossing method at 34 stream crossings: the James River at five locations, the Big Sioux River at nine locations, and 20 other waterways.

Additionally, ten ponds or areas of open water will also be avoided by HDD. Descriptions of HDD and other waterbody crossing methodologies are provided in Section 2.2.8 of the ECP in **Appendix 4**. Because HDD does not involve any intended direct contact with the waterbody, channel bed, or banks, no impacts to hydrology are expected at HDD crossings. Sixty-six additional streams and ponds will be crossed by boring which, similar to HDD, avoids impact to waterbodies. Impact associated with other crossing methods, such as wet open cut, that involve disturbance of stream banks and channel bottoms will be mitigated by using measures detailed in the ECP (**Appendix 4**) which include:

- Restoring banks to pre-construction contours unless too steep for restoration, in which case the banks will be restored to a stable angle of repose. Restoration includes grading, stabilization, and possibly revetments. These types of restorations will include bioengineering concepts which encourage the natural restoration of streambanks.
- Restoring stream bottoms to pre-construction conditions leaving no impediments to normal water flow.
- Restoring wetland edges to the pre-construction contours to maintain the hydrology of the wetland and stabilizing the wetland by installing permanent ECDs during final clean up.
- Installing trench breakers at wetland boundaries where the pipeline trench may cause a waterbody to drain.

After the installation of the pipeline, the disturbed ROW will be restored to its pre-construction elevations to avoid changes to the original surface drainage patterns.

Stormwater Pollution Prevention Plans (SWPPPs) will be prepared for the pipelines and all facilities (e.g., pump stations) in the course of obtaining General Stormwater Construction Permits and will identify how surface runoff will be managed. If the Project will require the storage of 1,320 gallons or more of oil products (e.g., diesel fuel, gasoline, lube oil, hydraulic oil, etc.) on the construction footprint, a Spill Prevention, Control and Countermeasure (SPCC) Plan will be developed, referenced in the SWPPPs, and submitted with the Notices of Intent for the SWPPPs.

Operation Impacts and Mitigation

Operations activities for the Project will not result in long-term substantive alterations of stream banks or channel morphology or long-term impacts to hydrology in general. If corrosion or damage is detected during pipeline inspections, excavation will expose the pipeline for repairs.

Operations personnel will conduct post-construction monitoring and inspection of construction mitigations to ensure restoration methods on terraces, wetland edges, and streambanks are effective. If pipeline repairs include in-stream work, the same mitigation measures used for construction will be employed. Permanent access roads along with any required culverts will be maintained as will SWPPP requirements for facilities.

5.2.2 Groundwater

Aquifer distribution in South Dakota is complex. In some areas, aquifers are present at several different depths. In eastern South Dakota, in the Project area, glacial outwash aquifers underlie much of the Project. A glacial outwash aquifer is an aquifer formed within outwash deposits which consist of stratified sand and gravel deposits created by melting glaciers. As a glacier melts, glacial meltwater pushes sediment away, leaving behind a layer of rocks, dirt, and sediment referred to as glacial outwash. Well-sorted, unconsolidated material within glacial outwash can store large quantities of groundwater, and in the Project area many public water supply systems draw from these relatively shallow water sources.

Approximately 60% of the Project overlays areas where groundwater is estimated to be within six feet of the ground surface (Geosyntec, 2024). Other aquifers, such as the Dakota Sandstone Aquifer, also underlie the Project but at great depth and would not be affected by the Project. Groundwater is not currently proposed for use during construction and operation of the Project. **Table 11** provides all aquifers germane to Project construction.

Table 11: Aquifers Crossed by the Project

Route ID	Start Milepost	To Milepost	County	Length (miles)	Aquifer Name	Type
IAL-510	0.00	1.42	Lincoln	1.42	Big Sioux	Glacial Outwash
IAL-510	1.42	2.95	Union	1.53	Big Sioux	Glacial Outwash
NDM-106	15.23	19.38	McPherson	4.15	Spring Creek	Glacial Outwash and Alluvium
NDM-106	22.68	24.59	McPherson	1.90	Spring Creek	Glacial Outwash and Alluvium
SDL-320	17.65	18.03	Sully	0.38	Highmore-Blunt	Glacial Outwash
SDL-513	0.00	11.91	Brookings	11.91	Big Sioux	Glacial Outwash
SDL-514	28.63	29.05	Grant	0.42	Antelope Valley	Glacial Outwash
SDL-514	29.05	30.84	Codington	1.79	Antelope Valley	Glacial Outwash
SDL-514	50.05	51.32	Codington	1.26	Big Sioux	Glacial Outwash
SDL-515	19.62	25.93	Brown	6.31	Elm	Glacial Outwash
SDM-104	27.14	28.18	Lincoln	1.04	Big Sioux	Glacial Outwash
SDM-104	96.81	98.75	Lake	1.94	Vermillion East-Fork	Glacial Outwash
SDM-104	98.91	99.30	Lake	0.39	Vermillion East-Fork	Glacial Outwash
SDM-104	99.83	100.15	Lake	0.32	Vermillion East-Fork	Glacial Outwash
SDM-105	25.26	37.73	Spink	12.47	Tulare	Glacial Outwash
SDM-105	67.62	67.82	Spink	0.21	Elm	Glacial Outwash
SDM-105	67.82	73.93	Brown	6.10	Elm	Glacial Outwash
SDT-206	3.26	9.91	Lake	6.65	Skunk Creek	Glacial Outwash
SDT-206	11.37	12.22	Lake	0.85	Skunk Creek	Glacial Outwash
SDT-207	7.73	10.27	Beadle	2.54	Tulare	Glacial Outwash
SDT-208	0.00	2.98	Codington	2.98	Big Sioux	Glacial Outwash
SDT-208	8.20	10.06	Codington	1.86	Big Sioux	Glacial Outwash
SDT-208	38.63	40.43	Clark	1.80	Vermillion East-Fork	Glacial Outwash
SDT-209	11.94	12.65	Spink	0.71	Tulare	Glacial Outwash
SDT-210	0.00	3.23	Brown	3.23	Elm	Glacial Outwash

Table 11: Aquifers Crossed by the Project						
Route ID	**Start Milepost**	**To Milepost**	**County**	**Length (miles)**	**Aquifer Name**	**Type**
SDT-212	0.59	1.36	Turner	0.77	Vermillion West-Fork	Glacial Outwash
SDT-212	8.26	9.38	Turner	1.11	Vermillion East-Fork	Glacial Outwash
SDT-411	8.25	11.14	Kingsbury	2.89	Vermillion East-Fork	Glacial Outwash
Source: https://danr.sd.gov/Press/DataAndMapping.aspx						

5.2.2.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Groundwater will not be used during construction of the Project. There is negligible potential for spills or leaks of fuel or lubricants to penetrate the ground surface and infiltrate groundwater during construction.

Procedures for spill or leak cleanup are included in the ECP (**Appendix 4**), and all construction equipment and vehicles will be required to carry spill kits to ensure timely cleanup. Additionally, much of the pipeline is underlain by confining materials (e.g., clays) that inhibit the infiltration of spills or leaks into groundwater.

Operation Impacts and Mitigation

Groundwater will not be used during operations of the Project. Operational activities will be infrequent, short-term, and localized and will include maintaining ROW vegetation and conducting pipeline inspections. If inspections find pipeline corrosion or damage, the pipeline will be excavated for repair. During pipeline operations there is the possibility of a release of CO_2 which could result in a temporary increase of CO_2 within groundwater temporarily affecting groundwater quality.

If a CO_2 release were to occur, the Project would immediately implement its emergency procedures, isolate the pipeline segment where the release has occurred, and remove that segment from service pending investigation and repair. However, if a CO_2 release were to occur it would expand into a gaseous phase, accelerate out of the ground or through surface water if the release occurred under a waterbody since the pipeline is under pressure, and escape into the atmosphere. Known occurrences of naturally CO_2 -charged potable water show that the common chemical reaction processes from dissolution of CO_2 into freshwater include rapid buffering of acidity by dissolution of calcite and slower equilibrium by reaction with clays and feldspars. Results from a series reaction of CO_2 with diverse aquifer rocks shows geochemical response within hours to days after introduction of CO_2 (R. Smyth, et al, 2009).

As noted above, much of the Project is underlain by confining materials that inhibit the infiltration of spills or leaks into groundwater. There is negligible potential for a spill or leak of fuel or lubricant that could contaminate ground water from vegetation maintenance equipment or from construction equipment during operational repairs.

5.2.3 Water Use and Sources

Municipal and rural water supplies in the Project area are largely drawn from groundwater sources with some sourced from surface water such as the Missouri River and Lake Oahe. The SD DANR administers the federal Safe Drinking Water Act in South Dakota as well as South Dakota's Drinking Water Regulations

that apply to public water systems in the state. The SD DANR has developed a Wellhead Protection Program that defines the land area which contributes water to a well and works to define potential contaminant sources in that wellhead protection area in the interest of protecting water quality (SD DANR, 2024a). Comprehensive data for the locations and areal extents of Wellhead Protection Areas is not available from SD DANR. The Applicant is consulting with SD DANR to identify any potential wellhead protection areas or other protected source water areas that may be intersected by the Project.

The South Dakota Association of Rural Water Systems (SDARWS) consists of seven districts, the Project lying within four of the districts, that have a broad mandate to work to promote the conservation, development, and proper management of water resources within their respective boundaries. On a practical level, almost any activity involving water can be considered by the districts; however, the districts have no regulatory authority. The Applicant provided a project overview presentation to the SDARWS in January 2022 and held another meeting with their representatives in December 2023. The Applicant was advised to collaborate individually with each rural water system to develop agreements. In early 2024, the Applicant initially held bi-monthly meetings with the rural water systems to provide updates and address any questions. The Applicant is actively engaging in discussions to finalize water system agreements. The SDARWS maintains a database of rural water systems in the state (SDARWS, 2024). The Project intersects 13 rural water systems as shown in **Table 12**.

Table 12: South Dakota Rural Water Systems Crossed by the Project

Rural Water System	Pipelines
BDM	SDL-515
Big Sioux	SDL-513
	SDT-206
Clark	SDT-208
Davison	SDT-410
Grant-Roberts	SDL-514
Kingbrook	SDL-513
	SDM-104
	SDT-206
	SDT-208
	SDT-410
	SDT-411
Lincoln	SDM-104
Mid-Dakota	SDL-320
	SDM-104
	SDM-105
	SDT-207
	SDT-208
	SDT-410
Minnehaha	SDM-104

Table 12: South Dakota Rural Water Systems Crossed by the Project	
Rural Water System	**Pipelines**
Sioux	SDT-212
	SDL-514
	SDT-208
South Lincoln	IAL-510
	SDM-104
	SDT-409
T-M	SDT-212
WEB	NDM-106
	NDT-211
	SDL-320
	SDL-335
	SDL-515
	SDM-105
	SDT-209
	SDT-210
Source: https://www.sdarws.com/ruralwatersystems.html	

The three largest uses of water associated with Project construction will be the water required for conducting hydrostatic tests during the final phase of construction, dust control, and HDD activity. Water used for hydrostatic testing of the pipeline, which will be approximately 26 million gallons in total, will be obtained from surface water resources. Preliminarily identified water sources for hydrostatic tests are provided in **Table 13**.

Table 13: Water Sources for Project Hydrostatic Tests			
Water Source	**County**	**Line**	**Section/Township/Range**
Big Sioux River	Lincoln	SDM-104	Sec. 33 T. 99N R. 48W [1]
James River	Spink	SDM-105	Sec. 34 T. 120N R. 63W [1]
Round Lake	Lake	SDT-206	Sec. 04 T. 105N R. 51W [1]
James River	Beadle	SDT-207	Sec. 35 T. 112N R.61W [1]
James River	Spink	SDT-209	Sec. 25 T. 117N R. 64W [1]
James River	Brown	SDL-515	Sec. 02 T. 122N R. 62W [1]
Lake Albert	Grant	SDL-514	Sec. 35 T. 121N R. 47W [1]
James River	Sanborn	SDT-410	Sec. 36 T. 105N R. 60W [1]
Notes: [1] Sec = Section, T = Township; N = North; R = Range; W = West			

Applications will be filed with the SD DANR for permits to appropriate water for all withdrawals (**Table 2**). Withdrawals will be subject to permit stipulations which may include restriction of withdrawal rates based on stream flow. Water will be recycled / transferred between pipeline test sections to reduce overall withdrawal volumes. Alternative water sources may be identified.

5.2.3.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

The Project will require substantial amounts of water for hydrostatic testing, dust control, and HDD support with the potential to impact the availability of water for the public. Construction will cross rural water systems pipelines with potential to impact those lines. During the final phase of construction, hydrostatic test water may be released to receiving water, or to the ROW where it may make its way to receiving water, with negligible potential to introduce contaminants to the receiving water. There is negligible potential for spills or leaks of fuel or lubricants from construction equipment to reach source water.

The Project will purchase water for construction use (hydrostatic testing, HDD support, and dust control) from municipalities and permit surface water sources for the water necessary to build the pipelines. Purchase agreements with the municipalities will ensure that Project consumption does not impact the volumes required for public use. To minimize the water volume required to conduct hydrostatic testing, the Project will shuttle water between pipeline test segments for reuse wherever practical and in keeping with any water use regulations. Permitting of new surface water sources will follow all permitting stipulations and volume/rate of withdrawal requirements of SD DANR permits.

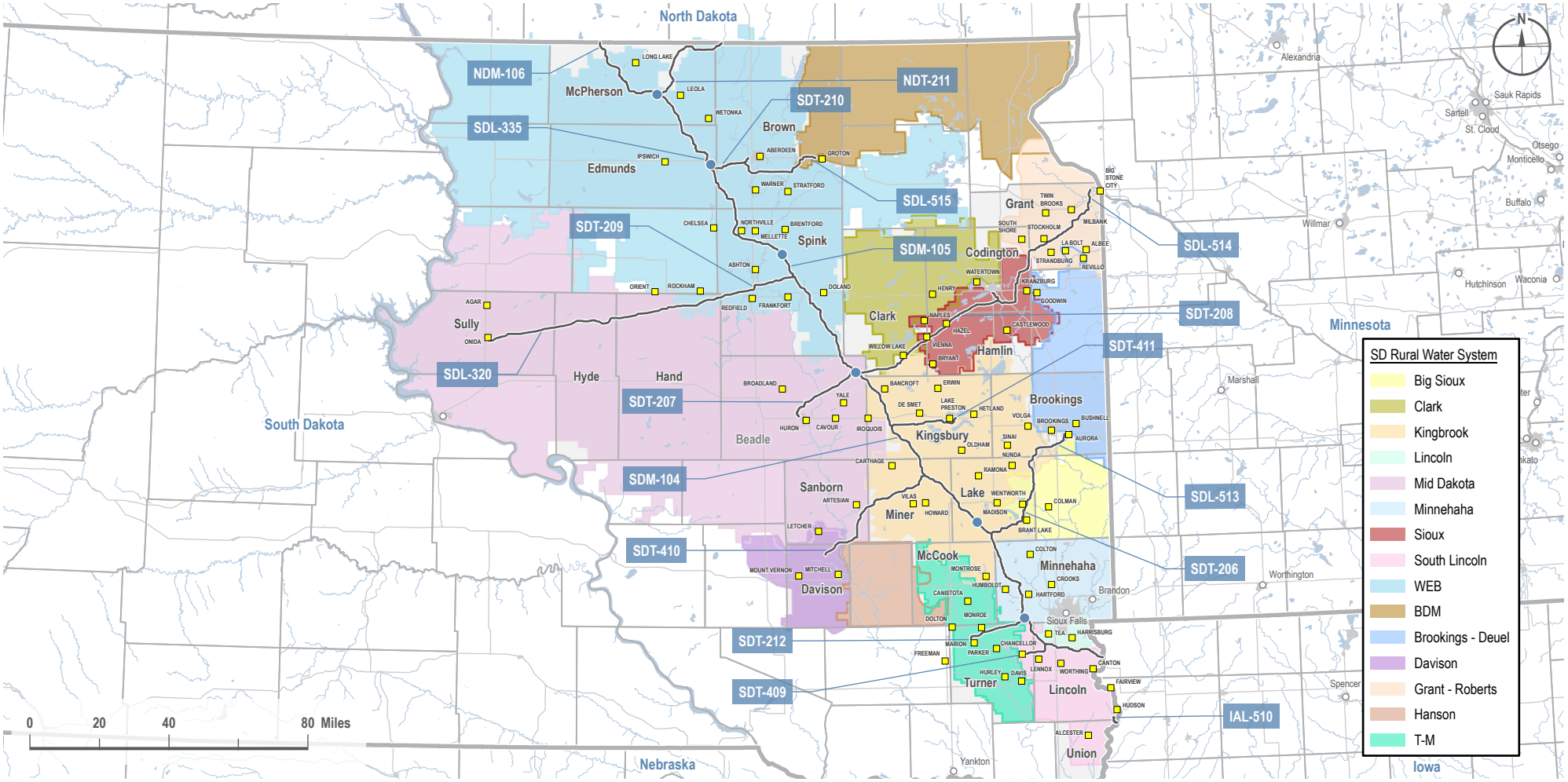
Prior to construction, the Applicant will determine the locations of rural water system pipelines by engaging South Dakota 811 Call Before You Dig. Crossing agreements developed with rural water systems will detail crossing methodologies and mitigation measures to be used to avoid impacts to water system pipelines. Typically, existing utilities such as the rural water system pipelines are crossed by installing the pipeline with a minimum of 24 inches of vertical separation while the existing utility remains in operation.

To mitigate potential impacts from the release of hydrostatic test water, the temperature of the water in the pipe will be allowed to “stabilize” to ambient ground temperature (approximately 12 hours) prior to dewatering. Hydrostatic test water will be dewatered through an energy dissipation device to a filtration system to minimize erosion and mitigate the risk of contamination reaching a receiving water.

To mitigate potential spills and leaks of fuel and lubricants from construction equipment, refueling and lubricating will be restricted to upland areas at least 100 feet from streams, wetlands, ditches, and other waterbodies and at least 150 feet away from groundwater wells. Fuels and lubricants will be stored in designated areas in approved containers. The SPCC procedures are described in the ECP (**Appendix 4**) and will be implemented in compliance with 40 CFR Part 112 (for oil spills) and the SD DANR Ground Water Quality Standards, Administrative Rules of South Dakota (ARSD) Chapter 74:54:01.

In limited situations, refueling water withdrawal pumps or directional drill equipment located within or near a water source may be required. In these situations, the specific measures identified in Section 8.0 (Spill Prevention, Containment, and Response) of the ECP (**Appendix 4**) will be followed.

SOUTH DAKOTA RURAL WATER SYSTEM AREAS CROSSED BY THE PROJECT



VICINITY MAP

LEGEND

- Proposed Project Route (as of 2024-10-04)
- Populated Place within 10 miles of the Project
- Pump Station
- County Boundary
- State Boundary
- City / Town
- Urban Area
- Highway
- River / Stream
- Waterbody

Pipeline Naming Convention
[State Abbreviation][Line Designation] - [Line Number]
(e.g. SDT-207)
-State Abbreviation: Iowa (IA), North Dakota (ND), South Dakota (SD)
-Line Designation: Lateral (L), Main (M), Trunk (T)
-Line Number: 3-digit series

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SUMMIT CARBON SOLUTIONS

REVISIONS

Date	Revised by	Checked by
2024-10-08	JC	GS

0 - Issued for SDPUC Application

Date	Revised by	Checked by

MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Rural Water System Areas Crossed by the Project
South Dakota

Figure Number: Figure 4

Scale: 1 : 2,750,000
1 inch equals 43.4 miles

Projection: Transverse Mercator
NAD 1983 UTM Zone 14N

Sheet: 1
1 of 1

Drawing Number: 1002-06-37
Revision 0

Operation Impacts and Mitigation

Pump Stations will not require any groundwater use during operations; therefore, no impacts to groundwater resources from aboveground facilities is anticipated.

If a CO_2 release were to occur, the Project would immediately implement its emergency procedures, which include detecting the release through monitoring systems and triggering alarms to alert personnel. The affected area will be evacuated, local emergency services will be notified. The pipeline segment where the release occurred will be isolated by activating shut-off valves and reducing pressure to prevent further leakage. The affected segment will be removed from service pending investigation to determine the cause of the release, followed by the necessary repairs before the segment is returned to service. However, if a CO_2 release were to occur it would expand into a gaseous phase, accelerate out of the ground since the pipeline is under pressure, and escape into the atmosphere. Known occurrences of naturally CO_2-charged potable water show that the common chemical reaction processes from dissolution of CO_2 into groundwater include rapid buffering of acidity by dissolution of calcite and slower equilibrium by reaction with clays and feldspars.

5.3 Terrestrial Ecosystems

The Project footprint in South Dakota is located within three Level III ecoregions: the Northern Glaciated Plains Ecoregion, the Western Corn Belt Plains Ecoregion, and the Northwestern Glaciated Plains Ecoregion, and ten Level IV ecoregions. General descriptions of these ecosystems and the proportion of the Project located within the ecosystems are provided below in **Table 14.**

Table 14: Ecoregions Crossed by the Project

Level III Ecoregion [1]	Level III Ecoregion Vegetation [2]	Level IV Ecoregion [3]	Project [1,3]	
			Miles	Percent
Northwestern Glaciated Plains	Spear grass (*Heteropogon contortus)*, blue grama grass (*Bouteloua gracilis*), and wheat grass (*Triticum aestivum*), were once dominant native grasses that covered many parts of the landscape. A variety of shrubs and herbs were also common as well as some sagebrush. On the driest sites yellow cactus and prickly pear (*Opuntia* spp.) can be found. Scrubby quaking aspen (P*opulus tremuloides*), willow (*Salix* spp), cottonwood (*Populus deltoides*), and box elder (*Acer negundo*) occur to a limited extent on shaded slopes of valleys and river terraces. Local saline areas support alkali grass (*Puccinellia nuttallii*), wild barley (*Hordeum spontaneum*), greasewood (*Sarcobatus vermiculatus*), red sampire (*Salicornia rubra*), and sea blite (*Suaeda maritima*). Streams in the region are mostly intermittent, though some are perennial, and there are some larger rivers. The region is drained by the Missouri River system to the south and to the north by the South Saskatchewan River. In some areas, a	Missouri Coteau	85	12%
		Southern Missouri Coteau Slope	19	3%
		Total for Northwestern Glaciated Plains	**104**	**15%**

Table 14: Ecoregions Crossed by the Project				
Level III Ecoregion [1]	**Level III Ecoregion Vegetation [2]**	**Level IV Ecoregion [3]**	**Project [1,3]**	
			Miles	**Percent**
	high concentration of semi-permanent and seasonal wetlands can be found, locally referred to as Prairie Potholes.			
Western Corn Belt Plains	Once a tallgrass prairie, this ecoregion was covered with little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), numerous forbs, and with small areas of bur oak (*Quercus macrocara*) and oak-hickory (*Carya ovata*) woodlands. The region has nearly all been converted to agricultural land. There are intermittent and perennial streams, many of which have been channelized. A few areas have natural lakes.	Loess Prairies	3	< 1%
		Total for Western Corn Belt Plains	**3**	**< 1%**
Northern Glaciated Plains	Most of the region is now farmland but in its native state, the landscape was characterized by quaking aspen (*Populus tremuloides*), oak groves, mixed tall shrubs, and intermittent fescue grasslands. Bur oak (*Quercus macrocara*) and grassland communities occupied drier sites. Many areas had transitional grassland containing tallgrass and shortgrass prairie, including big (*Andropogon gerardi*) and little bluestem (*Schizachyrium scoparium*), green needlegrass (*Nassella viridula*), blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), and switchgrass (*Panicum virgatum*). There is a low density of streams and rivers across the area. High concentrations of temporary and seasonal wetlands create favorable conditions for waterfowl nesting and migration.	Drift Plains	73	10%
		James River Lowland	232	33%
		Minnesota River Prairie	19	3%
		Prairie Coteau	138	20%
		Prairie Coteau Escarpment	5	1%
		Big Sioux Basin	38	5%
		Glacial Lake Basins	86	12%

Table 14: Ecoregions Crossed by the Project				
Level III Ecoregion [1]	**Level III Ecoregion Vegetation [2]**	**Level IV Ecoregion [3]**	**Project [1,3]**	
			Miles	**Percent**
		Total for Northern Glaciated Plains	**591**	**85%**

Notes:
[1] GIS data accessed online at https://www.epa.gov/eco-research/ecoregions-north-america.
[2] Descriptions from CEC 2011.
[3] Project centerline miles and percent of total Project centerline miles.

5.3.1 Vegetation Communities

Vegetation communities are described below. Additional information regarding vegetation communities is provided in the Project's Threatened and Endangered Species Report in **Appendix 15** and Wetland Delineation Report in **Appendix 16**.

5.3.1.1 General Vegetation

The distribution of land cover types along the pipeline ROW is summarized below in **Table 15**. This analysis is from high level land cover data from the U.S. Government and does not have the granularity presented in follow-on tables of vegetation types or impacts (e.g., **Table 20**). Most of the lands along the pipeline ROW are cultivated lands (68.1%), pasture / hay fields (12.6%), or grasslands (9.6%).

Table 15: Land Cover Types Traversed by the Project in South Dakota			
Cover Type[1]	**Project Centerline**		**Description[3]**
	Miles[2]	**Percent[2]**	
Irrigated lands/water sources for organized rural water systems lands/Public use	0.23	<0.1%	Areas of open water, generally with less than 25% cover of vegetation or soil.
Irrigated lands/water sources for organized rural water systems lands	0.42	<0.1%	Manmade and natural ponds.
Existing and potential extractive nonrenewable resources	<0.01	<0.1%	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
Rural residences and farmsteads, family farms, and ranches / Residential / Noise Sensitive Land Use	2.73	0.4%	Includes such land as residential, commercial, industrial, ROW corridors. Vegetation in previously disturbed areas is frequently little to none and is often composed of introduced weedy species. The previously disturbed areas crossed by the Project have been identified through land-use classification as ROW corridors, with a very small portion (<0.1 mile) identified as rural residence. ROW corridors include roads, utility corridors and railroads.

Table 15: Land Cover Types Traversed by the Project in South Dakota			
Cover Type[1]	**Project Centerline**		**Description[3]**
	Miles[2]	**Percent[2]**	
			These areas have often been replanted with a mixture of grass and forbs.
Rural residences and farmsteads, family farms, and ranches / Residential / Public use / Noise Sensitive Land Use	14.17	2.0%	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
Land used primarily for row and non-row crops in rotation	475.18	68.1%	Areas used for the production of annual crops, which in the Project area are crops such as wheat, corn, and soybeans. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
Pasturelands and rangelands / Haylands	87.59	12.6%	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation. Dominant vegetation observed in hayfields within the Project area consisted of oat (*Avena sativa*), blue grama (*Bouteloua gracilis*), smooth brome (*Bromus inermis*), blue grama (*Bouteloua gracilis*), redroot (*Ceanothus americanus*), orchard grass (*Dactylis glomerata*), creeping wildrye (*Elymus repens*), fox-tail barley (*Hordeum jubatum*), alfalfa (*Medicago sativa*), reed canarygrass (*Phalaris arundinacea*), Kentucky bluegrass (*Poa pratensis*), tall false ryegrass (*Schedeonorus arundinaceus*), and common dandelion (*Taraxacum officinale*). (Perennial 2021a, 2022b)
Palustrine Emergent (PEM) Wetlands	47.84	6.9%	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water. See descriptions of PEM wetland vegetation in Section 5.3.1. Further description is provided in the Project wetlands report provided in **Appendix 16**.
Palustrine Forested (PFO) Wetlands	0.16	<0.1%	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water. See descriptions of palustrine scrub shrub (PSS) and palustrine forested (PFO) wetland vegetation in Section 5.3.1. Additional information is provided in the Project wetlands report provided in **Appendix 16**.
Palustrine Scrub/Shrub (PSS) Wetlands	0.14	<0.1%	Areas where perennial PSS herbaceous vegetation accounts for greater than 80% of vegetative cover and the

Table 15: Land Cover Types Traversed by the Project in South Dakota			
Cover Type[1]	**Project Centerline**		**Description[3]**
	Miles[2]	**Percent[2]**	
			soil or substrate is periodically saturated with or covered with water.
Public Use	1.1	0.2%	Includes areas of deciduous forest dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change. Forests within the Project area are characterized as hardwood forests. Dominant tree and shrub species in the Project area include boxelder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), eastern red-cedar (*Juniperus virginiana*), European buckthorn (*Rhamnus cathartica*), American-aster (*Symphyotrichum lanceolatum*), American elm (*Ulmus americana*), and Siberian elm (*Ulmus pumila*). Also includes areas of shrub/scrub dominated by shrubs less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Undisturbed native grasslands	66.86	9.6%	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing by overseeding with species to facilitate grazing.
Potential sources for irrigated lands	0.52	0.1%	Areas of open water, generally with less than 25% cover of vegetation or soil with an ephemeral or intermittent flow regime.
Potential sources for irrigated lands / Public Use	0.99	0.1%	Areas of open water, generally with less than 25% cover of vegetation or soil with a perennial flow regime.
Public, commercial, and institutional use	0.07	<0.1%	Developed lands include such land for commercial and industrial uses. Vegetation in previously disturbed areas is frequently little to none and is often composed of introduced weedy species.

Notes:

[1] NLCD cover type descriptors have been revised to reflect SD PUC land use categories (South Dakota Administrative Rules 20:10:22:18). See Section 5.5.1 34 for additional information about NLCD cover type revisions. The wetland classification types and crossing lengths are based on data collected from field surveys for the Project rather than the NLCD.

[2] Length totals and percentages are rounded.

[3] Cover types of descriptions from National Land Cover Database 2021 (NLCD 2021) Legend online at: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description

Grasslands in the Project area (not classified as wetlands, agricultural lands, or hayfields) were found to be prairie habitat or tame planted grasslands. The prairie habitat consists of open land with a diverse mix

of grass species. These include tall grass, mixed grass, and short grass prairie types. Dominant vegetation observed in prairie habitat within the Project survey area consisted of slender wildrye (*Elymus trachycaulus*), smooth oxeye (*Heliopsis helianthoides*), field sow-thistle (*Sonchus arvensis*), stiff goldenrod (*Solidago rigida*), big bluestem (*Andropogon gerardii*), Canadian thistle (*Cirsium arvense*), Kentucky bluegrass (*Poa pratensis*), Canadian goldenrod (*Solidago canadensis*), fox-tail barley (*Hordeum jubatum*), smooth brome (*Bromus inermis*), western-wheat grass (*Pascopyrum smithii*), velvetleaf (*Abutilon theophrasti*), yellow bristlegrass (*Setaria pumila*), buffalograss (*Bouteloua dactyloides*), white sagebrush (*Artemisia ludoviciana*), little false bluestem (*Schizachyrium scoparium*), porcupine grass (*Stipa spartea*), needle and thread (*Stipa comata*), western snowberry (*Symphoricarpos occidentalis*), careless weed (*Amaranthus palmeri*), prairie junegrass (*Koeleria nitida*), common dandelion (*Taraxacum officinale*), white heath aster (*Symphyotrichum ericoides*), curlycup gumweed (*Grindelia squarrosa*), intermediate wheatgrass (*Agropyron intermedium*), annual ragweed (*Ambrosia artemisiifolia*), yard knotweed (*Polygonum aviculare*), perennial ragweed (*Ambrosia psilostachya*), creeping wildrye (*Elymus repens*), alfalfa (*Medicago sativa*), and prairie sunflower (*Helianthus petiolaris*). Tame or planted grasslands consist of tame pastures of cultivated fields planted with introduced (non-native) grass and legume species or cultivars with the multiple purposes of providing livestock grazing and foraging. Dominant vegetation observed in tame/planted grasslands within the Project survey area consisted of smooth brome, Kentucky bluegrass, big bluestem, reed canarygrass (*Phalaris arundinacea*), yellow bristle grass, creeping wild rye, wavy-leaf thistle (*Cirsium undulatum*), broad-leaf cattail (*Typha latifolia*), buffalograss, perennial ryegrass (*Lolium perenne*), crested wheatgrass (*Agropyron cristatum*), needleleaf sedge (*Carex duriuscula*), blue grama (*Bouteloua gracilis*), common dandelion, slender wildrye, alfalfa, and perennial ragweed (see the Wetland Delineation Report, **Appendix 16**). The majority of the grasslands found were not undisturbed native grasslands, and although not tilled, were overseeded with legumes, cultivars, or non-native grass species for grazing.

5.3.1.2 Grassland and Wetland Easements

USFWS established grassland and wetland easement programs to conserve habitat for nesting waterfowl and grassland birds in the Prairie Pothole Region. The easements are voluntary agreements with the landowners to protect the habitats on their property. After selling the wetland easement, the landowner cannot drain, fill, levee or burn the wetlands. However, if the wetlands dry up naturally, they can be farmed, grazed, or hayed (USFWS, 2020a). After selling the grassland easement, the landowner cannot mow, hay or harvest grass seed from the grassland until after July 15 of each year (USFWS, 2020b). This provision is to allow grassland nesting species, such as ducks and pheasants, time to fledge their young before any manipulation is done to the habitat. Grazing is permitted anytime. The landowners maintain ownership of their land and control whether to allow hunting or trapping.

During Project meetings, USFWS Ecological Services staff voiced a general concern regarding potential Project impacts to native grassland and wetland easements (i.e., protected wetlands) and further stated that mitigation will likely be required for surface crossings of USFWS easements. These easements are numerous and widespread across eastern South Dakota. GIS shapefiles were obtained from USFWS for all USFWS grassland and wetland easements in South Dakota. The Applicant has adjusted the route to avoid direct impacts to these resources. Construction of the Project will not result in any surface disturbance within the grassland or wetland easements[7] by either avoidance by routing around the easement or by

[7] The commitment to avoid surface disturbance to USFWS grassland and wetland easements applies to those grassland and wetlands easements that were established prior to the establishment of an easement with the landowner on a parcel crossed by the

utilizing a trenchless crossing method, such as HDD or bore, to cross the USFWS grassland or wetland easements. The location of HDD and bore crossings of these easements are listed in **Table 16**.

5.3.1.3 Noxious Weeds

The Administrative Rules of South Dakota (ARSD, 12:62:03:01.06) identifies and classifies seven plant species as noxious weeds statewide. ARSD 12:62:03:01.07 also provides a list of 27 additional plant species from which county boards may select species to be classified as locally noxious weeds within their respective county. Plant species identified either as statewide noxious weeds or selected as locally noxious by counties traversed by the Project are listed in **Table 17**. Surveys for noxious weeds have not been conducted in the Project footprint. Documented occurrences of statewide noxious weeds in counties traversed by the Project are indicated in **Table 17**. Reported infestations of state listed noxious weeds in South Dakota in 2023 are summarized by county in **Table 18** and infestations of county listed noxious weeds in 2020 and 2023 are summarized in **Table 19**.

Table 16: Horizontal Directional Drill and Bore Crossings of USFWS Grassland Easements and Wetland Easement (Protected Wetlands)

Easement Crossed By Centerline	County	Pipeline ID	Milepost	Length (Feet)	Impacts Avoided[1] (Acres)
Grassland[2]	McPherson	NDM-106	0.50	2,641	3.03
Grassland[2]	McPherson	NDM-106	7.37	2,536	2.91
Grassland[3]	McPherson	NDM-106	8.86	132	0.15
Grassland and Wetland[2]	McPherson	NDM-106	11.04	171	0.20
Grassland and Wetland[2]	McPherson	NDM-106	15.67	3,333	3.77
Grassland[3]	McPherson	NDM-106	16.81	212	0.24
Grassland[3]	McPherson	NDM-106	23.92	50	0.06
Grassland[3]	McPherson	NDM-106	25.01	77	0.09
Grassland[2]	McPherson	NDT-211	116.56	885	1.02
Grassland and Wetlands[2]	Hyde	SDL-320	29.23	2,648	3.04
Grassland[3]	Hyde	SDL-320	33.60	<1	0.02
Grassland[2]	Hand	SDL-320	40.69	2,812	3.23
Grassland[2]	Hand	SDL-320	41.22	183	0.21
Grassland and Wetland[3]	Hand	SDL-320	45.46	239	0.27
Wetland[3]	Hand	SDL-320	53.52	307	0.35
Grassland[2]	Hand	SDL-320	58.96	2,646	3.04

Applicant. The USFWS will honor pipeline easements on tracts that were acquired by the USFWS after Summit signed an easement with the landowner.

Table 16: Horizontal Directional Drill and Bore Crossings of USFWS Grassland Easements and Wetland Easement (Protected Wetlands)

Easement Crossed By Centerline	County	Pipeline ID	Milepost	Length (Feet)	Impacts Avoided[1] (Acres)
Grassland and Wetlands[2]	Hand	SDL-320	66.29	753	0.86
Grassland and Wetland[2]	Hand	SDL-320	66.82	2,640	3.03
Grassland[2]	Spink	SDL-320	75.88	386	0.44
Wetlands[2]	Spink	SDL-320	79.11	903	1.03
Wetlands[2]	Edmunds	SDL-335	0.06	116	0.14
Grassland[2]	Grant	SDL-514	27.36	792	0.91
Grassland and Wetlands[2]	Codington	SDL-514	35.49	4,197	4.83
Grassland[2]	Minnehaha	SDM-104	78.48	1,531	1.76
Grassland[2]	Spink	SDM-105	9.76	1,190	1.37
Grassland[3]	Spink	SDM-105	60.46	175	0.19
Grassland[2]	Edmunds	SDM-105	82.25	2,340	2.69
Grassland[2]	Edmunds	SDM-105	89.61	817	0.94
Grassland and Wetland[2]	Edmunds	SDM-105	91.29	1,979	2.27
Wetland[2]	Edmunds	SDM-105	94.89	977	1.12
Grassland[3]	McPherson	SDM-105	108.31	92	0.11
Grassland and Wetlands[2]	McPherson	SDM-105	112.02	3,033	3.48
Wetland[2]	Spink	SDT-209	1.92	288	0.33
Wetland[3]	Brown	SDT-210	6.41	20	0.02
Grassland[3]	Edmunds	SDT-210	11.58	96	0.11
Wetland[2]	Kingsbury	SDT-411	9.44	412	0.47
Grassland and Wetland[2]	Kingsbury	SDT-411	19.35	2,600	2.98

Notes:
[1] Acres are rounded.
[2] Crossed via HDD
[3] Crossed via Bore

Table 17: Noxious Weeds in South Dakota Counties Traversed by the Project

Noxious Weed	Noxious Weeds In Counties Traversed By The Project [1,2]																						
	Beadle	Brookings	Brown	Clark	Codington	Davison	Edmunds	Grant	Hamlin	Hand	Hyde	Kingsbury	Lake	Lincoln	Mccook	Mcpherson	Miner	Minnehaha	Sanborn	Spink	Sully	Turner	Union
Absinth wormwood [1] *Euphorbia esula*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Bull thistle [2] *Cirsium vulgare*	C	C	C	C	C	C	--	C	C	--	C	--	C	--	C	--	C	--	--	--	--	---	C
Canada thistle [1] *Cirsium arvense*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Common burdock [2] *Arctium minus*	--	--	--	--	--	--	--	C	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--
Common mullein [2] *Verbascum Thapsus*	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--
Field bindweed [2] *Convolvulus arvensis*	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--
Hoary cress [1] *Cardana draba*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Houndstongue [2] *Cynoglossum oficinale*	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--
Leafy spurge [1] *Euphorbia esula*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Musk thistle [2] *Carduus nutans*	C	C	C	--	C	C	--	C	C	C	C	C	C	C	C	--	C	-	C	C	--	--	C
Palmer Amaranth [2] *Amaranthus palmeri*	--	--	--	--	--	--	C	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--
Perennial sowthistle [1] *Sonchus arvensis*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Plumeless thistle [2] *Carduus acanthoides*	C	C	C	--	C	C	--	C	C	C	C	C	C	C	C	--	C	--	C	C	--	--	C
Poison hemlock [2] *Conium maculatum*	--	--	--	C	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Purple loosestrife [1] *Lythrum salicaria*	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Saltcedar [1] *Tamarix* spp.	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW

Table 17: Noxious Weeds in South Dakota Counties Traversed by the Project

Noxious Weed	Noxious Weeds In Counties Traversed By The Project [1,2]																						
	Beadle	Brookings	Brown	Clark	Codington	Davison	Edmunds	Grant	Hamlin	Hand	Hyde	Kingsbury	Lake	Lincoln	Mccook	Mcpherson	Miner	Minnehaha	Sanborn	Spink	Sully	Turner	Union
Scotch thistle [2] *Onopordum acanthium*	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--
Spotted knapweed [2] *Centaurea maculosa*	--	--	--	C	--	--	--	C	--	--	--	--	C	C	--	--	--	--	--	--	--	--	--
Yellow toadflax [2] *Linaria vulgaris*	C	--	C	--	--	C	C	--	C	C	--	--	--	--	--	C	--	--	--	C	--	--	--
Wild Parsnip [2] *Pastinaca sativa*	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--

[1] Statewide (SW) noxious weed species per ARSD 12:62:03:01.06 and online at https://danr.sd.gov/Conservation/PlantIndustry/WeedPest/WeedandPestInfo/StateNoxious/default.aspx.
[2] Localized (C) noxious weed in noted county per South Dakota Locally Noxious Weed Pest List, available at https://danr.sd.gov/Conservation/PlantIndustry/WeedPest/docs/noxiousweeds.pdf.

Table 18: Reported Infestations of Statewide Noxious Weeds in Counties Traversed by the Project							
	Acres Infested With Statewide Noxious Plant Species In 2023 [1]						
County	**Absinth Wormwood**	**Leafy Spurge**	**Canada Thistle**	**Hoary Cress**	Perennial Sowthistle	**Purple Loosestrife**	Saltcedar
Beadle	5,001-10,000	501-1,000	5,001-10,000	None reported	1,001-5,000	None reported	None reported
Brookings	501-1,000	5,001-10,000	20,001-40,000	None reported	1,001-5,000	None reported	None reported
Brown	5,001-10,000	>10,001	20,001-40,000	None reported	5,001-10,000	None reported	<100
Clark	>10,001	5,001-10,000	20,001-40,000	None reported	5,001-10,000	None reported	None reported
Codington	5,001-10,000	1,001-5,000	20,001-40,000	None reported	1,001-5,000	None reported	None reported
Davison	1,001-5,000	1,001-5,000	10,001-20,000	<100	501-1,000	<100	None reported
Grant	501-1,000	1,001-5,000	5,001-10,000	None reported	<100	None reported	<100
Edmunds	1,001-5,000	5,001-10,000	20,001-40,000	None reported	1,001-5,000	<100	None reported
Hamlin	1,001-5,000	1,001-5,000	20,001-40,000	None reported	1,001-5,000	<100	None reported
Hand	1,001-5,000	101-500	20,001-40,000	<100	1,001-5,000	None reported	None reported
Hyde	5,001-10,000	101-500	20,001-40,000	None reported	101-500	None reported	None reported
Kingsbury	>10,001	5,001-10,000	>50,001	None reported	>10,001	None reported	None reported
Lake	501-1,000	No data	No data	No data	No data	101-500	No data
Lincoln	<100	1,001-5,000	5,001-10,000	<100	1,001-5,000	<100	<100
McCook	501-1,000	>10,001	10,001-20,000	None reported	1,001-5,000	None reported	<100
McPherson	>10,001	>10,001	20,001-40,000	None reported	None reported	None reported	None reported
Miner	501-1,000	101-500	5,001-10,000	None reported	101-500	None reported	None reported
Minnehaha	101-500	101-500	<5,000	<100	101-500	<100	None reported
Sanborn	None reported	>10,001	20,001-40,000	None reported	5,001-10,000	101-500	None reported
Spink	1,001-5,000	1,001-5,000	10,001-20,000	None reported	1,001-5,000	<100	<100

Table 18: Reported Infestations of Statewide Noxious Weeds in Counties Traversed by the Project

County	Acres Infested With Statewide Noxious Plant Species In 2023 [1]						
	Absinth Wormwood	Leafy Spurge	Canada Thistle	Hoary Cress	Perennial Sowthistle	Purple Loosestrife	Saltcedar
Sully	1,001-5,000	101-500	<5,000	None reported	<100	None reported	None reported
Turner	5,001-10,000	>10,001	20,001-40,000	501-1,000	1,001-5,000	<100	None reported
Union	None reported	5,001-10,000	5,001-10,000	None reported	None reported	101-500	None reported

Notes

[1] Infested acres from South Dakota Department of Agriculture and Natural Resources maps available at https://danr.sd.gov/Conservation/PlantIndustry/WeedPest/WeedandPestInfo/StateNoxious/default.aspx.

Table 19: Reported Infestations of Locally Noxious Weeds in Counties Traversed by the Project

County	Acres Infested Within County Of County Listed Noxious Plant Species [1,2]						
	Bull Thistle[3]	Common Tansy[3]	Mullin[3]	Musk & Plumeless Thistle[4]	Poison Hemlock[4]	Spotted Knapweed[4]	Yellow Toadflax[4]
Beadle	None Reported	None Reported	101-500	5,001-10,000	None Reported	None Reported	<100
Brookings	501-1,000	None Reported	None Reported	101-500	None Reported	None Reported	None Reported
Brown	501-1,000	None Reported	None Reported	101-500	<100	None Reported	101-500
Clark	5,001-10,000	None Reported	None Reported	None Reported	501-1,000	1,001-5,000	None Reported
Codington	1,000-5,000	None Reported	None Reported	1,001-5,000	<100	None Reported	501-1,000
Davison	101-500	None Reported	None Reported	>10,000	<100	None Reported	<100
Grant	None Reported	<100	None Reported	101-500	None Reported	<100	<100
Edmunds	None Reported	None Reported	None Reported	None Reported	None Reported	None Reported	1,001-5,000
Hamlin	101-500	None Reported	None Reported	1,001-5,000	<100	None Reported	<100

Table 19: Reported Infestations of Locally Noxious Weeds in Counties Traversed by the Project

County	Acres Infested Within County Of County Listed Noxious Plant Species [1,2]						
	Bull Thistle[3]	Common Tansy[3]	Mullin[3]	Musk & Plumeless Thistle[4]	Poison Hemlock[4]	Spotted Knapweed[4]	Yellow Toadflax[4]
Hand	None Reported	None Reported	None Reported	1,001-5,000	None Reported	None Reported	<100
Hyde	None Reported	None Reported	<100	501-1,000	None Reported	None Reported	None Reported
Kingsbury	1,001-5,000	None Reported	None Reported	>10,000	<100	None Reported	None Reported
Lake	None Reported	None Reported	None Reported	No Data	None Reported	None Reported	None Reported
Lincoln	None Reported	None Reported	None Reported	501-1,000	None Reported	None Reported	None Reported
McCook	None Reported	None Reported	None Reported	501-1,000	None Reported	None Reported	None Reported
McPherson	None Reported	None Reported	None Reported	None Reported	None Reported	None Reported	>10,000
Miner	None Reported	None Reported	None Reported	5,001-10,000	None Reported	None Reported	None Reported
Minnehaha	None Reported	None Reported	None Reported	1,001-5,000	None Reported	None Reported	None Reported
Sanborn	None Reported	None Reported	None Reported	5,001-10,000	None Reported	None Reported	None Reported
Spink	None Reported	None Reported	None Reported	<100	None Reported	None Reported	<100
Sully	None Reported	None Reported	None Reported	None Reported	None Reported	None Reported	None Reported
Turner	None Reported	None Reported	None Reported	None Reported	None Reported	501-1,000	None Reported
Union	1,001-5,000	None Reported	None Reported	1,001-5,000	None Reported	None Reported	None Reported

Notes
[1] Infested acres from South Dakota Department of Agriculture and Natural Resources maps available at https://danr.sd.gov/Conservation/PlantIndustry/WeedPest/WeedandPestInfo/LocalNoxious/default.aspx.
[2] Although noxious weed infestations may be reported in a county, the species may not be selected by the county board as per ARSD 12:62:03:01.07 and listed in the South Dakota Locally Noxious Weed Pest List (https://danr.sd.gov/Conservation/PlantIndustry/WeedPest/docs/noxiousweeds.pdf).
[3] Species distribution map developed in 2020.
[4] Species distribution map developed in 2023.

5.3.1.4 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Construction of the Project will disturb a total of approximately 9,284 acres (**Table 20**) within South Dakota. Most of these lands are agricultural lands for crop production or used for pasture / hay production. What is not in agricultural production is barren, open water, or herbaceous vegetation. The impacts to these areas will be short term except for 41.45 acres of developed land used for aboveground facilities, including MLV sites, launcher and receiver sites, and permanent access roads. Approximately 0.84 acre of forested wetlands will be converted to herbaceous wetlands within the permanent ROW.

Agricultural areas with crops present will be mowed or disced to ground level unless the landowner requests for the crops to be removed so there will be a relatively small, temporary loss of crops in many agricultural areas during construction. Agricultural areas that have terraces will be surveyed to determine pre-construction contours and ensure restoration will be successful when establishing original contours and drainage patterns.

In areas of disturbed native grasslands and pastures, the Applicant has committed to collaborating with both the NRCS and other agencies prior to construction to develop appropriate native vegetation and pollinator seed mixes to implement in reseeding efforts where applicable along the disturbed ROW, with landowner approval.

Table 20: Project Impacts by Land Cover Type in South Dakota

Cover Type [1]	Construction Impact [2]		Operation Impact [3]	
	Acres[4]	Percent	Acres[4]	Percent
Irrigated lands/water sources for organized rural water systems lands/Public use	1.38	<0.0%	0.0	0.0%
Irrigated lands/water sources for organized rural water systems lands	2.84	<0.0%	0.0	0.0%
Existing and potential extractive nonrenewable resources	0.26	<0.0%	0.0	0.0%
Rural residences and farmsteads, family farms, and ranches / Residential / Noise Sensitive Land Use	34.66	0.4%	2.54	6.1%
Rural residences and farmsteads, family farms, and ranches / Residential / Public use / Noise Sensitive Land Use	189.40	2.0%	3.67	8.9%
Land used primarily for row and non-row crops in rotation	6,513.62	70.2%	18.44	44.5%
Pasturelands and rangelands / Haylands	1,194.12	12.9%	13.03	31.4%
Palustrine Emergent (PEM) Wetlands	441.50	4.8%	0.62	1.5%

Table 20: Project Impacts by Land Cover Type in South Dakota

Cover Type [1]	Construction Impact [2]		Operation Impact [3]	
	Acres[4]	Percent	Acres[4]	Percent
Palustrine Forested (PFO) Wetlands	1.10	<0.0%	0.84	2.0%
Palustrine Scrub/Shrub (PSS) Wetlands	1.33	<0.0%	0.0	0.0%
Public Use	15.83	0.2%	0.15	0.4%
Undisturbed native grasslands	875.85	9.4%	1.96	4.7%
Potential sources for irrigated lands	4.63	<0.0%	0.02	<0.0%
Potential sources for irrigated lands / Public Use	6.51	0.1%	0.0	0.0%
Public, commercial, and institutional use	1.06	<0.0%	0.18	0.4%
Total [5]	**9,284.09**	**100.0%**	**41.45**	**100%**

Notes:
[1] Cover types from and as mapped by National Land Cover Database but revised to include survey and desktop analysis. NLCD cover type descriptors have been revised to reflect SD legislation (South Dakota Administrative Rules 20:10:22:18). See Section 5.5.1 34 for additional information about NLCD cover type revisions.
[2] Construction impacts consist of Project footprint during construction including the operational pipeline ROW, temporary and additional temporary workspace (ATWS).
[3] Operation impacts consist of areas where permanent facilities exist including pump stations, MLVs, launcher and receivers, and permanent access roads and where PFO wetlands will be converted to PEM wetlands within the operational ROW.
[4] Acres are rounded.
[5] Totals are rounded to the nearest tenth and may cause totals to be minimally different.

Trees required to be removed will either be provided to the landowner for their use or sale or hauled and disposed of in an appropriate manner. The permanent ROW will be kept free of trees to ensure integrity and ease of maintenance and aerial patrols.

Bushes and trees will be felled or sheared to prevent damage to adjacent trees and structures. Tree stump removal and grading activities will be limited to directly over the trench or where needed for a safe work area. For HDDs and bores of waterbodies where there will be no travel lane within the ROW (such as using a bridge), no clearing will occur over the HDD path. The Applicant may trim vegetation with hand tools as needed to access a water source for HDD operations, hydrostatic testing of the pipeline.

The Applicant has developed a South Dakota Noxious Weed Management Plan specific to the Project (**Appendix 17**) and will implement procedures detailed within the plan to prevent the spread of noxious weeds. The Contractor will clean the tracks, tires, and blades of equipment by water or compressed air to remove excess soil prior to moving the equipment out of weed or soil-borne pest infested areas. The Contractor may also utilize cleaning stations to remove vegetative and soil materials using water at a high pressure in lieu of compressed air. The duration between final grading and permanent seeding will be minimized to reduce the potential growth of nuisance species establishing. Certified weed-free hay or straw will be used for mulch and sediment barriers. Where required by weed control boards for specific species that require treatment ahead of construction, the topsoil will be stripped from the full width of

the ROW where isolated weed populations exist and will be stored separately from other topsoil and subsoil. These locations will be identified and marked prior to construction activities by an EI. Alternatively, approved herbicides may be used to prevent the growth and spread of weeds. Only non-residual herbicides will be used.

Additionally, the Applicant has prepared a SD AIMP (**Appendix 6**) and will implement proposed measures within the SD AIMP to minimize impacts to and restore agricultural lands during and after construction. Mitigation measures within the SD AIMP include procedures for segregating and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices such as installation of seeding nets. In addition, the Applicant will work closely with landowners and soil conservation agencies to identify and implement recommended soil conservation practices in specific areas where they are needed. Damaged irrigation and tile drainage systems will be repaired in accordance with the SD AIMP.

Operation Impacts and Mitigation

Most of the ROW will be allowed to revert to pre-construction vegetative conditions. This includes all of the temporarily impacted lands totaling approximately 5,035.9 acres (**Table 19)** and much of the permanent ROW (4,206.6 acres). Exceptions in the permanent ROW include maintenance of an herbaceous corridor over the centerline through wooded areas and PFO wetlands and the permanent loss of vegetation at aboveground facilities, including pump stations, MLVs, launchers and receivers, and permanent access roads, which total approximately 40.6 acres. Approximately 0.84 acre of forested wetlands will be converted to herbaceous wetlands within the permanent ROW.

Maintenance activities may result in minor alterations of vegetation including clearing the permanent pipeline ROW of vegetation (in areas outside wetlands, waterbodies, and agricultural land). The same mitigation measures employed during construction will be employed during vegetation clearing of the permanent pipeline ROW.

5.3.2 Wildlife

5.3.2.1 Biological Consultations

Coordination with USFWS has been ongoing and several meetings have been held with both the USFWS and state wildlife agencies. Meetings were held to introduce the Project and to discuss potential wildlife impacts, review species lists, provide survey results, and discuss mitigation measures and next steps. USFWS Wetland Management Districts and Refuges were contacted to identify federally owned lands and/or easements crossed by the Project. Two pre-application meetings were held on August 24, 2021, and attended by Project representatives and USFWS Ecological Services staff in North Dakota and South Dakota. Additional meetings with the USFWS in South Dakota were held from 2021 through 2023 with an update provided in May 2024. Meetings provided results of surveys, changes to the Project, and steps forward as changes occurred. A meeting with the USFWS and, separately the SDGFP, was held in January 2022 to discuss listed species and surveys requirements. Recommendations and concerns offered by agency staff during those meetings are summarized below in **Table 21** and additional communications with environmental agencies are compiled in **Appendix 22** – Environmental Agency Correspondence Table.

Table 21: Recommendations And Concerns Voiced By USFWS During Project Pre-Application Meetings	
Topic	**USFWS Recommendation / Concern [1]**
Listed Species [2]	USFWS is most concerned with the Dakota skipper in South Dakota
	Prairie bush- clover should not be on the species list
	Poweshiek skipperling should not be on the species list
	Dakota skipper has a limited survey window and few qualified surveyors
Suggested Mitigation	Few northern long-eared bat roost trees in State but avoid tree felling in June and July[3]
	Keep migratory birds in mind when scheduling construction
	Utilize trenchless methods to cross streams and rivers that support Topeka shiner
	Stop construction when whooping cranes are observed near the Project
	Concerned regarding impacts to grasslands
	Mitigation will likely be required for surface crossings of USFWS easements
	USFWS recommends siting yards in agricultural areas
	Recommended avoiding USFWS fee-owned lands or boring underneath

Notes:
[1] Voiced by USFWS Ecological Services during meetings held with Project representatives in various meetings.
[2] Draft species list presented by Project included Dakota skipper, Poweshiek skipperling, prairie bush-clover, Western prairie fringed orchid, pallid sturgeon, northern long-eared bat, whooping crane, and piping plover.
[3] Since the time of this pre-application meeting, the federal status of the northern long-eared bat has been reclassified as endangered, and the Applicant has now committed to not falling any trees in suitable northern long-eared bat habitat during the bat's active season from May 15 to September 30.

5.3.2.2 Wildlife Habitat

Wildlife habitat has been assessed concurrently with other biological surveys, e.g., wetlands and waterbodies. Habitat was primarily assessed to determine its suitability for potentially supporting listed species. Subsequently, several surveys have been conducted to assess habitat suitability more thoroughly as well as complete presence/absence surveys for several listed species including Dakota skipper, Topeka shiner, and lined snake. In addition, the Applicant completed a desktop analysis of northern long-eared bat habitat along the entire route in South Dakota, following USFWS guidance (USFWS 2023). Wildlife habitat will continue to be assessed concurrently with other biological surveys as well as species-specific surveys.

5.3.2.3 Big Game Species

Big game animals are species of relatively large mammals or birds that are commonly hunted and for which hunting seasons are routinely established in South Dakota. Big game found in South Dakota counties crossed by the Project include white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*) and wild turkey (*Meleagris gallopavo*) as indicated in **Table 22.** These species are discussed further below.

Table 22: Distribution and Occurrence of Big Game Species in Project Counties				
County	**White-Tailed Deer[1]**	**Mule Deer[1]**	**Pronghorn[1]**	**Wild Turkey[1]**
Beadle	primary range	rare/few to locally fair	rare	primary range/few to locally fair
Brookings	primary range	rare	rare	primary range / few to locally fair
Brown	primary range	rare	rare	few to locally fair

Table 22: Distribution and Occurrence of Big Game Species in Project Counties				
County	**White-Tailed Deer[1]**	**Mule Deer[1]**	**Pronghorn[1]**	**Wild Turkey[1]**
Clark	primary range	rare	rare	few to locally fair
Codington	primary range	rare	rare	few to locally fair / primary range
Davison	primary range	rare/few to locally fair	rare	few to locally fair / primary range
Edmunds	primary range	rare to primary range	rare	few to locally fair
Grant	primary range	rare	rare	primary range/few to locally fair
Hamlin	primary range	rare	rare	few to locally fair / primary range
Hand	primary range	primary range to rare	few to locally fair	few to locally fair / primary range
Hyde	primary range	primary range	few to locally fair	few to locally fair
Kingsbury	primary range	rare	rare	few to locally fair
Lake	primary range	rare	rare	few to locally fair
Lincoln	primary range	rare	rare	few to locally fair / primary range
McCook	primary range	rare	rare	few to locally fair
McPherson	primary range	rare to primary range	rare	few to locally fair
Miner	primary range	rare	rare	few to locally fair
Minnehaha	primary range	rare	rare	few to locally fair / primary range
Sanborn	primary range	rare	rare	Primary range / few to locally fair
Spink	primary range	rare	rare	few to locally fair
Sully	primary range	primary range	few to locally fair	few to locally fair
Turner	primary range	rare	rare	few to locally fair / primary range
Union	primary range	rare	rare	Primary range / few to locally fair

Notes:
[1] Occurrence data from SDGFP (2014) Wildlife Action Plan Explorer website at: https://apps.sd.gov/gf43wap/Species.aspx#tab2.

5.3.2.3.1 Deer

Deer are the most important big game animals in terms of statewide hunting effort and harvests. Two species occur in South Dakota. The white-tailed deer is found in suitable habitat across all of South Dakota with all of the Project counties classified as being within its primary range. The white-tailed deer is highly adaptable and can be found in urban areas, deciduous and coniferous forests, plains, prairies, agricultural areas, and drier areas. The other South Dakota deer species, the mule deer, is found wherever there is suitable habitat in western South Dakota (west of Missouri Breaks) where it prefers hills or open country. Mule deer occurrences are considered to be rare in most Project counties, but Edmunds, McPherson, Sully, Hyde, and Hand counties are considered to be in primary mule deer range. Only about 3 percent of the deer in SDGFP's East River firearm management unit, which encompasses all of South Dakota east of the Missouri River, are mule deer, the remainder being white-tailed deer (SDGFP, 2017a).

Hunting seasons are established annually across the State. The Project counties are in SDGFP's East River firearm management unit, which typically has the main (firearms) deer hunting season November 23 – December 8, with wider seasons for archery and muzzleloaders (generally September-December).

5.3.2.3.2 Pronghorn

The pronghorn antelope is found in suitable habitat across western South Dakota where it prefers short grass and mixed-grass prairies with rolling hills that provide good visibility. It is found in much more limited numbers in eastern South Dakota, and its occurrence is generally rated as rare in all counties traversed by the Project, except for Hand, Hyde, and Sully counties where it is rated as few to locally fair (SDGFP, 2019a). The pronghorn is not protected under state or federal endangered species laws and hunting seasons are established annually for this species within Management Units. Currently, Sully County (Management Unit 59A) and Hyde and Hand counties (both in Management Unit 38A) are the only Project counties open to pronghorn hunting (SDGFP, 2024a). SDGFP (2024b, 2024c) reported relatively low 2022 spring pronghorn densities of 0.01-0.5 animals per square mile (State range 0.01-7.0) and low 2023 harvests of 0-1 pronghorns per 100 square miles (State range 01 to >30) in Sully County (Unit 59A) and Hyde and Hand Counties (Unit 38A). SDGFP (2024b) For the combined 2023 firearm and archery seasons, 12 pronghorn were harvested in Sully County (Unit 59A) and 12 were harvested in Hyde and Hand counties (Unit 38A). There are currently no pronghorn hunting seasons established in the other Project counties.

5.3.2.3.3 Wild Turkey

Wild turkeys were extirpated from the State by 1920 but have been brought back through a series of reintroductions from 1950 to 2008 and they are now found in the Black Hills, and riparian drainages with suitable woodland habitat, and in established woodland areas across the state (SDGFP, 2021d). In South Dakota, the species prefers hardwood and mixed conifer-hardwood forests with scattered open areas (SDGFP, 2021d). Hunting seasons are established annually for the wild turkey in South Dakota with prairie portions of the State having two seasons, a spring season in April-May and a fall season in November-January (SDGFP, 2021e). Some Project counties have little if any good habitat, and therefore few if any turkeys, and no turkey hunting (**Table 23**). Although most, if not all, suitable wild turkey habitat in the State is now inhabited by wild turkeys, SDGFP's management goals for most areas still include increases in the turkey populations (SDGFP, 2021d).

Table 23: Turkey Management Areas and Hunting Success in Project Counties

Management Unit [1]	Project County [2]	Spring 2023 And Fall 2022 Hunting Season [4]				Management Goal [5,6]
		Licenses Sold[3]	Hunter Success[3] (%)	Harvest By Season		
				Spring	Fall	
01A	Minnehaha	80	43	34	9	increase
06A	Brookings	40	48	19	–	increase
08A/08B	Davison	100/100	50/27	50/27	11	increase
22A	Codington	126	45	57	–	increase
29A	Grant	300	49	146	60	increase
32A	Hamlin/Clark	20	58	12	–	increase
40A	Beadle/Hand	20	40	8	–	increase
44A/44B	Lincoln	50/49	35/38	18/19	2	increase

Table 23: Turkey Management Areas and Hunting Success in Project Counties

Management Unit [1]	Project County [2]	Spring 2023 And Fall 2022 Hunting Season [4]					
		Licenses Sold[3]		Hunter Success[3] (%)	Harvest By Season		Management Goal [5,6]
					Spring	Fall	
56A	Sanborn	10		25	3	–	increase
61A	Turner	30		67	20	–	increase
62A	Union	120		49	58	16	increase
–	Brown, Edmunds, Hyde, Lake, McCook, McPherson, Miner, Spink, Sully	–	–	–	–	–	

Notes:
[1] Hunting license not valid outside regulatory Management Unit (SDGFP 2021d).
[2] County within the Management Unit with Project footprint.
[3] Data from SDGFP 2023 Spring Turkey Harvest Report.
[4]Data from SDGFP 2023 Spring and 2022 Fall Turkey Harvest Statistics (SDGFP 2021f); dashes (–) indicate no fall turkey hunting season in these counties, no harvest record.
[5] Data from SDGFP 2021d; dashes (–) indicate no season in the county.
[6] Management goal set by SDGFP (2021d) as increase, maintain, or decrease turkey population.
[7] Management Unit also includes Day County, which has no Project footprint.

5.3.2.4 Small Game Species

Small game are those species of birds and mammals other than big game, which are legally hunted in South Dakota during established hunting seasons. Mammalian small game species include cottontail rabbits (*Sylvilagus* spp) and tree squirrels (*Sciurus* spp). Avian small game species include American crow (*Corvus brachyrhynchus*), common snipe (*Gallinago gallinago*), mourning dove (*Zenaida macroura*), and the upland game birds northern bobwhite (*Colinus virginanus*), gray partridge (*Perdix perdix*), chukar partridge (*Alectoris chukar*), ringneck pheasant (*Phasianus colchicus*), ruffed grouse (*Bonasa umbellus*), sharp-tailed grouse (*Tympanuchus phasianellus*), greater prairie-chicken (*Tympanuchus cupido*), greater sage grouse (*Centrocercus urophasianus*). Sandhill crane (*Antigone canadensis*), tundra swan (*Cygnus columbianus*), and ducks may also be considered small game species. All of these species are, or may be, hunted in the Project counties except the greater sage grouse and the ruffed grouse, which are both found only in far western South Dakota.

5.3.2.4.1 Prairie Grouse

Prairie grouse (sharp-tailed grouse and the greater prairie-chicken) are important game birds in the State. In 2020, a projected 10,487 resident and 6,389 nonresident grouse hunters harvested a total of 67,261 prairie grouse (SDGFP, 2024g). Habitat prioritization areas have been established by SDGFP for prairie grouse. Prairie grouse abundance and Project proximity to prairie grouse priority habitat are provided in **Table 23**. The lekking and nesting season is generally March 1 – July 30, although lekking may start as early as late February and mean nesting initiation has been reported as April 22 (SDGFP, 2017). SDGFP used prairie grouse occupancy and habitat characteristics to model habitat and identify priority habitats for conservation (Runnia and Solem, 2018). The distribution of these priority habitats in relation to Project footprint is indicated in **Table 24.**

The Applicant conducted aerial surveys for sharp-tailed grouse and greater prairie-chicken leks in April 2022. The Applicant's initial surveys found 77 of the leks are within 8 miles of the current route. Surveys

will be conducted prior to construction to confirm lek sites and construction restrictions. SDGFP and the Applicant agreed to implement construction mitigation measures to avoid disruption to lek sites. The measures included morning construction restrictions within 2 miles of a documented lek between 0.5 hour before to 2 hours after sunrise from March 1 to June 30 and a no construction restriction within 0.5 mile of a documented lek from March 1 to June 30.

Table 24: Abundance, Priority Habitats, and Harvest of Prairie Grouse in Project Counties

Project County	Sharp-Tailed Grouse			Greater Prairie Chicken			Prairie Grouse Harvest (Birds/100 Sq Mi)[3]
	Abundance [1]	Priority Habitat In [2]		Abundance [1]	Priority Habitat In [2]		
		County	Footprint		County	Footprint	
Beadle	present, <10 Leks	yes	yes	present, <10 Leks	yes	--	0-23
Brookings	maybe present	yes	yes	possibly present	--	--	0-23
Brown	present, no known leks	yes	yes	present, <10 leks	--	--	0-23
Clark	present, <10 leks	yes	--	present, <10 leks	--	--	0-23
Codington	present, <10 leks	yes	yes	present, no known leks	--	--	24-78
Davison	maybe present	yes	--	possibly present	--	--	24-78
Edmunds	present, <10 leks	yes	yes	present, no known leks	yes	--	0-23
Grant	present,>10 leks	yes	yes	present, <10 leks	--	--	0-23
Hamlin	maybe present	yes	--	possibly present	--	--	0-23
Hand	present,>10 leks	yes	yes	present,>10 leks	yes	yes	24-78
Hyde	present,>10 leks	yes	yes	present,>10 leks	yes	yes	0-23
Kingsbury	present, no known leks	yes	yes	possibly present	--	--	0-23
Lake	maybe present	yes	yes	possibly present	--	--	0-23
Lincoln	probably absent	--	--	probably absent	--	--	24-78
McCook	maybe present	yes	--	probably absent	--	--	0-23
McPherson	present,>10 leks	yes	yes	present, <10 leks	--	--	24-78
Miner	present, no known leks	yes	--	possibly present	--	--	0-23
Minnehaha	maybe present	yes	--	probably absent	--	--	0-23
Sanborn	maybe present	yes	yes	present, no known leks	--	--	0-23

Table 24: Abundance, Priority Habitats, and Harvest of Prairie Grouse in Project Counties

Project County	Sharp-Tailed Grouse			Greater Prairie Chicken			Prairie Grouse Harvest (Birds/100 Sq Mi)[3]
	Abundance [1]	Priority Habitat In [2]		Abundance [1]	Priority Habitat In [2]		
		County	Footprint		County	Footprint	
Spink	present, no known leks	yes	yes	present, <10 leks	yes	--	0-23
Sully	present,>10 leks	yes	yes	present, <10 leks	yes	yes	24-78
Turner	maybe present	yes	--	possibly present	--	--	0-23
Union	probably absent	--	--	probably absent	--	--	0-23

Notes
[1] SDGFP (2022) assesses abundance and distribution based on the number of known leks.
[2] Priority habitat within the Project County and within Project footprint per GIS layers obtained from SDGFP Environmental Review Tool and reviewed on 06/11/2024 athttps://ert.gfp.sd.gov/content/map.
[3] Average number of prairie grouse (sharp-tailed grouse and greater prairie chicken) harvested per 100 square miles in 2022 per SDGFP 2023 Prairie Grouse Hunting Forecast Report .

5.3.2.4.2 Ringneck Pheasant

The ringneck pheasant is another very important small game species with over one million birds harvested in most years. Central and eastern South Dakota are within the primary range of the ringneck. During the 2022 hunting season >38-64 pheasants per square mile were harvested in Brown, Beadle, Miner, and Davison counties, >24-38 in Brookings, Clark, Edmunds, Kingsbury, McCook, Spink, and Sully counties, >13.4-24 in Codington, Hamlin, Hand, Lake, McPherson, Minnehaha, and Turner counties, >5.6-13.4 in Hyde, Lincoln and Union counties, and >0-5.6 in Grant and Sanborn counties (SDGFP, 2024h).

5.3.2.4.3 Waterfowl

Central and eastern South Dakota are within the Prairie Pothole Region. Prairie potholes account for just 10 percent of North America's waterfowl breeding habitat, but the region produces nearly half the continent's ducks. USFWS has used funds from the sale of Federal Duck Stamps to conserve some of the most threatened and productive migratory bird habitats as Waterfowl Production Areas (WPAs) which may be fee-title lands or easements and are part of the National Wildlife Refuge System. As opposed to National Wildlife Refuges, WPAs lands are dispersed across several counties and townships. There are currently over 160,000 acres of such WPAs in South Dakota. All WPAs could not be avoided by routing. As now planned, Project pipelines will cross WPAs at 96 locations (**Appendix 18**) with construction impacts totaling approximately 1,054 acres, reduced to 498 acres for the operational ROW which will have no lasting impacts to emergent or scrub-shrub habitats (wetland or upland). Surface impacts to USFWS Grassland Easements and Protected Wetlands have been avoided by either routing around the easement or by crossing the easement with the use of HDD and bore crossing technology. The Applicant will work with the USFWS and landowner to cross the WPAs and restore them to meet the easement terms.

5.3.2.5 Nongame Species

A number of bird species found in the Project area are designated by USFWS as Birds of Conservation Concern (BCC). Per mandates in the Fish and Wildlife Conservation Act, USFWS identifies species, subspecies, and populations (taxa) of all migratory nongame birds that without additional conservation action are likely to become candidates for listing under the Endangered Species Act of 1973 (ESA). These species (BCC) represent USFWS's highest conservation priorities based on an assessment of factors,

including population abundance and trends, threats on breeding and nonbreeding grounds and size of breeding and nonbreeding ranges. The Project within South Dakota lies in Bird Conservation Region 11 – Prairie Potholes. BCC with probable presence in the Project area are listed in **Table 25**.

Table 25: Probable Presence of Birds of Conservation Concern in the Project Area

Bird Of Conservation Concern [1,2]	Breeding Period [2]	Probable Presence [3]
American Golden-plover [1,2] *Pluvialis dominica*	Project does not overlap breeding range	Mar-May, Sep-Oct
Baird's Sparrow [1,2] *Ammodramus bairdii*	Breeds May 20 to Aug 15	May-Aug
Black Tern [1,2] *Chlidonias niger*	Breeds May 15 to Aug 20	May-Aug
Black-billed Cuckoo [1,2] *Coccyzus erythropthalmus*	Breeds May 15 to Oct 10	May-Oct
Bobolink [1,2] *Dolichonyx oryzivorus*	Breeds May 20 to Jul 31	May-Sep
California Gull[1,2] *Larus californicus*	Breeds Mar 1 to Jul 31	Mar-May, Aug-Sep
Chestnut-collared Longspur [1,2] *Calcarius ornatus*	Breeds May 1 to Aug 10	Mar-Aug
Chimney Swift[1,2] *Chaetura pelagica*	Breeds Mar 15 to Aug 25	Apr-Sep
Clark's Grebe [1,2] *Aechmophorus clarkii*	Breeds Jun 1 to Aug 31	Jun-Aug
Franklin's Gull [1,2] *Leucophaeus pipixcan*	Breeds May 1 to Jul 31	Mar-Nov
Golden-winged Warbler [1,2] *Vermivora chrysoptera*	Breeds May 1 to Jul 20	May-Jul
Grasshopper Sparrow[1,2] *Ammodramus savannarum*	Breeds May 1 to Jul 20	May-Aug
Henslow's Sparrow[1,2] *Centronyx henslowii*	Breeds May 1 to Aug 31	Jun-Jul
Hudsonian Godwit[1,2] *Limosa haemastica*	Project does not overlap breeding range	Apr-May
Le Conte's Sparrow [1,2] *Ammodramus leconteii*	Breeds Jun 1 to Aug 15	May-Oct
Lesser Yellowlegs [1,2] *Tringa flavipes*	Project does not overlap breeding range	Mar-Apr, Jul-Nov
Long-eared Owl[1,2] *asio otus*	Breeds Mar 1 to Jul 15	Jan-Apr, Nov
Marbled Godwit [1,2] *Limosa fedoa*	Breeds May 1 to Jul 31	Apr-Jul
Northern Harrier[1,2] *Circus hudsonius*	Breeds Apr 1 to Sep 15	Jan-Dec
Pectoral Sandpiper[1,2] *Calidris melanotos*	Project does not overlap breeding range	Mar-May, Sep-Nov
Prairie Loggerhead Shrike[1,2] *Lanius ludovicianus excubitorides*	Breeds Feb 1 to Jul 31	Apr-Sep
Red-headed Woodpecker [1,2] *Melanerpes erythrocephalus*	Breeds May 10 to Sep 10	Mar-Sep
Ruddy Turnstone[1,2] *Arenaria interpres morinella*	Project does not overlap breeding range	May-Jun, Aug-Sep
Rusty Blackbird[1,2] *Euphagus carolinus*	Project does not overlap breeding range	Jan-Apr, Oct-Dec
Semipalmated Sandpiper[1,2] *Calidris pusilla*	Project does not overlap breeding range	Apr-Jun, Jul-Oct

Table 25: Probable Presence of Birds of Conservation Concern in the Project Area		
Bird Of Conservation Concern [1,2]	**Breeding Period [2]**	**Probable Presence [3]**
Short-billed Dowitcher [1,2] *Limnodromus griseus*	Project does not overlap breeding range	Apr-Jun, Jul-Oct
Sprague's Pipit [1,2] *Anthus spraguei*	Breeds May 10 to Aug 31	May-Aug
Upland Sandpiper[1,2] *Bartramia longicauda*	Breeds May 1 to Aug 31	Apr-Aug
Western Grebe[1,2] *aechmophorus occidentalis*	Breeds Jun 1 to Aug 31	Apr-Oct
Willet [1,2] *Tringa semipalmata*	Breeds Apr 20 to Aug 5	Apr-Sep
Wood Thrush[1,2]	Breeds May 10 to Aug 31	Apr-Aug

Notes:
[1] Birds with BCC status in the Project area per IPaC (2024).
[2] Breeding period of BCCs with probable presence in the Project area per IPaC (2024).
[3] Period BCC may be found in the Project area per IPaC 2024; note that presence may be only part of the beginning or end month.

SDGFP has identified 101 animal species as Species of Greatest Conservation Need in their South Dakota Wildlife Action Plan (SDGFP, 2014), including 29 bird species, 11 mammal species, 12 reptile or amphibian species, 11 terrestrial insect species, 9 freshwater mussel species, 4 gastropod species, 21 fish species, and 4 aquatic insect species.

The Project also contains footprint in areas identified by the Audubon Society as Important Bird Areas (IBAs). Approximately 22 miles of SDL-320 and 9 miles of SDT-410 traverses the Wolsey Crane Stopover Area and approximately 3 miles of SDT-411 traverses the Lake Thompson Area, both IBAs. The Worsley Crane Stopover Area was designated by Audubon as an IBA due to its importance as a staging area for sandhill and whooping cranes. The habitat of the Worsley Crane Stopover Area is characterized as a mixture of wet meadows, marshes, creeks, grasslands, and corn fields. During spring migration, and to a lesser extent, in the fall, the cranes feed on waste grain in the cornfields, as well as forage in wet meadows and pastures. Approximately 60,000 sandhill cranes used these lands, within the IBA, during migration in 2012 and 100,000 in 2013. The Lake Thompson Area was designated as an IBA due to its significance as a major stopover for shorebirds, during low water level conditions. Lake Thompson also supports nesting waterbird colonies for up to six species of waders and colonial waterbirds, including the great blue heron, double-crested cormorant, great egret, snowy egret, cattle egret, and Black-crowned night-heron (Audubon, 2024).

5.3.2.6 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Construction of the Project will include the clearing of approximately 9,284 acres of land (**Table 20**), all with some value to wildlife. However, a large percentage (72%) of the impacted lands will be croplands. Clearing in pasture / hay lands and grassland / herbaceous areas could result in the destruction of bird nests, both game birds (wild turkey, ringneck pheasant, prairie grouse) and non-game birds. Noise and human disturbance associated with construction could displace these species from a broader area for a short period of time. No especially sensitive habitats for non-game birds, or other small game species have been identified along the route. Project footprint traverses some prairie grouse priority habitat, including prairie grouse leks in the vicinity of the Project identified in 2022 aerial surveys, however an agreement with SDGFP on mitigation measures will avoid impacts.

Impacts to big game species will include the temporary loss of potential forage (native vegetation and croplands) and will result in temporary habitat fragmentation within the surface disturbance areas during construction. However, these temporary impacts to vegetation will represent a small percentage (far less than 1 percent) of the overall available habitat within the Project region. No especially sensitive habitats for big game have been identified along the route. Because the big game species mentioned above have adapted to human activities and land uses, displacement from construction areas are likely to be short-term.

Construction during hunting seasons will likely result in some space use conflicts with hunters, with hunters being restricted from construction areas and perhaps avoiding larger areas surrounding the work sites. Most hunting in the area is for white-tailed deer, wild turkey, prairie grouse, and ringneck pheasant. These impacts will be short-term lasting only as long as construction requires, or the season remains open. These impacts are considered small because of the area of impact in comparison to the acreage open for hunting, and the small numbers of hunters that likely use the area (**Table 22)**. This could reduce harvest in the area by very small amounts; however, construction of temporary access roads for Project construction could result in increased hunter access with a consequential increased hunting pressure on game species.

To allow wildlife movements, gaps will be left in the spoil piles that align with breaks in the strung pipe. Bridges may also be constructed to allow the passage of wildlife. Trenching procedures will be followed to minimize the length of time the trench is left open. Indirect impacts will result from increased noise levels and human presence during surface disturbance activities.

SDGFP and the Applicant agreed to implement construction mitigation measures to avoid disruption to prairie grouse lek sites. The measures included morning construction restrictions within 2 miles of a documented lek between 0.5 hour before to 2 hours after sunrise from March 1 to June 30 and a no construction restriction within 0.5 mile of a documented lek from March 1 to June 30. The Applicant will conduct updated aerial prairie grouse surveys prior to the start of construction, to confirm lek sites and construction restrictions.

Operation Impacts and Mitigation

Operations are expected to have little impact on wildlife. All of the construction ROW and most of the permanent ROW will be allowed to revert to pre-construction vegetative conditions. This includes all of the temporarily impacted lands totaling approximately 5,035.9 acres (**Table 20**) and much of the permanent ROW (4,206.6 acres). Disturbances associated with maintenance activities will be isolated, short-term, and infrequent and include clearing the permanent pipeline ROW of vegetation and identifying corrosion through regular inspections. Maintenance activities will have only short-term impacts on wildlife and no impact on wildlife populations.

5.3.3 Threatened and Endangered Species

The Project crosses portions of 23 South Dakota counties. Nine species (**Table 26**) federally listed as either threatened or endangered under the ESA occur or are thought to possibly occur in these counties (IPaC, 2024; USFWS, 2021a; Perennial, 2021b and 2022a). One candidate species, monarch butterfly (*Danaus plexippus*), one species proposed as endangered, tricolored bat (*Perimyotis subflavus*), and one species proposed threatened, western regal fritillary (*Argynnis idalia occidentalis*) were identified to possibly occur in the Project area. A threatened and endangered species report detailing the methods and results of surveys and habitat assessments conducted to date is provided in **Appendix 15.** The results of the assessment are utilized in preparation of the following sections.

Three of these federally listed species are also listed by the State of South Dakota as threatened or endangered as indicated in **Table 26**; these are piping plover, pallid sturgeon, and whooping crane.

In addition to these federally listed species, there are eight other species that are state listed (but not federally listed) and known to occur in Project Facility counties (**Table 26**; SDGFP, 2024j,k,l).

The Project footprint was reviewed on the SDGFP South Dakota Environmental Review Tool interactive websites with township level Natural Heritage data (SDGFP, 2024). The numbers of documented occurrences of sensitive species within townships that include the Project footprint are provided in **Table 27**.

The Applicant is preparing an applicant prepared Biological Assessment (BA) to evaluate the effects of construction and operation of the proposed Project on federally listed species under the ESA. The BA is being prepared as part of informal consultation with USFWS to support the USACE permitting process for the Project. The BA is expected to be finalized in early 2025.

5.3.3.1 Sensitive Plant Species

Sensitive plant species discussed here are plant species that are federally listed as threatened or endangered species (**Table 26**). The State does not designate plants as state-listed species.

5.3.3.1.1 Western Prairie Fringed Orchid

The western prairie fringed orchid is a flowering plant that can grow to a height of 3 feet but is typically 18 to 30 inches tall. Historically, it was distributed throughout much of the western central lowlands and eastern Great Plains physiographic provinces of the central U.S., and Interior Plains in extreme south-central Canada. Conversion of native grasslands into cropland, as well as overgrazing, herbicides, and exotic plant invasion have led to significant declines. Invasive plants such as leafy spurge (*Euphorbia esula*) and reed canary grass (*Phalaris aruninacea*) may displace the orchid through competition (USFWS 2021b). The plant is reliant on sphinx moths for pollination and seed production so any threat to these insects, such as the use of insecticides, is also a threat to the orchid (Schneider et al., 2018). The plant was federally listed as threatened in 1989 (54 FR 39857); to date, no critical habitat has been designated for the species.

Currently, there are no known populations of this species in South Dakota (USFWS, 2021a,b). Status surveys have been completed in South Dakota and have confirmed this, but it is possible that plants have been overlooked. References to possible range of the western prairie fringed orchid being located in Lake, Lincoln, McCook, Miner, Minnehaha, and Turner counties, are based on the existence of habitat in those counties. The species is most often found in unplowed, calcareous prairies and sedge meadows (USFWS, 1996) and may occur along ditches and roadsides (USFWS, 2017). In tallgrass prairies, it is typically associated with big bluestem (*Andropogon gerardii*), little bluestem, and Indiangrass (*Sorghastrum nutans*). In wetter sites, it is commonly associated with tufted hairgrass (*Deschampsia caespitosa*) and switchgrass (*Panicum virgatum*), and in sedge meadows is associated with *Carex* spp. and spikerushes (*Eleocharis* spp.) (USFWS, 1996).

Although western prairie fringed orchid may be extirpated in South Dakota, portions of the state are within the species range and suitable habitat may be present along the Project route. To date, the Applicant has surveyed approximately 428 acres of suitable habitat in South Dakota that was thought to potentially harbor the species; none were found and almost all the habitat was determined to be unsuitable. However, portions of lateral SDL-514 cross approximately 67 acres of habitat that may be suitable for western prairie fringed orchid. These areas in Codington, Grant, Lake, and Lincoln counties will be surveyed for western prairie fringed orchid in July 2025 if access is available. See the Threatened and Endangered Species Report **(Appendix 15)** for additional details.

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
Northern Long-eared Bat *Myotis septentrionalis*	FE	All	Limited suitable habitat or northern long-eared bat (NLEB) occurs within the Project footprint in South Dakota and would be affected. Direct effects to foraging and roosting habitat could potentially include habitat loss/fragmentation, species disturbance, increased predation risk, and reduced prey availability. However, suitable habitat would only be removed within the state-specific inactive season which would occur outside of May 15 through October 1, per USFWS guidance. More than 10 acres of trees would not be removed from any wooded area or from any collection of wooded areas within 1,000 feet of each other per the USFWS's Determination Key. No wooded roosting or foraging habitat would become separated by more than 1,000 feet due to tree removal (USFWS 2023a). Suitable habitat would not be removed within 5.0 miles of known or potential hibernaculum.	May affect, not likely to adversely affect
Tricolored Bat *Perimyotis subflavus*	FPE	Minnehaha, Union	Tricolored bat occurs throughout the eastern half of U.S.; within the Project area in South Dakota. Suitable habitat is similar to that for NLEB. Direct effects to foraging and roosting habitat for tricolored would be similar to that for NLEB as noted above. Suitable habitat would be removed within the state-specific inactive season per USFWS guidance for NLEB.	May affect, not likely to adversely affect
Western Regal Fritillary *Argynnis idalia occidentalis*	FPT	Grant, McPherson	Regal fritillary inhabits relatively undisturbed native grasslands. Primary areas of potential habitat on the Project occur in Grant and McPherson counties where regal fritillaries were observed during survey for Dakota skipper. In areas of disturbed native grasslands and pastures, the Applicant has committed to collaborating with both the NRCS and other agencies prior to construction to develop appropriate native vegetation and	May affect, not likely to adversely affect

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
			pollinator seed mixes to implement in reseeding efforts where applicable along the disturbed ROW, with landowner approval.	
Piping Plover *Charadrius melodus*	FT, ST	Hyde, Kingsbury, Sully, Union	Suitable habitat for the piping plover may be present at various locations within the Project area in South Dakota, especially near major rivers, depending on water levels. This species only has the potential to be present during the breeding season (April-August) on suitable sandbars or nesting habitat along major rivers. All major rivers will be crossed using HDD technology; therefore, suitable nesting habitat will not be affected.	May affect, not likely to adversely affect
Rufa Red Knot *Calidris canutus rufa*	FT	All	Suitable stopover habitat for the red knot may be present at various locations within the Project area in South Dakota. This species is only present during migration, and the Project area does not host any designated key stopover areas. Therefore, it is anticipated that red knot would use their preferred habitat beyond the areas of active disturbance within the Project area. Additionally, individuals of this species are highly mobile and would likely avoid the construction area.	May affect, not likely to adversely affect
Whooping Crane *Grus americana*	FE, SE	Beadle, Brown, Clark, Codington, Davison, Edmunds, Hamlin, Hand, Hyde, Kingsbury, McCook, McPherson, Miner, Sanborn, Spink, Sully, Turner,	Suitable stopover habitat for the whooping crane is present in the Project area, especially by the Platte River. This species is only present during migration. Whooping cranes migrate through the Project area beginning in early to mid-April during the spring and again in October during the fall migration. Construction activities will start prior to and throughout migration when the whooping crane would be expected to occur in the Project area.	May affect, not likely to adversely affect

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
			Mitigation measures outlined by the USFWS and provided in Section 5.3.3.4 would be followed to avoid impacts to this migratory species during construction.	
Pallid Sturgeon *Scaphirhynchus albus*	FE, SE	Hyde, Lincoln, Sully, Union	Suitable habitat for the pallid sturgeon is present in the Project area. Potential impacts will be avoided with HDD techniques to avoid river disturbance.	No Effect
Topeka Shiner *Notropis topeka*	FE	Beadle, Brookings, Brown, Clark, Codington, Davison, Hamlin, Hand, Kingsbury, Lincoln, McCook, McPherson, Miner, Minnehaha, Sanborn, Spink, Turner, Union	Suitable habitat for the Topeka shiner is present in the Project area at several streams and rivers in South Dakota. The Applicant will implement avoidance measures for this species, such as HDD or bore techniques at the crossings with suitable habitat to avoid impacting this species. The use of HHD or bore crossing methods will avoid all in-stream impacts.	May affect, not likely to adversely affect
Scaleshell Mussel *Leptodea leptodon*	FE	Union	The Big Sioux River, which may contain potential habitat for the scaleshell mussel, will be crossed using trenchless HDD methods. Screens will be placed on intake hoses when rivers are used for water withdrawal for hydrostatic testing. The Applicant will screen the intake end of any water withdrawal pump with mesh having openings no larger than 0.125 inch, a floating surface intake would be used to avoid the benthic habitat; water velocity at the screen would not exceed 12 centimeters per second, and the intake screens would be periodically checked for impingement of any aquatic species. If changes are required, USFWS will be consulted.	No Effect
Dakota Skipper *Hesperia dacotae*	FT	Brookings, Codington, Grant,	Field-based habitat assessments were conducted in South Dakota in 2022, 2023 and 2024 and did not identify any areas of suitable habitat for Dakota skipper. Species-specific surveys for Dakota	May affect, not likely to adversely affect

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
		Hamlin, McPherson	skipper were conducted during the adult flight period in July 2022, 2023, and 2024; no Dakota skipper were observed. Additional survey is scheduled in June and July 2025 in areas of potentially suitable habitat as access is available.	
Monarch Butterfly *Danaus plexippus*	FC	All	Suitable habitat for the monarch butterfly is present in the Project area. Following construction, host plant (i.e., milkweed) abundance and distribution across the project footprint is expected to be similar to pre-construction conditions after reclamation. In areas of disturbed native grasslands and pastures, the Applicant has committed to collaborating with both the NRCS and other agencies prior to construction to develop appropriate native vegetation and pollinator seed mixes to implement in reseeding efforts where applicable along the disturbed ROW, with landowner approval.	Not Likely to Jeopardize
Western Prairie Fringe Orchid *Platanthera praeclara*	FT	Brookings, Lake, Lincoln, McCook, Miner, Minnehaha, Turner, Union	Species-specific surveys for western prairie fringed orchid (WPFO) were conducted in South Dakota during the blooming season in July 2022, 2023, and 2024. To date, the Applicant has surveyed 444 acres of habitat in South Dakota thought to harbor the species, with no WPFO found and almost all habitat was determined to be unsuitable. Portions of SDL-514 cross approximately 67 acres of potential suitable habitat for WPFO, these areas will be surveyed in July 2025 as access is available. Given the absence of individuals and the general marginal quality of habitat, impacts on this species are unlikely.	May affect, not likely to adversely affect
Swift Fox *Vulpes velox*	ST	Sully, Hyde	Suitable habitat may be present within the Project area, especially in Sully and Hyde counties. However, based on coordination with SDGFP, occurrence is unlikely due to minimal habitat and lack of recorded observations in the vicinity of the proposed Project. Therefore, the Project is not likely to adversely affect the swift fox.	Not Likely to Adversely Affect

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
Bald Eagle *Haliaeetus leucocephalus*	BGEPA [6]	All	Suitable habitat for the bald eagle may be present at various locations within the Project area in South Dakota, especially near large rivers and streams such as the Big Sioux River and the Vermillion River. Although bald eagles were observed during an aerial survey for raptor nests, eagle nests were not observed within the Project area. In the event a bald eagle is observed prior to or during construction, the Applicant will coordinate with both SDGFP and USFWS. Additionally, the Applicant will adhere to the conservation measures established in the USFWS National Bald Eagle Management Guidelines.	Not Likely to Adversely Affect
Lined Snake *Tropidoclnion lineatum*	SE	Lincoln, Minnehaha, Union	Species-specific surveys were conducted in July 2022. Neither lined snakes nor suitable habitat were observed within the Project area. Additional surveys for lined snake will take place in Fall of 2025 at 2 small areas. However, based on the small amount of potential habitat on the route, and connecting habitat at these 2 locations, the likelihood of adversely affecting lined snake is low.	Not Likely to Adversely Affect
False Map Turtle *Graptemys pseudogeographica*	ST	Sully, Hyde, Turner, Lincoln, Union	Suitable habitat for the false map turtle may be present in the Project area. However, the Project area within the range of this species has largely been converted to agricultural use. Therefore, the Project is not likely to adversely affect the false map turtle.	Not Likely to Adversely Affect
Banded killifish *Fundulus daphaneus*	SE	McPherson, Edmunds, Brown	Suitable habitat for the banded killifish may be present in the Project area, especially in quiet shallow streams, ponds, and lakes within McPherson County (Hydrologic Unit Code 10: 1013010603). However, based on coordination with SDGFP, the proposed Project is not within 1 mile of any known location that supports banded killfish. Therefore, the Project will have no effect on this species	No Effect
Blacknose Shiner *Notropis heterolepis*	SE	Brown, Codington, Grant	Suitable habitat for the blacknose shiner may be present in the Project area in the tributaries of the James, Big Sioux, and Keya Paha River basins. However, based on coordination with SDGFP, the proposed Project is not within 1 mile of any known location	No Effect

Table 26: Federal and State Listed Species with the Potential to Occur in the Project Area				
Species [1]	**Status [2]**	**Project Counties [3,4]**	Impact Assessment[5]	Determination Of Effects[6]
			that supports blacknose shiner. Therefore, the Project will have no effect on this species.	
Northern Redbelly Dace *Chrosomus eus*	ST	Codington, Miner, Turner, Lincoln, Hamlin, Kingsbury, McCook, Minnehaha, Brookings	Species-specific surveys were conducted in June 2022. The Project would cross 4 streams that currently support, or have historically supported, northern redbelly dace, including Deer Creek in Brookings County, North Fork Yellow Bank River in Grant County, West Fork Vermillion River in Kingsbury County, and Willow Creek in Codington County. The West Fork Vermillion River would be crossed 3 times by different laterals. The Applicant will utilize trenchless crossing methods in these waterbodies, such as HDD or bore, to avoid all in-stream impacts. Therefore, the Project is not likely to adversely affect the northern redbelly dace.	Not Likely to Adversely Affect
Interior Least Tern *Sternula antillarum athalassos*	SE	Sully, Union,	Suitable habitat for the interior least tern may be present west and south of the Project area. However, this species is only present in South Dakota during the nesting season (May-August). Construction activities will start prior to and will continue through when the least tern would visit the state. Because suitable habitat is found beyond the Project area where disturbance is actively occurring, it is unlikely there will be impacts to this species. Therefore, the project is not likely to adversely impact the interior least tern	Not Likely to Adversely Affect

Notes:
[1] Federal and State listed species in South Dakota found in counties the Project traverses
[2] Status: ST = state threatened, SE = state endangered, BGEPA = Bald and Golden Eagle Protection Act, FT= federally threatened, FE= federally endangered, FPT= federally proposed threatened, FPE=federally proposed endangered, FC= federal candidate species
[3] Counties with Project footprint only.
[4]Occurrence / distribution from SDGFP (2024j) mapping website Wildlife of South Dakota accessed on 6/18/2024 at https://apps.sd.gov/gf43wap/Species.aspx for state species; and from USFWS (2021a) at https://www.fws.gov/sites/default/files/documents/SpeciesByCounty_Feb2021.pdf for federal species.
[5] Key habitats and distribution from SDGFP Wildlife of South Dakota website https://apps.sd.gov/gf43wap/Species.aspx#tab2.
[6] Impacts have not yet been determined by the USFWS Section 7 consultation process. The Determination of Effects is based on the Applicant's assessment of species impacts based on USFWS's effect determinations.

Table 27: Occurrence of Sensitive Species Near Project Footprint based on SDGFP Natural Heritage Data																					
		Number Of Occurrences Within Townships With Project Footprint By Pipeline ID																			
Species	**Status**	**SDM 104**	**SDM 105**	**NDM 106**	**SDT 206**	**SDT 207**	**SDT 208**	**SDT 209**	**SDT 210**	**SDT 212**	**SDT 409**	**SDT 410**	**SDT 411**	**SDL 320**	**SDL 335**	**SDL 513**	**SDL 514**	**SDL 515**	**NDT 211**	**IAL 510**	**Total**
Western Prairie Fringed Orchid	FE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dakota Skipper	FT	-	3	1	-	-	2	-	-	-	-	-	-	-	-	-	1	-	1	-	8
Poweshiek Skipperling	FE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Topeka Shiner	FE	-	1	-	-	1	-	-	-	2	1	2	-	-	-	2	1	-	-	-	9
Pallid Sturgeon	FE/SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Whooping Crane	FE/SE		-	-	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-	-	4
Piping Plover	FT/ST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rufa Red Knot	FT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern Long-eared Bat	FT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern Redbelly Dace	ST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1

Table 27: Occurrence of Sensitive Species Near Project Footprint based on SDGFP Natural Heritage Data

Species	Status	Number Of Occurrences Within Townships With Project Footprint By Pipeline ID																			
		SDM 104	SDM 105	NDM 106	SDT 206	SDT 207	SDT 208	SDT 209	SDT 210	SDT 212	SDT 409	SDT 410	SDT 411	SDL 320	SDL 335	SDL 513	SDL 514	SDL 515	NDT 211	IAL 510	Total
Blacknose Shiner	SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Banded Killifish	SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
False Map Turtle	ST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lined Snake	SE	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Bald Eagle	BGEPA	2	1	-	1	1	1	1	-	-	-	-	-	2	-	2	2	1	2	1	17
Swift Fox	ST	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1

Notes:

[1] If the species occurs in the county, its occurrence is inserted as either “known” or “possible” as indicated in USFWS (2021a) South Dakota Listed Species by County List (updated February 12, 2021) available athttps://www.fws.gov/sites/default/files/documents/SpeciesByCounty_Feb2021.pdf.

[2] Status is listing status: FT = federally endangered, FT = federally threatened, ST = state threatened, SE = state endangered, BGEPA = Bald and Golden Eagle Protection Act.

[3] Project counties are those South Dakota counties with Project footprint.

5.3.3.2 Sensitive Wildlife Species

Sensitive wildlife species discussed here are terrestrial and amphibious species of wildlife that are either federally listed as threatened or endangered species or listed by the State in South Dakota as threatened or endangered (**Table 26**).

5.3.3.2.1 Lined Snake

The lined snake is a small fossorial species of snake typically found in a variety of habitats including "prairie grasslands, scattered oak forests, and residential and suburban areas; however, most literature suggests this species inhabits remnant, undisturbed prairies along woodland corridors" (Amphibians and Reptiles of South Dakota, 2022). In South Dakota, the lined snake has been documented along the Big Sioux River and James River in Minnehaha and Hutchinson counties (Amphibians and Reptiles of South Dakota, 2022).

Based on existing habitat mapping and input from the SDGFP, the Applicant identified 3 sites in Lincoln County along the Project that could support lined snake. However, most portions of the Project within Lincoln County are cultivated and are not suitable habitat for lined snake. Additionally, no sites along the Project in Minnehaha County and Union County were found with suitable habitat for the lined snake. Survey was completed at 1 site in 2022 in Lincoln County; no lined snakes were observed, and habitat was mostly unsuitable for the species. The remaining 2 small sites in Lincoln County will be surveyed in 2025 if access is available. See the Threatened and Endangered Species Report **(Appendix 15)** for additional details.

5.3.3.2.2 Dakota Skipper

The Dakota skipper is a small butterfly. Historically, the species occurred throughout the vast grasslands of the north-central U.S. and south-central Canada, extending from Illinois to Saskatchewan, but its range has been much reduced due to the loss of native prairie grasslands. It is found in two types of native prairies, each containing a high diversity of wildflowers and grasses. One is a low, wet prairie dominated by bluestem grasses, wood lily (*Lilium philadelphicum*), harebell (*Campanula rotundifolia*) and smooth camas (*Zygadenus elegans*). The other is an upland prairie often found on ridges and hillsides and dominated by bluestem grasses, and needlegrasses dominate these prairies; purple coneflower (*Echinacea angustifolia*) is typical of high-quality sites (USFWS, 2014a; 2018b). There is no critical habitat in South Dakota counties crossed by the Project. Dakota skippers are believed to presently use 44 sites in 10 South Dakota counties, including Project counties McPherson, Hamlin, and Codington (Cochrane and Delphey, 2002).

The Applicant completed pedestrian habitat assessments, in 2022, 2023, and 2024. Species-specific surveys for Dakota skipper were conducted during the adult flight period in July 2022, 2023, and 2024; no Dakota skipper were observed and suitable habitat was limited due to invasion by non-native grasses such as smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). In total, 26 sites totaling approximately 495 acres have been surveyed on the current Project route in either 2022, 2023, or 2024. See the Threatened and Endangered Species Report **(Appendix 15)** for additional details.

5.3.3.2.3 Poweshiek Skipperling

Poweshiek skipperlings are small butterflies most often found in remnants of native prairie in Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin and in fens in Michigan (USFWS, 2013). However, this skipperling may have been extirpated from the Dakotas, Minnesota, and Iowa – an area that previously contained the vast majority of the surviving populations. It is now known only from Wisconsin,

Michigan, and Manitoba. During surveys in 2014, the species could be found only at a few sites in a single Michigan county, in very limited numbers at one site in Wisconsin, and in Canada at the single Manitoba site. Suitable habitat for the Poweshiek skipperling may be present in the Project area (Perennial, 2021b). Although some data indicates the skipperling could possibly be found in Clark, Codington, and Hamlin counties, the USFWS indicated that effects on the species from the Project are unlikely and consultation is not required. Based on surveys for Dakota skipper, habitat for Poweshiek skipperling is limited on the Project in South Dakota.

5.3.3.2.4 Monarch Butterfly

The monarch butterfly is a candidate species and not yet listed or proposed for listing by the USFWS. Monarchs feed on a diversity of flowering plants but require various species of milkweed (*Asclepis spp.*) for egg-laying and larval feeding (USFWS, 2022). The Project Area crosses within the range of the eastern population of the monarch butterfly. Limited monarch habitat with various milkweed species occur along the Project, primarily either in road ditches and wetlands (e.g., showy milkweed (*Asclepias speciosa*)), or in the relatively limited native grasslands along the Project (e.g., whorled milkweed (*Asclepias verticillata*) or green milkweed (*Asclepias viridiflora*)).

5.3.3.2.5 Western Regal Fritillary

The western regal fritillary was proposed for listing as a threatened species under the ESA on August 4, 2024 by the USFWS. Unlike monarchs which are more general in their habitat needs as long as sufficient nectar sources and larval host plants are available, primarily milkweed species, the regal fritillary is considered an indicator of the health of native prairie and a specialist species (Royer and Marrone 1992b, Swengel 1996). Violets (*Viola spp.*) are the sole larval hostplants for the regal fritillary. In eastern South Dakota, and throughout the Project area, habitat for regal fritillary is limited. Most native prairie has been converted to agriculture and most remaining pastures, including unplowed pastures, are dominated by Kentucky bluegrass and/or smooth brome. In its species assessment for regal fritillary, the USFWS determined that the Northern Glaciated Plains Analytical Unit, which contains the Project area in South Dakota, provides a medium level of habitat resiliency (i.e., ability of populations to withstand environmental change) (USFWS, 2023b).

5.3.3.2.6 Whooping Crane

The whooping crane was listed under the ESA as endangered on March 11, 1967 (32 FR 4001). It is also state-listed as endangered in South Dakota. Critical habitat has been federally designated for whooping cranes (43 FR 20938-942; Canadian Wildlife Service [CWS] and USFWS 2005) but none is located in South Dakota. The wild population of 536 birds, nests Wood Buffalo Park in Canada and winter on the Texas coast. During spring and fall migration, the Aransas-Wood Buffalo National Park population moves through the central Great Plains including portions of South Dakota. Birds from this population depart from their wintering grounds in Texas from late March through May 1. Fall migration typically begins in mid-September with most birds arriving on wintering grounds between late October and mid-November (CWS and USFWS, 2005). Whooping cranes use a variety of habitats during migration (Howe, 1987; Lingle, 1987; Lingle et al., 1991; Johns et al., 1997) but are most closely associated with river bottoms, marshes, potholes, prairie grasslands, and croplands (CWS and USFWS, 2005). Whooping cranes generally use seasonally or semi permanently flooded palustrine wetlands, broad river channels, and shallow portions of reservoirs for roosting and various cropland and emergent wetlands for feeding (Austin and Richert, 2001; Johns et al., 1997). Suitable stopover habitat for the whooping crane may be present in the Project area (Perennial, 2021b).

5.3.3.2.7 Piping Plover

The piping plover is a migratory shorebird. Historically, the piping plover bred across three geographic regions: (1) U.S. and Canadian Northern Great Plains from Alberta to Manitoba south to Nebraska; (2) Great Lakes beaches; and (3) Atlantic coastal beaches from Newfoundland to North Carolina. Wintering areas are less well known, although wintering birds have been most often seen along the Gulf of Mexico, southern U.S. Atlantic coastal beaches from North Carolina to Florida, eastern Mexico, and scattered Caribbean Islands (Haig, 1986; USFWS, 1988). The piping plover's current breeding range is similar except that breeding populations in the Great Lakes have almost disappeared (Haig and Plissner, 1993).

The piping plover was listed as endangered and threatened December 11, 1985 (50 FR 50726) (USFWS, 1985). The Great Lakes population of piping plover is federally listed as endangered, while the remaining Atlantic and Northern Great Plains populations are listed as threatened. Migrating and wintering populations of piping plover were also classified as threatened. Populations of piping plover within South Dakota are considered to belong to the threatened Northern Great Plains population.

Critical habitat has also been federally designated under the ESA for the piping plover, including areas along much of the Missouri River in both South Dakota and Nebraska. The final rule designating critical habitat for the Northern Great Plains breeding population of the piping plover (67 FR 57638) within and along river segments bounding Nebraska has been vacated by the Service. Primary constituent elements of critical habitat include: (1) prairie alkali lakes and wetlands; (2) shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (3) springs and fens along edges of alkali lakes and wetlands; (4) adjacent uplands 200 feet above the high water mark of alkali lakes or wetlands; (5) rivers with sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river; and (6) reservoirs with sparsely vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel, or shale (67 FR 57638). Suitable habitat for the piping plover may be present at various locations within the Project area, especially near large rivers with unvegetated sandbars (Perennial, 2021b). Primary summer habitat is found within Hyde, Kingsbury, Sully, and Union counties within the Project area (SDGFP, 2024j).

5.3.3.2.8 Rufa Red Knot

The rufa red knot is a migratory shorebird, which nests on breeding grounds in the Canadian arctic and then migrates southward, primarily along the coastline, and especially the eastern coastline, to its wintering grounds. Rufa red knots migrate to wintering areas as far south as Tierra del Fuego, South America; however, many birds winter along the coast of the southeastern U.S., Gulf of Mexico, and northern Brazil (USFWS, 2013). It is a casual or irregular occurrence within the non-coastal portion of the Central Flyway (Central Flyway Council, 2013); however, there are very few records of this species in South Dakota. The rufa red knot was federally listed as a threatened species on December 11, 2014. No critical habitat has been designated. Suitable stopover habitat for the rufa red knot may be present at various locations within the Project area (Perennial, 2021b)

5.3.3.2.9 Northern Long-eared Bat

The range of the northern long-eared bat extends across much of eastern and north central U.S. from Maine to eastern Montana and adjacent Canada and south as far as parts of Louisiana and Alabama. Historical and current ranges encompass all of South Dakota, except for a few southwestern counties. Historically, the bat has been patchily distributed throughout its range but has been decidedly most common in the northeastern U.S. and Canada and less common in the southern and western parts of the

range. The primary threat to the northern long-eared bat is the white-nose syndrome, an infectious disease responsible for unprecedented mortality in some hibernating insectivorous bats of the northeastern U.S. The disease is believed to have resulted in population declines of 99 percent in affected areas of the historic range.

The northern long-eared bat was listed as an endangered species by the USFWS on November 29, 2022 (87 FR 73488), with a final rule effective date of March 31, 2023 (88 FR 4908). No critical habitat has been established. Suitable summer roosting habitat may be present within the Project area (Perennial, 2021b). The Applicant has completed a desktop assessment of summer roosting habitat within the Project study area in South Dakota. Suitable habitat is limited in the Project area and in eastern South Dakota in general (USFWS, 2023a) as described in the Threatened and Endangered Species Report (**Appendix 15**).

5.3.3.3 Sensitive Aquatic Species

Sensitive aquatic species in South Dakota include fish, amphibians, and aquatic reptiles such as turtles that are either federally listed as threatened or endangered species or listed by the State in South Dakota as threatened or endangered, but which are not also federally listed. Information for state-listed species is provided above in **Table 26**. Additional information on federal and state listed species is provided below.

5.3.3.3.1 Topeka Shiner

The USFWS listed the Topeka shiner as endangered in January 1999. Prior to that, the limited available survey data suggested the fish occupied 10 percent or less of its historic range (USFWS, 1999). However, recent studies documented the occurrence of Topeka shiners in 80 percent of the known historically occupied streams in South Dakota and a number of streams where they were not previously reported, suggesting the fish is more abundant in South Dakota than other states within its range (Shearer, 2003). Topeka shiners generally occupy small, prairie streams with groundwater inputs (springs), high water quality, and/or gravel substrates (Pflieger, 1997). In South Dakota, the Topeka shiner is presently found in 72 tributaries of the James (27), Vermillion (15), and Big Sioux (39) rivers in South Dakota (USFWS, 2018a). The Project crosses 16 streams at 34 locations (some streams are crossed more than once by different laterals e.g., Big Sioux River), all within these watersheds. The USFWS designated critical habitat for the Topeka shiner in 2004; however, none was designated within South Dakota. **Table 28** lists streams crossed by the Project that currently, or historically, support Topeka shiner. Based on input from the USFWS and SDGFP, the Applicant assessed habitat at 5 stream crossings in 2022 to determine appropriate crossing methods. No Topeka shiner were observed although suitable habitat was present at 2 stream crossings. See the Threatened and Endangered Species Report (**Appendix 15**) for additional details.

Table 28: Project Crossings of Streams with Current or Historic Presence of Topeka Shiner

Stream Name	County	Pipeline Route ID	Flow Regime At Crossing
Big Sioux River	Union	IAL-510	Perennial
Big Sioux River	Brookings	SDL-513	Perennial
Big Sioux River	Codington	SDL-514	Perennial
Big Sioux River	Lincoln	SDM-104	Perennial

Table 28: Project Crossings of Streams with Current or Historic Presence of Topeka Shiner			
Stream Name	**County**	**Pipeline Route ID**	**Flow Regime At Crossing**
Big Sioux River	Codington	SDT-208	Perennial
Camp Creek	Turner	SDT-212	Wetland
Deer Creek	Brookings	SDL-513	Perennial
Dry Run	Sanborn	SDT-410	Intermittent
Dry Run	Davison	SDT-410	Perennial
East Fork Vermillion River	Lake	SDM-104	Perennial
East Fork Vermillion River	Turner	SDT-212	Perennial
James River	Brown	SDL-515	Perennial
James River	Spink	SDM-105	Perennial
James River	Beadle	SDT-207	Perennial
James River	Spink	SDT-209	Perennial
James River	Sanborn	SDT-410	Perennial
Long Creek	Turner	SDT-212	Perennial
Long Creek	Turner	SDT-409	Intermittent
Middle Pearl Creek	Beadle	SDM-104	Upland
Pearl Creek	Beadle	SDM-104	Natural Pond
Pearl Creek	Beadle	SDT-208	Wetland
Redstone Creek	Kingsbury	SDM-104	Perennial
Redstone Creek	Clark	SDT-208	Ephemeral
Redstone Creek	Kingsbury	SDT-411	Perennial
Rock Creek	Kingsbury	SDM-104	Intermittent
Rock Creek	Miner	SDT-410	Perennial

Table 28: Project Crossings of Streams with Current or Historic Presence of Topeka Shiner			
Stream Name	**County**	**Pipeline Route ID**	**Flow Regime At Crossing**
Rock Creek	Kingsbury	SDT-411	Intermittent
Shue Creek	Beadle	SDM-105	Perennial
Shue Creek	Beadle	SDT-207	Perennial
South Fork Pearl Creek	Kingsbury	SDM-104	Wetland
West Fork Vermillion River	Kingsbury	SDM-104	Wetland
West Fork Vermillion River	Turner	SDT-212	Perennial
West Fork Vermillion River	Miner	SDT-410	Intermittent
West Fork Vermillion River Tributary	Kingsbury	SDT-212	Intermittent
Willow Creek	Codington	SDL-514	Perennial

5.3.3.3.2 Northern Redbelly Dace

Northern redbelly dace is a small minnow that prefers shallow, slow-moving creeks or ponds with cold, clear waters. The species is a sight-feeder; consequently, clear water in creeks lined with sand or gravel, as opposed to mud, is preferred although they may inhabit small marshes and beaver ponds (SDGFP, 2022). In South Dakota, the species is found primarily east of the Missouri River and has been reported from tributaries of the Missouri, Big Sioux, Minnesota, White, Niobrara and Keya Paha river drainages (SDGFP, 2022).

The Project would cross 4 streams that currently support, or have historically supported, northern redbelly dace. One stream, the West Fork Vermillion River, would be crossed 3 times by different laterals (**Table 29**). See the Threatened and Endangered Species Report (**Appendix 15**) for additional details.

Table 29: Project Crossings of Streams with Current or Historic Presence of Northern Redbelly Dace			
Stream Name	**County**	**Pipeline Route ID**	**Flow Regime at Crossing**
Deer Creek	Brookings	SDL-513	Perennial

Table 29: Project Crossings of Streams with Current or Historic Presence of Northern Redbelly Dace			
Stream Name	**County**	**Pipeline Route ID**	**Flow Regime at Crossing**
North Fork Yellow Bank River	Grant	SDL-514	Perennial
West Fork Vermillion River	Kingsbury	SDM-104	Wetland
West Fork Vermillion River	Turner	SDT-212	Perennial
West Fork Vermillion River	Miner	SDT-410	Intermittent
West Fork Vermillion River Tributary	Kingsbury	SDT-212	Intermittent

5.3.3.3.3 Pallid Sturgeon

The pallid sturgeon is a large fish that can weigh up to 80 pounds and reach lengths of 6 feet. Historically their range encompassed most of the Mississippi, Missouri, Yellowstone, and Atchafalaya Rivers, but their range and population have been reduced by damming and channelization of rivers. Commercial fishing and environmental contaminants may have contributed to the decline. The pallid sturgeon was listed as endangered (55 Federal Register 36641) on September 6, 1990. Pallid sturgeons are adapted to living close to the bottom of large rivers with high turbidity and a natural hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, islands, sand flats, and gravel bars.

By 1967, the first year when all six dams on the mainstem Missouri River were operating as a system, large portions of the Missouri River had changed from a riverine to a lacustrine (lake) environment (National Research Council, 2002). Remnant pallid sturgeon exists in the reservoirs but there has been no evidence of any reproduction in the reservoirs since dam completion (Gilbraith et al., 1988). USFWS (2021a) identifies Hyde, Lincoln, and Sully counties as the only Project counties where the pallid sturgeon is of concern. Its current range in South Dakota is shown as restricted to the Missouri River from North Dakota south to and within Lake Sharpe and between the Fort Randall and Gavins Point Dams, and to the lower Big Sioux River in Lincoln County (Pallid Sturgeon Recovery Program, 2021; USFWS, 2014b). The Project does not cross the Missouri River in South Dakota, and as currently proposed crosses no named streams within Hyde and Sully counties. Suitable habitat for the pallid sturgeon may be present in the Project area within the Big Sioux River. The Project will cross the Big Sioux River using HDD technology at six locations in Brookings, Codington, Lincoln, and Union counties.

5.3.3.4 Impacts and Avoidance/Mitigation Measures

An assessment of the potential of Project construction or operation impacts and mitigation measures affecting the identified threatened and endangered species identified above is provided in the Threatened and Endangered Species Report (**Appendix 15**).

Construction Impacts and Mitigation

Construction impacts to all federal and state listed species will be minimal due to either avoidance or mitigation measures. Construction impacts are a function of either habitat removal, habitat degradation, or direct take of a species. These types of impacts are summarized below by relevant habitats that could support listed species.

Forested Habitat. Minimal forested habitat occurs within the Project in South Dakota and most of what does occur is not suitable habitat for listed bat species because it occurs in small, isolated plantings that are not connected to suitable roosting or foraging habitat. In the few areas where potential suitable habitat, for protected bat species, occurs within the construction footprint trees will be removed. Permanent impacts are those outside of HDDs and within the permanent ROW; these areas will be periodically cleared in order to allow for pipeline inspection per federal regulation. Temporary impacts are those within the temporary construction workspaces; trees will be allowed to regrow to a size that could be used by northern long-eared bat and tricolored bat. In total, approximately 6 acres of suitable bat habitat will be removed, of which about 3 acres are within the permanent ROW and about 3 acres are within the temporary ROW.

Native Prairie. Some native prairie can provide habitat for listed species such as Dakota skipper, western prairie fringed orchid, and lined snake. Construction impacts include the removal of native prairie habitat during construction. However, to date, no suitable habitat for listed species has been identified within native prairie that has been surveyed in South Dakota. All areas with native prairie species that have been surveyed lack suitable floristic or hydrologic characteristics to support listed species and/or are also invaded by non-native species, such as smooth brome, that limit habitat suitability for listed species.

Waterbodies. Major waterbodies can provide habitat for listed species such as pallid sturgeon or piping plover, while minor waterbodies can provide habitat for listed species such as Topeka shiner or northern redbelly dace. No construction impacts to waterbodies that could support listed species are anticipated as all waterbodies that could support these species will be crossed using trenchless technology.

Although suitable habitat for listed species is limited in the Project footprint, the Applicant will nonetheless implement mitigation measures to further reduce or avoid impacts. These measures include the following:

Forested Habitat

- The Applicant will clear trees in suitable northern long-eared bat habitat in South Dakota during the state-specific inactive season dates for northern long-eared bat; October 1 – May 15.
- The Applicant has optimized workspace design to only that which is necessary to safely construct the Project. Additionally, all temporarily impacted areas will be allowed to revegetate naturally upon completion of construction. To facilitate periodic corrosion and leak detection surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in an herbaceous state except along HDDs.

- The Applicant will not remove 10 acres in any wooded stand or within a collection of stands that are within 1,000 feet of each other per the USFWS's Determination Key (USFWS, 2023b).
- No wooded area will be separated by more than 1,000 feet due to tree removal per the USFWS's Determination Key (USFWS, 2023b).
- The Applicant will not install permanent artificial lighting in suitable northern long-eared bat habitat.

Native Prairie

- Suitable, commercially available native grasses and forbs will be seeded in areas of native prairie if acceptable to the landowner.
- Fugitive dust abatement measures will be utilized to minimize disturbing adjacent habitats.
- Restrict the use of insecticides during construction or operation within verified habitats.
- During construction chemicals (e.g., herbicides) will not be used during the Dakota skipper adult flight period to avoid injurious impacts.

Waterbodies

- All rivers and major waterbodies will be crossed via HDD. No dredging or other impacts will occur to major river systems.
- Trenchless crossing methods (i.e., HDD or bore) and no in-stream work between May 15 and July 31 at all streams identified by agencies as having potential to support Topeka shiner or northern redbelly dace.
- All temporarily impacted waterbodies will be returned to pre-construction contours and allowed to revegetate naturally upon completion of construction.

In addition to these habitat-specific mitigation measures, the Applicant will also implement timing restrictions as necessary to avoid impacts to some species, including the following:

Whooping Crane

- Contractors performing work will be educated to identify a whooping crane and be advised that if a crane appears within 1,000 feet of construction activities, all work will cease until the crane(s) move outside that 1,000-foot buffer area or if USFWS provides relief based upon site-specific circumstances. The Applicant's EIs will coordinate with the USFWS on sightings during construction as well as data the Service may have for the area.
- During the migratory season, if equipment over 15 feet high is to be used for Project work, the equipment will be flagged or marked to increase visibility to whooping cranes and lessen the risk of collisions.
- During nighttime hours and periods of low visibility all construction equipment containing components that could reach 15 feet (i.e., track hoe boom) would be lowered to prevent any potential interference with whooping crane individuals, should they be traveling at lower altitudes in the vicinity of the Project area.

Bald Eagle

- If nesting bald eagles are observed in the Project area during construction, the Applicant will coordinate with the USFWS and adhere to measures in the 2007 USFWS' National Bald Eagle Management Guidelines (USFWS, 2007c). These measures stipulate maintaining a 660-foot buffer between active nests and activities that may disturb nesting eagles.

Operation Impacts and Mitigation

Due to the limited amount of suitable habitat for listed species that will be affected during construction, operational impacts will likewise be minimal.

Since operational impacts are limited, operational mitigation measures are few and include the following:

- Restrict the use of insecticides and herbicides during operation within verified habitats.
- Allow trees to regrow outside of the permanent ROW.
- Should bald eagle nest be identified near the Project, maintain a 660-foot buffer between active nests and activities that may disturb nesting eagles.

5.4 Aquatic Ecosystems

5.4.1 Wetlands

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (Cowardin et al., 1979). Wetlands provide a variety of environmental benefits, including water quality, flood storage, wildlife habitat, nutrient sequestration, and recreation. The following section describes the wetlands crossed by the Project and the Applicant's plans to minimize impacts.

Wetlands and riparian areas were identified along the Project by completing field and desktop surveys. Wetlands and waters of the U.S. along the route were delineated in accordance with the direction provided by the USACE – Omaha District. A report detailing methods and findings of wetland delineations conducted for the Project is attached in **Appendix 16**.

Wetlands within the Project area were classified into three categories: palustrine emergent (PEM) wetlands, palustrine scrub-shrub (PSS) wetlands, and palustrine forested (PFO) wetlands (Cowardin et al., 1979).

Palustrine emergent wetlands generally are dominated by fowl blue grass (*Poa palustris*) and fox tail (*Hordeum jubatum*) in areas that typically contain water for several weeks after spring snowmelt. Shallow-marsh vegetation such as spikerush (*Eleocharis palustris*) and wheat sedge (*Carex antherodes)* dominate areas where water typically persists for a few months each spring, and deep-marsh vegetation like cattails (*Typha latifolia*), and hardstem bulrush (*Scirpus acutus*) occupies areas where water persists throughout the year (USDA NRCS, 2008; USGS, 2006).

Palustrine scrub-shrub wetlands are dominated by woody shrubs and trees less than 20 feet tall (Cowardin et al., 1979). Dominant woody vegetation in Palustrine scrub-shrub wetlands in the Project survey area consists of white willow (*Salix alba*), narrowleaf willow (*S. Interior*), and common lilac (*Syringa vulgaris*).

Palustrine forested wetlands are dominated by woody vegetation that is at least 20 feet tall (Cowardin et al., 1979). The dominant woody vegetation in Palustrine forested wetlands in the Project survey area consists of eastern cottonwood (*Populus deltoides*), crack willow (*S. fragilis*), white willow, peachleaf willow (*S. amygdaloides*), green ash (*Fraxinus pennsylvanica*), and common buckthorn (*Rhamnus cathartica*). The report (EXP, 2024) provided in **Appendix 16** provides complete lists of dominant species in the wetlands as well as descriptions of soils and hydrology.

5.4.1.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Wetlands within the Project area in South Dakota are limited to approximately 42.79 miles of PEM wetlands and approximately 0.11 miles of PFO wetlands which cross the Project's centerline. Approximately 0.13 miles of PSS wetlands will be crossed by the centerline and impacted during construction. Impacts on wetland vegetation will be greatest during and immediately following construction. To mitigate the potential for these impacts, the Applicant will implement specific procedures as outlined in the ECP (**Appendix 4**) and summarized below.

All wetland areas within grassland easements and USFWS protected wetlands will be avoided either through routing to avoid the wetland feature on the easement or through the use of HDD or a bore.

Wetlands impacts are indicated in **Table 30** below. **Appendix 14** provides a list of each wetland impacted by Project construction and operation.

Smaller streams and ephemeral or intermittent drainages will likely be open cut and wetlands located in these areas will be crossed by the same construction method as the adjacent drainage. Permanent access roads and permanent aboveground facilities will result in the loss of approximately 0.6 acres of PEM wetlands.

Woody vegetation in PFO wetlands will be removed during construction (approximately 0.1 acres) and will regrow within the temporary workspace over many years. Construction will result in the permanent conversion of approximately 0.7 acres of PFO wetlands and 0.9 acres of PSS wetlands to PEM wetlands in the permanent ROW, which would result in loss of the incremental portion of functional value associated with loss of tree cover, but these wetlands would retain other wetland values such as water retention, water filtration, and aquatic habitat.

Herbaceous vegetation in PEM wetlands along the pipeline ROW is expected to re-establish to pre-construction levels within 1 to 5 years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. The construction ROW will result in the permanent conversion of approximately 0.7 acres of PFO wetlands and 0.9 acres of PSS wetlands to PEM wetlands in the permanent ROW. PFO wetlands within the temporary construction workspace would not return to pre-construction conditions for an extended length of time, typically 10 years or more to reach mature habitat.

The ECP (**Appendix 4**) contains BMPs for successful restoration to be followed in wetlands. All work shall be conducted in accordance with applicable permits.

Table 30: Wetlands Impacted by the Project

Wetland Type [1]	Project Impacts By Facility Type [2]									
	Pipeline		Access Roads		Launcher/Receiver		MLV		Pump Station	
	Construction Row (Acres)	Operation Row (Acres)	Construction (Acres)	Operation (Acres)	Construction (Acres)	Operation (Acres)	Construction (Acres)	Operation (Acres)	Construction (Acres)	Operation (Acres)
PEM	408.6	0.0	1.7	0.1	0.05	0.05	0.06	0.06	0.4	0.4
PSS	1.3	0.9	--	--	--	--	--	--	--	--
PFO	0.8	0.7	--	--	--	--	--	--	--	--
Total	**410.7** [3]	**1.6**	**1.9** [3]	**0.1**	**0.05** [3]	**0.05**	**0.06** [3]	**0.06**	**0.4** [3]	**0.4**

Notes:
[1] PEM = palustrine emergent, PSS = palustrine scrub-shrub, PFO = palustrine forested.
[2] Area within Project footprint; there are no direct wetland impacts associated with Project facilities not listed here. Project HDD crossings and bore crossings are not included as impacts, the ground disturbance at these locations will be avoided.
[3] Construction impacts include both construction footprint and operation footprint.
[4] Acres are rounded up.

Operation Impacts and Mitigation

Permanent ECDs will be utilized to stabilize wetland hydrology and contours. Post-construction mowing and clearing of wetland areas will be limited and will only occur within PFO wetlands to allow a 10-foot survey corridor for corrosion and leak surveys. Trees within wetlands will not be cleared unless the roots may compromise the integrity of the pipeline coating.

The Applicant will restore soil horizons by placing subsoil into the trench followed by topsoil to allow wetlands affected by construction activities to naturally revegetate. This is the preferred method of restoration since there have been decades of success because the USACE NWP conditions specify this requirement in their approvals. The Federal Energy Regulatory Commission (FERC) also recognizes this reclamation method in their Wetland Procedures.

Over the operational life of the pipeline, vegetation will be allowed to re-establish in emergent with the exception of 0.1 acres of PEM wetlands filled for a permanent access road and 0.5 acres of wetlands filled for aboveground facilities (**Table 30**). Herbaceous vegetation in PEM wetlands along the pipeline ROW is expected to re-establish to pre-construction levels within 1 to 5 years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. The construction ROW will result in the permanent conversion of approximately 0.7 acres of PFO wetlands and 0.9 acres of PSS wetlands to PEM wetlands in the permanent ROW. As part of its NWP 58 approval from the USACE, the Applicant will abide by all required conditions to ensure wetland function is not lost for any wetland crossed. The Applicant will work with the USACE to provide mitigation for PFO wetlands impacts as appropriate.

Although planning and routing efforts have reduced the overall number of wetlands crossed by the Project, wetlands are present along and adjacent to the Project pipeline route. The impact of CO_2 released into a wetland environment will depend not only upon the quantity of CO_2 released, but also on the physical condition of the wetland at the time of the release.

Carbon dioxide released from the pipeline within a wetland could reach the soil surface. If the water table reaches the surface, the release will manifest as dissipating carbon to its natural state. The general lack of surface flow within a wetland will restrict carbon movement. Where surface water is present within a wetland, the spill will dissipate into the surface water or vaporize into the air. The depth of soil impacts likely will be minimal, due to shallow (or emergent) groundwater conditions. Groundwater impacts within the wetland are likely to be minimal and confined to the near surface, enhancing the potential for biodegradation. If any impacts were to occur from a release within an isolated wetland. As described in Section 6.4, pH will increase in an isolated wetland due to the carbon incorporation of fresh water. However, this release will be diluted and dissipated once the leak is stopped and repaired, and the CO_2 is diluted from surface/groundwater movement.

The chance of a release occurring at any specific wetland along the pipeline is very low. Based on survey data and aerial interpretation, wetlands comprise approximately 410.7 acres of the Project in South Dakota. According to statistics compiled by the USDOT (Pipeline and Hazardous Materials Safety Administration [PHMSA] Report to Congress, 2018; Bureau of Transportation Statistics, National Transportation Statistics, 2021), pipelines represent the safest and most reliable mode for transporting CO_2 as compared to rail and truck transportation. Based on this data, the risk of a CO_2 release in a wetland is very small.

An accidental release from the pipeline will have little to no impact on the natural wetland habitat. This is based on:

1. A leak would be an unlikely event
2. Safety measures built into the design and operations of the pipeline would limit the release size and extent of impact (MLVs, emergency response procedures, operating maintenance, etc.)
3. CO_2 would dissipate into the atmosphere since the pipeline is under pressure
4. Any freezing (from the drop in pressure upon release) of vegetation would be localized around the release location. Vegetation would naturally re-establish after excavation and repairs have been completed, similar to natural reclamation found along pipelines after construction is complete.
5. A CO_2 release would first displace ambient soil gas and then be released into any overlying surface water. CO_2 would dissolve in the water up to its respective solubilities, given the pH, salinity, and temperature of the water at the time of the release. Depending on the relative flux rate of the release to the volume of water in the surface waterbody where the event occurs and the flow rate of the stream (if applicable), most of the gas will decompress and be released up through the water into the atmosphere. Shallow surface waterbodies that have significant turnover (shallow lakes) or turbulence (streams) will quickly release dissolved CO_2 back into the atmosphere. The CO_2 concentration in the water is unlikely to reach 2 percent (i.e., when injuries to aquatic life can occur) since the solubility of CO_2 at typical atmospheric conditions would keep the concentration less than about 0.2 percent. South Dakota surface waters are naturally alkaline, at about 8.2 pH (Caramanna, et al., 2014; Jones, et al., 2015; Little and Jackson, 2010; Pearce, et al., 2014; USDOE, 2007; USEPA, 2024).

If a release occurs, the Applicant will initiate its emergency response procedures to shut the MLVs and restore the ROW where the release occurred. A Control Center Management and Leak Detection Overview was developed to provide the strategy of leak detection and monitoring procedures. A draft of this document is provided in **Appendix 8**. Restoration of any vegetative damage from a release will follow the timelines discussed above and would be localized and small scale to the immediate area around the release.

5.4.2 Fisheries

5.4.2.1 Aquatic Habitats and Communities

Segments of the Big Sioux River, James River, Webber Gulch, and Whetstone River crossed by the Project have been designated by the State with the beneficial use of “warmwater semipermanent fish life propagation water.” The Willow Creek, Moccasin Creek, Lake Henry, East Fork Vermillion River, and West Fork Vermillion River stream segment crossed by the Project has been designated the beneficial use value of “warmwater marginal fish life propagation” (SDDANR, 2024b; ARSD 74:51:01). SD DANR (ARSD 74:51:01:29) classifies a stream as high-quality fishery water if it has been assigned the beneficial use of coldwater permanent fish life propagation, coldwater marginal fish life propagation, or warmwater permanent fish life propagation. Only two waterbodies, Brant Lake and North Fork Yellow Bank River, crossed by the Project have a designation with “warmwater permanent fish life propagation.” Brant Lake and the North Fork Yellow Bank River will be crossed via HDD and impacts will be avoided as further discussed in Section 5.4.2.5. All other waterbody crossings are considered to be low quality fishery waters. Fisheries in all the waterbodies to be crossed are considered to be warmwater fisheries and warmwater fish species are generally more resistant to the impacts of increased sediments than those of coldwater fisheries (e.g., salmonids). The common species found in these prairie streams are adapted to frequent

sediment loads from spring melt and heavy runoff from agricultural fields. From a recreational fishery standpoint, the most important waterbodies crossed by the Project are the James River, the Big Sioux River, Lake Henry, and Brant Lake; however, the segments of Whetstone River, Willow Creek, Moccasin Creek, North Fork Yellow Bank River, East Fork Vermillion River, and West Fork Vermillion River crossed by the Project have also been designated as having the beneficial use of warmwater semipermanent or marginal fish life propagation waters and the other perennial streams provide some fisheries values.

Except for the East Fork of the Vermillion River, West Fork of the Vermillion River, Whetstone River, James River, and the Big Sioux River, these crossed streams are low order streams or tributaries of relatively small size. Woody riparian habitats are found at only four of the waterbody crossings, the crossing of the Whetstone River in Grant County, Big Sioux River in Brookings County, Battle Creek in Lake County, and Lake Albert in Grant County. Some of the other stream crossings have adjacent riparian areas consisting of palustrine emergent wetland (**Table 31**).

SDGFP (2019b) conducted electrofishing at two sites (i.e., Highway 12 and Hitchcock) on the James River within the SDGFP Northeast Fisheries Management Area (NEFMA) in September 2017. Species collected included: bigmouth buffalo (*Ictiobus cyprinellus*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), emerald shiner (*Notropis atherinoides*), fathead minnow (*Pimephales promelas*), flathead catfish (*Pylodictis olivaris*), freshwater drum (*Aplodinotus grunniens*), gizzard shad (*Dorosoma cepedianum*), grass carp (*Ctenopharyngodon idella*), orangespotted sunfish (*Lepomis humilus*), red shiner (*Cyprinella lutrensis*), river carpsucker (*Carpiodes carpio*), shorthead redhorse (*Moxostoma macrolepidotum*), shortnose gar (*Lepisosteus platostomus*) and walleye (*Sander vitreus*). Silver carp (*Hypopthalmichthys molitrix*) were observed jumping but were not captured.

Surveys of the Big Sioux River revealed many of the same species. A survey of 13 sites along the length of the Big Sioux in South Dakota yielded 48 species (Dieterman and Berry 1998). Cyprinids (minnows) represented 56 percent of the catch with the sand shiner (*Notropis ludibundis*), red shiner, and fathead minnow being numerically dominant. Ictalurids made up 22 percent of the catch and were dominated by black bullheads (*Ameiurus melas*) and channel catfish (*Ictalurus punctatus*). Catostomids (suckers) represented 14 percent of the catch, with the white sucker (*Catostomus commersoni*) being the most common, and the predominant percids (perch) were the johnny darter (*Etheostoma nigrum*) and walleye being most common.

Table 31: Named Waterbodies Crossed by the Project

Feature Name	County	Line / Milepost	Crossing Method [1]	Crossing Length [2] (Feet)	Impact [3] (Acres)	Associated Wetlands [4]	Stream Type
Bachelor Creek	Lake	SDL-513 / 29.4	WOC	21.6	0.04	PEM	Perennial
Battle Creek	Lake	SDL-513 / 19.9	WOC	21.7	0.04	PEM, PFO, PSS	Perennial
Beaver Creek	Lincoln	SDM-104 / 50.1	WOC	3.5	0.006	PEM	Intermittent
	Lincoln	SDM-104 / 50.4	WOC	2.5	0.004	PEM	Ephemeral

Table 31: Named Waterbodies Crossed by the Project							
Feature Name	**County**	**Line / Milepost**	**Crossing Method [1]**	**Crossing Length [2] (Feet)**	**Impact [3] (Acres)**	**Associated Wetlands [4]**	**Stream Type**
	Lincoln	SDT-409 / 6.5	WOC	30.6	0.05	PEM	Perennial
Big Sioux River	Union	IAL-501 / 3.0	HDD	240.5	0.0	--	Perennial
	Brookings	SDL-513 / 8.7	HDD	41.3	0.0	PEM, PFO	Perennial
	Brookings	SDL-513 / 8.7	HDD	29.3	0.0	PEM, PFO	Perennial
	Brookings	SDL-513 / 8.7	HDD	106.0	0.0	PEM, PFO	Perennial
	Codington	SDL-514 / 50.5	HDD	75.4	0.0	PEM	Perennial
	Codington	SDT-208 / 0.1	HDD	251.7	0.0	--	Perennial
	Codington	SDT-208 / 0.2	HDD	64.2	0.0	PEM	Perennial
	Codington	SDT-208 / 0.7	HDD	53.0	0.0	PEM	Perennial
	Lincoln	SDM-104 / 27.2	HDD	92.7	0.0	PEM	Perennial
Brant Lake	Lake	SDT-206 / 3.4	HDD	264.7	0.0	PEM	Lake
Bryant Creek	Hand	SDL-320 / 64.5	WOC	20.7	0.04	PEM	Intermittent
Deer Creek	Brookings	SDL-513 / 3.8	HDD	51.5	0.0	PEM	Perennial
Dry Run	Spink	SDM-105 / 41.3	WOC	82.1	0.14	PEM	Perennial
	Spink	SDT-209 / 9.9	HDD	99.3	0.0	PEM	Perennial
	Davison	SDT-410 / 0.7	Bore	26.9	0.0	PEM	Perennial
	Sanborn	SDT-410 / 15.9	Bore	11.9	0.0	PEM	Intermittent
	Lake	SDM-104 / 97.4	HDD	54.6	0.0	PEM	Perennial

Table 31: Named Waterbodies Crossed by the Project							
Feature Name	**County**	**Line / Milepost**	**Crossing Method [1]**	**Crossing Length [2] (Feet)**	**Impact [3] (Acres)**	**Associated Wetlands [4]**	**Stream Type**
East Fork Vermillion River	Turner	SDT-212 / 8.9	HDD	94.1	0.0	--	Perennial
Elce Creek	Turner	SDT-212 / 10.1	Bore	18.8	0.0	--	Perennial
Foster Creek	Spink	SDM-105 / 15.1	WOC	51.6	0.07	PEM	Intermittent
Franklin Creek	Lake	SDT-206 / 5.5	WOC	10.3	0.03	PEM	Intermittent
James River	Brown	SDL-515 / 10.2	HDD	106.4	0.0	PEM	Perennial
	Spink	SDT-105 / 50.2	HDD	68.7	0.0	--	Perennial
	Beadle	SDT-209 / 11.2	HDD	1996.7	0.0	PEM	Perennial
	Spink	SDM-209 / 1.4	HDD	114.0	0.0	PEM	Perennial
	Sanborn	SDT-410 / 7.4	HDD	159.3	0.0	PEM	Perennial
Jim Creek	Sanborn	SDT-410 / 20.2	WOC	26.3	0.05	PEM	Intermittent
	Miner	SDT-410 / 24.3	Bore	13.0	0.0	PEM	Intermittent
Lake Albert	Grant	SDL-514 / 4.3	HDD	399.6	0.0	PFO	Lake
Lake Henry	Kingsbury	SDT-411 / 9.5	HDD	1010.2	0.0	PEM	Lake
Long Creek	Turner	SDT-212 / 13.2	Bore	18.5	0.0	PEM	Perennial
	Lincoln	SDT-409 / 1.2	Bore	29.0	0.0	--	Intermittent
Matter Creek	Hand	SDL-320 / 51.4	WOC	11.2	0.03	--	Ephemeral
Medicine Knoll Creek	Sully	SDL-320 / 17.7	HDD	26.5	0.0	PEM	Perennial

Table 31: Named Waterbodies Crossed by the Project							
Feature Name	**County**	**Line / Milepost**	**Crossing Method [1]**	**Crossing Length [2] (Feet)**	**Impact [3] (Acres)**	**Associated Wetlands [4]**	**Stream Type**
Moccasin Creek	Brown	SDL-515 / 20.1	Bore	125.3	0.0	--	Perennial
	Brown	SDL-515 / 20.1	Bore	61.1	0.0	--	Perennial
North Fork Yellow Bank River	Grant	SDL-514 / 12.9	HDD	46.2	0.0	--	Perennial
	Grant	SDL-514 / 13.0	HDD	43.5	0.0	--	Perennial
Pearl Creek	Beadle	SDM-104 / 150.6	HDD	20.8	0.0	PEM	Pond
Pooley Creek	Miner	SDT-410 / 29.4	Bore	5.0	0.0	PEM	Intermittent
	Miner	SDT-410 / 29.9	Bore	40.9	0.0	PEM	Intermittent
	Miner	SDT-410 / 30.8	Bore	35.4	0.0	PEM	Intermittent
Redstone Creek	Kingsbury	SDM-104 / 129.9	Bore	53.4	0.0	PEM	Perennial
	Clark	SDT-208 / 44.8	Bore	1.0	0.0	PEM	Ephemeral
	Kingsbury	SDT-411 / 19.8	HDD	70.1	0.0	--	Perennial
Rock Creek	Kingsbury	SDM-104 / 124.4	WOC	10.4	0.02	PEM	Intermittent
	Miner	SDT-410 / 33.2	Bore	12.7	0.0	PEM	Perennial
	Kingsbury	SDT-411 / 15.2	Bore	27.0	0.0	PEM	Intermittent
Round Lake	Lake	SDT-206 / 3.4	HDD	187.2	0.0	PEM	Lake
Shue Creek	Beadle	SDM-105 / 3.1	Bore	13.3	0.0	PEM	Perennial
	Beadle	SDT-207 / 18.0	Bore	71.0	0.0	--	Perennial

Table 31: Named Waterbodies Crossed by the Project

Feature Name	County	Line / Milepost	Crossing Method [1]	Crossing Length [2] (Feet)	Impact [3] (Acres)	Associated Wetlands [4]	Stream Type
Snake Creek	Spink	SDM-105 / 58.5	WOC	60.6	0.02	PEM	Perennial
	Spink	SDM-105 / 61.5	HDD	94.0	0.0	PEM	Perennial
	Brown	SDM-105 / 78.2	WOC	17.8	0.03	PEM	Perennial
	Brown	SDT-210 / 9.1	WOC	7.2	0.02	PEM	Intermittent
Spring Creek	McPherson	NDM-106 / 23.7	WOC	23.9	0.04	PEM	Intermittent
Timber Creek	Spink	SDM-105 / 31.7	HDD	76.5	0.0	PEM	Perennial
Webber Gulch	Brown	NDT-211 / 90.0	HDD	161.6	0.0	PEM	Perennial
West Branch Skunk Creek	Minnehaha	SDM-104 / 77.3	WOC	2.7	0.005	--	Ephemeral
West Fork Vermillion River	Turner	SDT-212 / 1.1	Bore	55.0	0.0	--	Perennial
	Miner	SDT-410 / 41.4	WOC	2.3	0.004	PEM	Intermittent
Whetstone River	Grant	SDL-514 / 1.9	HDD	120.0	0.0	PFO	Perennial
Willow Creek	Codington	SDL-514 / 38.8	Bore	22.7	0.0	PEM	Perennial

Notes:

[1] Crossing method is either HDD (horizontal directional drill), bore, or WOC (wet open cut) as identified in Section 2.2.

[2] Crossing length is centerline and bank to bank.

[3] Temporary impact within stream; there may be additional impact to adjacent temporary associated wetlands.

[4] Associated wetlands are riparian wetlands that abut the waterbody but are not included in the impact acreage: PEM = palustrine emergent; PSS = palustrine scrub shrub; PFO = palustrine forested.

A fish survey using gill nets in 2016 found the most abundant fish to be as follows in descending order: black bullhead, yellow perch, smallmouth bass, walleye, white bass, white sucker, common carp, channel catfish, black crappie, bluegill, bigmouth buffalo, and northern pike. Sago pondweed is a common aquatic plant in the lake (SDGFP, 2016).

5.4.2.2 Recreational and Commercial Fisheries

Little active management of stream fisheries currently occurs by SDGFP NEFMA, which includes McPherson, Edmunds, Spink, Codington, and Hamlin counties (SDGFP, 2019b). Because of climate and hydrology, stream fisheries within the NEFMA are often temporal only occurring in the spring when flows are high, and the streams become populated with sport fish moving from lakes with connections to the stream. SDGFP (2019b) reports that regarding stream fishing in the NEFMA, the James River is commonly fished, and limited angling occurs on the Big Sioux River (within the NEFMA). SDGFP has not stocked fish in these two rivers in more than 25 years (**Table 32**). Walleye, northern pike, channel catfish and bullheads are commonly targeted by anglers fishing the James River and the Big Sioux River. Past stocking of some of the smaller streams such as Shue Creek, Timber Creek, and Snake Creek indicates they provide some recreational fishing opportunities. The species of fish that were stocked in these streams (**Table 32**) also provides an indication of the species that are fished for. In SDGFP's Southeast Fisheries Management Area the Big Sioux, James and East Vermillion Rivers are considered major rivers providing significant recreational fisheries that are self-sustained by fish movement and natural reproduction.

Table 32: Fish Stocked in Named Waterbodies Crossed by the Project

Stream	County[1]	Fish Stocked [2]	Most Recent Stock Year [3]
Big Sioux River	Brookings, Codington	black crappie, black bullhead, yellow perch, smallmouth bass, northern pike, walleye, white crappie, channel catfish, largemouth bass	1996
Brant Lake	Lake	walleye, yellow perch, fathead minnow, black crappie, bluegill, channel catfish, smallmouth bass, largemouth bass, northern pike, white crappie, spottail shiner, black bullhead,	2024
East Fork Vermillion River	Lake, Turner	walleye, black crappie, yellow perch, bluegill, channel catfish, fathead minnow, largemouth bass, northern pike, white crappie,	2017
James River	Brown, Spink	saugeye, walleye, black crappie, channel catfish, smallmouth bass, northern pike, sauger, yellow perch, largemouth bass, black bullhead, black crappie, white bass, rock bass, bluegill	2023
Lake Albert	Grant	walleye, largemouth bass	2011
Lake Henry	Kingsbury	Walleye, northern pike, black bullhead, yellow perch, black crappie, bluegill, largemouth bass	2024
Medicine Knoll Creek	Sully	bluegill, largemouth bass	2019
Moccasin Creek	Brown	yellow perch, black bullhead	1943
Redstone Creek	Kingsbury, Clark	walleye	1985
Round Lake	Lake	northern pike	1969
Shue Creek	Beadle	black bullhead	1935

Table 32: Fish Stocked in Named Waterbodies Crossed by the Project			
Stream	**County[1]**	**Fish Stocked [2]**	**Most Recent Stock Year [3]**
Snake Creek	Spink, Brown	black bullhead	1935
Timber Creek	Spink	Northern pike, yellow perch, black bullhead, largemouth bass	1970
Whetstone River	Grant	yellow perch, brown trout, largemouth bass	1937
Willow Creek	Codington	brook trout	1917

Notes:
[1] Stocking location may not be in a county crossed by the Project
[2]Fish species stocked by SDGFP in named streams crossed by the Project per SDGFP stocking reports at: Fishery Reports | South Dakota Game, Fish, and Parks (sd.gov)
[3] The most recent year that stocking was conducted by SDGFP in that waterbody.

Brant Lake is actively managed for walleye and yellow perch, but black crappie (*Pomoxis nigromaculatus*) bluegill (*Lepomis macrochirus*), smallmouth bass (*Micropterus dolomieu*), northern pike (*Esox lucious*), and white bass (*Morone chrysops*) frequently provide additional fishing opportunity. Although three fish kills have been documented since 1999, they had no significant impact on game fish populations. Yellow perch and walleye, among other species, are often stocked in the lake (as recently as 2024) to maintain population abundance and fishing opportunity (SDGFP, 2016). Round Lake and Lake Albert provide fishing opportunities as well.

5.4.2.3 Aquatic Invasives

SDGFP (2024) reports infestations with aquatic invasive species in three waterbodies crossed by the Project footprint (**Table 33**). The species include three species of fish – silver carp (*Hypopthalmichthys molitrix*), bighead carp (*Hypopthalmichthys nobilis*), and the grass carp (*Ctenopharyngodon Idella*).

Table 33: Surface Waterbodies Crossed by the Project that are Infested by Aquatic Invasive Organisms				
Waterbody	**County**	**Fish [1]**		
		Silver Carp	**Bighead Carp**	**Grass Carp**
Big Sioux River (Below Sioux Falls)	Lincoln	X	X	X
East Vermillion (Below the Spillway)	Turner	X	X	--
James River	Beadle	X	X	X
	Brown	X	X	X
	Sanborn	X	X	X
	Spink	X	X	X

Notes:
[1] Data from SDGFP (2024) Environmental Review Tool website at: https://ert.gfp.sd.gov/content/map

5.4.2.4 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

While impacts to aquatic habitats and communities in streams and wetlands caused by the construction of a pipeline cannot be completely avoided, the impacts can be minimized with proper planning, use of proven BMPs, control implementation, and monitoring. The impacts to aquatic fauna and their ecosystems are typically associated with direct alteration at the crossing site, disruption of stream flow, increased sediment loads, and alteration of downstream habitats due to increased sediment deposits (INGAA, 1998). Case studies show that the impacts are generally localized and short-term, and recovery is apparent within one year (INGAA, 1998; Anderson, et al., 1998).

The Project will cross 326 waterbodies including rivers, streams, lakes, and ponds. Of these stream crossings, 68 named waterbodies, including 4 ephemeral stream crossings, 16 intermittent stream crossings, 43 perennial stream crossings, 4 lake crossings, and 1 pond crossing are listed in **Table 30**. Some of the larger named waterbodies will be crossed multiple times by different pipelines, such as the Big Sioux River with 9 crossings. These additional crossings are included in the total amount of crossings. Brant Lake is a 1,037-acre glacial lake located at MP 3.4 on SDT-206. The northwestern corner of the lake, which is isolated by a road, will be crossed by the pipeline using HDD technology. Round Lake is hydrologically connected to Brant Lake and will be crossed by SDT-206 with the same HDD method. Three streams listed in **Table 32** (i.e., Big Sioux River, James River, and the East Fork Vermillion River) will be crossed by Project pipelines via the HDD or bore crossing methods to avoid aquatic invasives and minimize impacts. Project construction will involve 258 crossings of other aquatic habitats including very small ephemeral unnamed streams, named streams with no defined channel, roadside and field ditches, prairie potholes, and ponds.

The level of impacts caused by construction greatly depends on the type of stream, flow at the time of construction, and the crossing methods employed. In all cases, the Applicant has developed the Project's ECP which is similar to the FERC's Plan and Procedures and will adhere to rapid construction across small waterbodies (within 24 hours) and for non-HDD/bore crossings, a short duration to accommodate reduction of impacts. Dry, open-cut methods are typically used for smaller streams because the crossing can be completed in short duration resulting in temporary and short-term impacts. Wet, open-cut methods generally result in the highest level of sediments introduced to the waterbody during construction but is also the fastest method. The speed at which a wet, open-cut method can be completed significantly reduces the surge of sediments caused by construction. Trenchless methods are typically reserved for intermediate and major waterbodies crossings. While trenchless methods limit the impacts to aquatic fauna and water quality, they are not always the most feasible option to cross a waterbody. Trenchless methods typically take longer to complete and have the associated risk of an inadvertent release. Other factors to consider include the subsurface conditions, length of the bore, above ground structures, topography (CH2M Hill, 2014), access on either side of the crossing, and whether or not a bridge or other temporary access across the waterbody is still required. These considerations are one reason trenchless methods are not typically utilized for smaller waterbody crossings and why open-cut methods are a better option at reducing the risks and impacts to the waterbody because of the quicker crossing timeframe.

In addition, timing also plays an important role in minimizing the impacts. For example, the FERC provides a set of guidelines and goals for the maximum amount of time spent to complete a crossing depending on the size of the water course (FERC, 2013). Timing the construction to avoid periods when aquatic fauna is spawning is another way to minimize impacts. The FERC also provides a comprehensive set of procedures

to follow for waterbody and wetland crossings and the Applicant's ECP follows these best practices. Understanding the characteristics of the waterbody while following regulatory requirements and best management practice guidelines will aid in minimizing the impacts during construction and allow for adequate recovery of the resource.

Construction of the Project will have only minor and temporary impacts on aquatic habitat and fisheries. The primary impact will be the re-suspension of sediments in the water column which will temporarily reduce water quality and could result in the destruction of sessile benthic organisms during excavation or mortalities to benthic organisms due to re-deposition of the suspended sediments most of which are silty clay. Fish eggs and larvae could be negatively affected in a similar manner. Motile adult fish will be displaced from the work area as they will move away from areas of increased turbidity. Displacement could briefly interfere with spawning or feeding and reduce fishing opportunities or success. However, these impacts will be temporary as the crossings are small and will be conducted rapidly - in a matter of a couple of days. Impacts such as increased suspended sediments will dissipate within hours of completion of the crossing. Twenty (20) of the sixty-eight (68) named stream crossings will occur in stream segments with ephemeral or intermediate flow regimes, which indicates significant spawning does not take place in these locations.

All named waterbodies crossed by the Project except for fourteen (14) streams (Spring Creek, Matter Creek, Bryant Creek, Battle Creek, Bachelor Creek, Beaver Creek, West Branch Skunk Creek, Rock Creek, Foster Creek, Dry Run, Snake Creek, Franklin Creek, Jim Creek, and one crossing of the West Fork Vermillion River) will all be crossed using HDD or bore technologies and therefore require no in-water work and result in no disturbance of the waterbody banks or channels, and no suspension of sediments. The Whetstone River crossing and Lake Albert are the only waterbodies with adjacent forested riparian areas. Workspace for the HDD will be located outside the riparian habitat, but woody vegetation may need to be cut by hand within a 15-foot-wide area along the HDD path to access water and the true-tracker. While HDD crossings generally avoid impacts to the waterbodies and their banks, they sometimes result in an inadvertent release of drilling fluids from the borehole through the soils (termed an inadvertent return) to the floor of the waterbody and then to the water column. To mitigate such impacts, only non-toxic drilling fluids and additives will be utilized, and the Applicant has developed a contingency plan that outlines operational procedures and responsibilities for the prevention, containment, and clean-up of inadvertent returns associated with the HDD process (**Appendix 7**).

If the stream is open cut, a number of mitigation measures will be applied to minimize impacts and restore stream banks (refer to the ECP in **Appendix 4**). Any necessary work areas near the waterbody will be minimized and limited in size. Markers will be placed at the banks of waterbodies until post-construction reclamation is completed to ensure the riparian cover is maintained. Hazardous materials such as fuels, lubricating oils, or chemicals will not be stored within 100 feet of the waterbody. Waterbody banks will be restored to the pre-construction contour or to an angle of stable repose if they are cut banks. Topsoil will be replaced on top of the subsoil. Waterbody banks will be stabilized by installing permanent ECDs and allowed to revegetate.

The introduction and/or spread of invasive or exotic species during construction is also a concern. To reduce the potential for such an event, pre-construction surveys for invasive or noxious species will be conducted along the ROW. Areas identified to avoid will have signs posted by the Applicant, so they are easily recognized by Project personnel and measures outlined in the Noxious Weed Management Plan (**Appendix 17**) will be followed. The Contractor will clean the tracks, tires, and blades of equipment with clean water or compressed air to remove excess soil prior to moving the equipment out of weed or soil-borne pest infested areas. None of the rivers/streams identified with invasive or exotic species will be

crossed with an open cut construction method and will therefore avoid the possibility of spreading those species. Any water withdrawals from those waterbodies will utilize screens to prevent the uptake of any invasive species and the water will be returned to the source, avoiding spreading the invasive species to another waterbody.

Operational Impacts and Mitigation

Operations will have little if any impact on aquatic streams, lakes, and fisheries once the work areas are restored. Post-construction mowing and clearing of riparian areas will occur every 2-3 years, or as necessary, in unfarmed areas. The use of pesticides and herbicides will be prohibited within 100 feet of a waterbody unless approved by the appropriate land management and state agency. Vegetation between HDD entry and exit posts will not have routine clearing or mowing.

The potential for accidental release of CO_2 into the aquatic environment from a pipeline rupture is very low based on the frequency of pipeline ruptures in general and the fact that open water habitats represent only 0.2 percent of the pipeline routes, but such a release, were it to occur, could have some impacts on the aquatic communities.

The magnitude of the impacts of a release will be contingent upon the volume of the release and the size and flow of the waterbody (dilution), but in general will be expected to be low. The release of CO_2 will cause the concentration of dissolved CO_2 in the water column to increase with consequent decreases in pH and will cause direct toxicity effects. According to Henry's Law, at 25° C, an equilibrium concentration of CO_2 and water would approach 0.55 parts per million which would not constitute a significant adverse impact to most fish species. Oversaturation could occur adjacent to the leak site with CO_2 concentration levels potentially going as high as 1,500 parts per million. While CO_2 concentrations at these levels would be extremely toxic to fish, the possibility of many fish being killed would still be remote or virtually nonexistent because:

1. Fish are mobile and most waterbodies crossed will move the CO_2 downstream as well as dilute it,
2. a bubble stream from a leak would cause fish to avoid the area,
3. a CO_2 leak would be short term because of block valve safety precautions, and
4. a leak or blowout is unlikely to occur at all. Sessile species (e.g., mollusks) would be more vulnerable to increases in CO_2 levels in the water column because of their inability to move locations.

The CO_2 increases would have to occur consistently over a prolonged period of time (months) for impacts to be seen. In addition, when CO_2 dissolves in water, about one-percent of it forms carbonic acid (H_2CO_3), which almost immediately dissociates to bicarbonate anions and protons (HCO_3-). This produces a solution of bicarbonate. Because surface waters are in equilibrium with atmospheric CO_2 there is a constant concentration of H_2CO_3 in the water. The presence of limestone and other calcium carbonate rocks in lakes and streams helps to maintain a constant pH because the minerals react with the excess acid. When water is in equilibrium with both CO_2 and carbonate containing rock, the pH of the water is buffered to a pH of 8.3, close to the pKa of the weak acid bicarbonate HCO_3- (pKa = 8.4). Due to the presence of alkaline soils and limestone bedrock, South Dakota surface waters average a pH of 8.2. The solubility of CO_2 in water is a function of both the temperature and the salinity of the water, where CO_2 is more soluble in freshwater than seawater, and solubility decreases with increasing temperature.

Fish appear to be less sensitive to the physiological impacts of acidification than invertebrates with carbonate shells, and adult fish less sensitive than eggs and juvenile fish. Motile adult fish will also likely

move away from the release (Suzuki, 2020) but CO_2 concentrations near the source could increase to toxic levels and result in morbidity or mortality on fish that do not move away and on sessile invertebrates. Most impacts will be short-term ameliorating soon after the release is stopped, but re-colonization by invertebrates could take a year or longer.

5.5 Land Use and Local Land Controls

5.5.1 Existing Land Use

Land classifications were translated from NLCD classifications to the land cover classifications as described in ARSD 20:10:22:18 (**see Table 34**). However, not all land use classifications were surveyed, and much of what the NLCD calls grasslands is not undisturbed native prairie. This can be seen in some areas where both Hay/Pasture and Grasslands occurs in the same section of the corridor and the aerial signature clearly shows the land has been tilled. The land use analysis also incorporated the field and desktop determinations of wetlands and waterbodies. The land use map book is provided in **Appendix 5C**.

Miles of each land cover types crossed by the Project are provided in Section 5.3, **Table 15**: Land Cover Types Traversed by the Project in South Dakota. The land required for construction and operations is provided in **Table 20** in Section 5.3. Noise sensitive lands are addressed in Section 6.5.3. Most of the land crossed is considered to be rural residences and farmsteads, and other occupied buildings for noise sensitive lands.

Table 34: Land Use Classification

National Land Cover Dataset Classifications[1]	Based on ARSD 20:10:22:18 — Land Use Classifications[2]
Barren Land	Existing and potential extractive nonrenewable resources
Cultivated Crops	Land used primarily for row and non-row crops in rotation
Developed, High Intensity	Public, commercial, and institutional use and Noise Sensitive Land Use
Developed, Low Intensity	Rural residences and farmsteads, family farms, and ranches / Residential, and Noise Sensitive Land Use
Developed, Medium Intensity	Rural residences and farmsteads, family farms, and ranches / Residential, and Noise Sensitive Land Use
Developed, Open Space	Rural residences and farmsteads, family farms, and ranches / Residential / Public use, and Noise Sensitive Land Use
Grassland	Undisturbed native grasslands
Hay / Pasture	Pasturelands and rangelands / Haylands
Manmade Pond	Irrigated lands / water sources for organized rural water systems
Natural Pond	Irrigated lands / water sources for organized rural water systems
Open Water	Irrigated lands / water sources for organized rural water systems lands / Public use

Table 34: Land Use Classification	
National Land Cover Dataset Classifications[1]	**Based on ARSD 20:10:22:18 — Land Use Classifications[2]**
Ephemeral	Potential source for irrigated lands
Intermittent	Potential source for irrigated lands
Perennial	Potential source for irrigated lands / Public use
Mixed Forest	Public Use
Deciduous Forest	Public Use
Shrub / Scrub	Public Use
Palustrine Emergent (PEM) Wetland	Applicant field survey/desktop delineated wetland feature
Palustrine Forested (PFO) Wetland	Applicant field survey/desktop delineated wetland feature
Palustrine Scrub/Shrub (PSS) Wetland	Applicant field survey/desktop delineated wetland feature

[1] National Land Cover Database 2021 (NLCD 2021) Legend online at: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description

[2] South Dakota Administrative Rules 20:10:22:18. Available online at: https://sdlegislature.gov/Rules/AdministrativeSouth%20D/20:10:22:18

5.5.1.1 Compatibility with Existing Land Use

The Project will be compatible with the predominant row and non-row crops in rotation land use impacted by the Project (70% of the footprint). The construction ROW on agricultural lands (row and non-row crops in rotation and pasturelands and rangelands/haylands) accounts for over 7,707.7 acres (83% of the total construction footprint) and will be installed at a minimum of four feet (top of pipe) below ground surface as to not interfere with normal agricultural operations. Construction of the Project will also require approximately 241.0 acres of lands described as rural residences and farmsteads, family farms, ranches, residential, commercial, institutional, and public use land use areas; and approximately 459.3 acres of potential sources for irrigated lands, potential sources for irrigated lands public use, PSS wetlands, PFO wetlands, and PEM wetlands). Construction of the Project will also impact approximately 875.9 acres of undisturbed native grasslands and 0.3 acres of existing and potential extractive nonrenewable resources.

Aboveground facilities, including pump stations, MLVs, and launcher and receivers will permanently impact agricultural land (approximately 28.6 acres), rural residences and farmsteads, family farms, ranches, residential, and public use land use areas (approximately 2.4 acres), undisturbed native grasslands (approximately 0.6 acres), and some PEM wetlands (approximately 0.5 acre). Additionally, PFO wetlands located within the operational footprint of the pipeline will be permanently altered to PEM wetlands.

Access roads required for construction will impact agricultural land (approximately 24.0 acres), rural residences and farmsteads, family farms, ranches, residential, commercial, institutional, and public use land use areas (approximately 8.6 acres), and undisturbed native grasslands (approximately 9.8 acres). Access roads may impact some PEM wetlands and waterbodies (approximately 1.7 acres and less than 0.1 acre, respectively). There will be approximately 5.8 miles of permanent access roads that will be built to access MLVs and pump stations and will connect to existing roads.

5.5.2 Displacement

There will be no homes removed or displaced because of the Project.

5.5.3 Local Land Use Controls

The Applicant will comply with local regulations to review proposed Project measures within their respective counties and municipalities before construction. Project pipelines will cross multiple counties (**Table 36**). Project aboveground facilities, including pump stations, launcher, and receivers, and MLVs will be located in Beadle, Brookings, Brown, Clark, Codington, Edmunds, Grant, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McPherson, Miner, Minnehaha, Sanborn, Spink, Sully, Turner, and Union counties.

The Applicant reviewed zoning and comprehensive plans for counties where pipelines and aboveground facilities have been proposed. Local regulations require a review of proposed Projects within their respective counties. For example, the Lincoln County subdivision ordinance requires the review of any proposed utilities prior to excavation, construction, and improvements (Lincoln County, 2005) and the Beadle County Comprehensive Plan identifies objectives to design around wetlands and to limit development in areas with poor soils and high-water tables (Beadle, 2016).

The Brown County Zoning Ordinance, Title 4 and McPherson County Zoning Ordinance No. 10-2 require a CUP for utility substations (i.e., pump stations) in all zones except commercial, highway commercial, and light industrial districts:

Public Utility Substations: facilities for the distribution of telephone, radio, communications, water, gas, and electricity shall be permitted as a conditional use in the various zoning districts subject to conditions, which will assure their harmony, especially aesthetically with the nature of the respective district (Brown County ND, McPherson County, 2011).

Table 35 is a list of anticipated local reviews and permits that will be required for the Project based on the Project facilities in each county. The Applicant will contact applicable local regulatory agencies prior to any excavation, construction, and improvement activities to ensure the Project is compliant with requirements with agencies referenced in **Table 2**. The Applicant will apply for CUPs where applicable prior to construction.

Six counties (Brown, Edmunds, McPherson, Minnehaha, Sanborn, Spink) passed ordinances restricting the siting of an interstate, common carrier pipeline, transporting a commodity (CO_2) that is heavily regulated by the PHMSA. See **Section 1.8** for discussion of these county ordinances and key aspects that prohibit the ability to route a pipeline that's compliant with ordinances and other restrictions (avoidance areas).

Table 35: Local Land Use Control Permits Anticipated for the Project						
County	**Pipelines**	**Pump Station**	**MLV**	**Launcher-Receiver**	**Access Roads**	**Permits**
Beadle	✓	✓	✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit; Conditional Use
Brookings	✓		✓		✓	Pipeline Construction Review; Zoning Review; Building Permit; Floodplain Development Permit
Brown	✓		✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit; Conditional Use
Clark	✓		✓		✓	Pipeline Construction Review
Codington	✓		✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit
Davison	✓				✓	Pipeline Construction Review; Zoning Review; Building Permit; Floodplain Development Permit
Edmunds	✓	✓	✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit
Grant	✓		✓		✓	Pipeline Construction Review; Zoning Review; Building Permit
Hamlin	✓		✓		✓	Pipeline Construction Review
Hand	✓		✓		✓	Pipeline Construction Review
Hyde	✓		✓		✓	Pipeline Construction Review
Kingsbury	✓		✓	✓	✓	Pipeline Construction Review; Building Permit; Zoning Application
Lake	✓	✓	✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit
Lincoln	✓		✓	✓	✓	Pipeline Construction Review
McCook	✓					Pipeline Construction Review
McPherson	✓	✓	✓		✓	Pipeline Construction Review; Building Permit; Zoning Application; Conditional Use
Miner	✓		✓	✓	✓	Pipeline Construction Review
Minnehaha	✓	✓	✓		✓	Pipeline Construction Review; Building Permit; Zoning Application; Conditional Use

Table 35: Local Land Use Control Permits Anticipated for the Project

County	Pipelines	Pump Station	MLV	Launcher-Receiver	Access Roads	Permits
Sanborn	✓		✓		✓	Pipeline Construction Review; Zoning Review; Building Permit
Spink	✓	✓	✓	✓	✓	Pipeline Construction Review; Zoning Review; Building Permit
Sully	✓		✓	✓	✓	Pipeline Construction Review; Zoning Review/Application
Turner	✓		✓		✓	Pipeline Construction Review; Building Permit
Union	✓		✓		✓	Pipeline Construction Review; Zoning Review; Building Permit

5.5.4 Lands Enrolled in Agency Programs

The Applicant is working with landowners to identify parcels or portions of parcels that are within a Conservation Reserve Program (CRP) or other conservation programs.

South Dakota allows landowners to lease their land for public hunting and fishing activities. Walk-In Areas (WIA) are privately owned lands which are leased for public hunting access by the SDGFP. Landowners may also enroll in the Conservation Reserve Enhancement Program (CREP) for those currently enrolled in the CREP by signing a lease agreement with SDGFP to provide public hunting and fishing access. No CREP or WIA lands have been identified within the Project footprint at this time.

The Applicant is currently working directly with the USDA to ensure that all USDA conservation parcels along the Project route are identified.

A review of publicly available data shows that the pipeline will cross seven NRCS easements. Easements programs associated with the crossed easements include the Grasslands Reserve Program which is intended to protect, restore, and enhance grassland, including rangeland, pastureland, shrubland, and certain other lands and the Wetlands Reserve Program [WRP]) which protects, restores and enhances wetlands with the goal of achieving the greatest wetland functions and optimum wildlife habitat on every acre enrolled. Surface impacts to Grasslands Reserve Program and WRP have been avoided through re-routes and use of HDD or bores on all routes. The Applicant is currently working directly with the USDA to ensure that all USDA conservation parcels along the Project route are identified and as re-routes are contemplated with landowners and that the construction of the Project will not result in any landowners being penalized under the conditions of their easement contracts. The Applicant will work with the USDA and landowners on the crossing of any easement to either ensure that the reclamation meets the

easement requirements or provide the landowner with compensation to reimburse the federal government.

5.5.5 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Impacts to land use during construction will be primarily from clearing vegetation, topsoil segregation, grading, and backfilling. To reduce impacts to land use, the pipeline ROW has been collocated to the greatest extent possible (see Section 4.1). Most of the ROW will revert to pre-construction vegetative conditions.

The impacts of construction will be greatest during and immediately following construction. Generally, once the pipeline is in place, wetland vegetation and other vegetation communities will transition back to a community with a function similar prior to construction.

Long-term or permanent impacts for the pipeline ROW are not expected as the majority of areas will revert to previous uses. Permanent impacts from associated infrastructure and aboveground facilities will be minor because the permanent conversion of land use from pump station, MLVs, and launcher and receivers, account for a total of only 32.1 acres and 8.5 acres for permanent access roads.

The pipeline will be buried with a minimum of four feet of cover that will not interfere with normal agricultural operations. For agricultural users, the Applicant will work with landowners to identify drain tiles prior to construction. Where underground drain tile is encountered in the project profile, the pipeline will be installed in such a manner that the permanent tile repair can be installed with at least 12 inches of clearance from the pipeline or as agreed upon with landowner. Where drain tiles are impacted, the tiles will be repaired in accordance with Section 6.7 of the SD AIMP (**Appendix 6**). Tiles will be temporarily repaired to allow the regular operation of the tiles while construction of the Project is undertaken. Once the pipeline has been installed, all drain tiles will be permanently repaired to their original or better condition. If a landowner has future plans of installing drain tile, then the Applicant will work with the individual landowner to install the pipe at a depth to allow for the installation of the drain tile afterward without issue by plowing it in over the top of the pipeline.

Individual landowners will be compensated for the construction ROW and permanent ROW to operate the pipeline. Once construction is completed and the ROW has been restored, grazing and livestock movement over the permanent ROW will resume. Additionally, the Applicant will compensate individual landowners for use of the temporary construction workspace on their land, crop losses and other damage caused by construction activities, as well as for the Applicant's ROW to operate the pipeline.

Grazing is expected to return to normal after vegetation is re-established. Areas that have been cleared of vegetation are expected to recover in one to three growing seasons after construction is completed, sooner if in row crop production.

Seed mixes will be determined prior to construction and after consultations with landowners and local NRCS offices. Following those consultations, the Applicant will provide a table to the SD PUC of the anticipated seed mixes that will be used to cover the range of site variables. If irrigation is required to establish vegetation in accordance with Section 7.2.4 of the ECP (**Appendix 4**), then the Applicant will utilize irrigation methods such as water trucks, entering into an agreement to pay a landowner on an as-needed basis to irrigate, or setting up an irrigation sprayer for areas needing irrigation. The Applicant will apply measures in the ECP (**Appendix 4**) and the SD AIMP (**Appendix 6**) to promote recovery of areas by removing and then restoring topsoil and reseeding disturbed areas with approved seed mixtures or returning to the landowner for crop planting.

Where the pipeline will be constructed via clearing for the pipeline ROW, long, linear lines in the landscape will be visible immediately after construction. However, because a relatively small acreage of land use will be converted to another land use, it is anticipated that impacts will be minor and ameliorated over time as vegetation is re-established or agricultural use continues.

Impacts to some wetlands, waterbodies, and grasslands will be avoided with the use of HDDs. During construction, contractors will adhere to the measures outlined in the ECP (**Appendix 4**), which includes procedures to minimize wetland impacts. Other temporary impacts include restricting access across the ROW during construction, such as restricting livestock access, hunting, grazing, or similar activities.

Applicable local regulatory agencies will be contacted prior to any excavation, construction, and improvement activities to ensure the Project complies with local ordinances. The Applicant will apply for CUPs where applicable prior to construction. The Applicant will negotiate road haul agreements with counties impacted by construction use of their roads. This will culminate in the requirement for construction bonds to cover the potential impacts to public roads. The Project will also be responsible for repairing damage to roads and restoring them to pre-construction or better condition.

The Applicant is currently working directly with the USDA to ensure that all USDA conservation parcels along the Project route are identified and that the construction of the Project will not result in any landowners being penalized under the conditions of their easement contracts. The Applicant will work with the USDA and landowners on the crossing of any easement to either ensure that the reclamation meets the easement requirements or provide the landowner with compensation to reimburse the federal government. The pipeline is not expected to permanently impact any easements held by agency programs.

For crossings construction procedures, mitigation measures, and BMPs outlined in the Project's ECP (**Appendix 4**), SD AIMP (**Appendix 6**), SD Inadvertent Return Plan (**Appendix 7**), and Noxious Weeds Management Plan (**Appendix 17**) will reduce construction and operation impacts through restoration processes.

Operation Impacts and Mitigation

Maintenance and operation activities are not anticipated to be significant because disturbances will be isolated, short-term, and infrequent and include clearing the permanent pipeline ROW of vegetation and identifying corrosion through regular inspections. The primary long-term impact is the prohibition of permanent structures (e.g., homes, barns) within the permanent ROW and installation of new, permanent facilities.

The Project will comply with applicable local land use zoning ordinances, building rules, and regulations for aboveground Project facilities.

5.6 Water Quality and Uses

South Dakota classifies surface water under the following state-designated system of 11 beneficial uses for environmental and water quality assessment:

- Domestic Water Supply,
- Coldwater Permanent Fish Life Propagation,
- Coldwater Marginal Fish Life Propagation,
- Warmwater Permanent Fish Life Propagation,
- Warmwater Semipermanent Fish Life Propagation,

- Warmwater Marginal Fish Life Propagation,
- Immersion Recreation,
- Limited Contact Recreation,
- Fish and Wildlife Propagation, Recreation, Stock Watering,
- Irrigation, and
- Commerce and Industry.

The SD DANR assesses waterbodies to determine if water quality parameters meet those required for each beneficial use and designates the waterbody as impaired under Section 303(d) of the Clean Water Act (CWA) if it does not meet these criteria (SD DANR, 2024b). The proposed Project crosses eight impaired waterbodies: the James River, Big Sioux River, West Fork Vermillion River, Moccasin Creek, Webber Gulch, North Fork Yellow Bank River, Willow Creek, and Lake Henry. The Project centerline crosses the Big Sioux River at six different locations and the James River at five different locations in South Dakota (**Table 36**). Additional information on named waterbodies that are crossed by the Project and have specifically assigned beneficial uses is provided in **Table 36**. A complete list of Project waterbody crossings and their designated uses is provided in **Appendix 14**.

Table 36: Impairment Status of Streams with Assigned Beneficial Uses that are Crossed by the Project

Waterbody [1]	County	Pipeline	MP	Crossing Method [2]	Beneficial Uses [3]	Impairment Status [4]	Impaired Use [5] (Cause)
Big Sioux River SD-BS-R-BIG_SIOUX_15	Union	IAL-510	3.0	HDD	5, 7, 8, 9, 10	5 impaired without TMDL	6 (TSS) 7, 8 (*E. Coli*)
Big Sioux River SD-BS-R-BIG_SIOUX_06	Brookings	SDL-513	8.7	HDD	5, 8, 9, 10	5 impaired without TMDL	5 (TSS)
Big Sioux River SD-BS-R-BIG_SIOUX_06	Brookings	SDL-513	8.7	HDD	5, 8, 9, 10	5 impaired without TMDL	5 (TSS)
Big Sioux River SD-BS-R-BIG_SIOUX_06	Brookings	SDL-513	8.7	HDD	5, 8, 9, 10	5 impaired without TMDL	5 (TSS)
Big Sioux River SD-BS-R-BIG_SIOUX_03	Codington	SDL-514	50.5	HDD	5, 8, 9, 10	4A EPA approved TMDL	8 (*E. Coli*)
Big Sioux River SD-BS-R-BIG_SIOUX_14	Lincoln	SDM-104	27.2	HDD	5, 7, 8, 9, 10	5 impaired without TMDL	5 (TSS) 7, 8 (*E. Coli*)
Big Sioux River SD-BS-R-BIG_SIOUX_02	Codington	SDT-208	0.1	HDD	5, 8, 9, 10	5 impaired without TMDL	8 (*E. Coli*)

Table 36: Impairment Status of Streams with Assigned Beneficial Uses that are Crossed by the Project							
Waterbody [1]	**County**	**Pipeline**	**MP**	**Crossing Method [2]**	**Beneficial Uses [3]**	**Impairment Status [4]**	**Impaired Use [5] (Cause)**
Big Sioux River SD-BS-R-BIG_SIOUX_02	Codington	SDT-208	0.2	HDD	5, 8, 9, 10	5 impaired without TMDL	8 (*E. Coli*)
Big Sioux River SD-BS-R-BIG_SIOUX_02	Codington	SDT-208	0.7	HDD	5, 8, 9, 10	5 impaired without TMDL	8 (*E. Coli*)
Brant Lake SD-BS-L-BRANT_01	Lake	SDT-206	3.4	HDD	4, 7, 8, 9	1 all uses met	==
East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_02	Lake	SDM-104	97.4	HDD	6, 8, 9, 10	1 all uses met	==
James River SD-JA-R-JAMES_05	Brown	SDL-515	10.2	HDD	5, 8, 9, 10	5 impaired without TMDL	5, 8 (DO)
James River SD-JA-R-JAMES_06	Spink	SDM-105	50.2	HDD	5, 8, 9, 10	5 impaired without TMDL	5, 8 (DO)
James River SD-JA-R-JAMES_07	Beadle	SDT-207	11.2	HDD	1, 5, 8, 9, 10	5 impaired without TMDL	1 (TDS) 5, 8 (DO)
James River SD-JA-R-JAMES_06	Spink	SDT-209	1.4	HDD	5, 8, 9, 10	5 impaired without TMDL	5, 8 (DO)
James River SD-JA-R-JAMES_09	Sanborn	SDT-410	7.4	HDD	5, 8, 9, 10	5 impaired without TMDL	5 (TSS)
Lake Henry SD-VM-L-HENRY_01	Kingsbury	SDT-411	9.5	HDD	6, 7, 8, 9	5 impaired without TMDL	6, 9 (MeHg) 6 (pH)
Moccasin Creek SD-JA-R-MOCCASIN_02	Brown	SDL-515	20.1	Bore	6, 8, 9, 10	5 impaired without TMDL	8 (DO)
Moccasin Creek SD-JA-R-MOCCASIN_02	Brown	SDL-515	20.1	Bore	6, 8, 9, 10	5 impaired without TMDL	8 (DO)
North Fork Yellow Bank River	Grant	SDL-514	12.9	HDD	4, 8, 9, 10	4A EPA approved TMDL	8 (*E. Coli*)

Table 36: Impairment Status of Streams with Assigned Beneficial Uses that are Crossed by the Project

Waterbody [1]	County	Pipeline	MP	Crossing Method [2]	Beneficial Uses [3]	Impairment Status [4]	Impaired Use [5] (Cause)
SD-MN-RYELLOW_BANK_N_FORK_01							
North Fork Yellow Bank River SD-MN-R-YELLOW_BANK_N_FORK_01	Grant	SDL-514	13.0	HDD	4, 8, 9, 10	4A EPA approved TMDL	8 (*E. Coli*)
Webber Gulch SD-JA-R-ELM_01	Brown	NDT-211	90.0	HDD	1, 5, 7, 8, 9	5 impaired without TMDL	1 (TDS)
West Fork Vermillion River SD-VM-R-VERMILLION_WEST_FORK_01_USGS	Turner	SDT-212	1.1	Bore	6, 8, 9, 10	4A EPA approved TMDL	8 (*E. Coli*)
Whetstone River SD-MN-R-WHETSTONE_01	Grant	SDL-514	1.9	HDD	5, 8, 9, 10	1 all uses met	==
Willow Creek SD-BS-R-WILLOW_01	Codington	SDL-514	38.8	Bore	6, 8, 9, 10	5 impaired without TMDL	8 (*E. Coli*)

Notes:
[1] Table includes only named waterbodies crossed by the Project for which specific beneficial uses have been assigned; see **Appendix 14** for other waterbodies.
[2] Crossing methods are bore and HDD (horizontal directional drill).
[3] Beneficial uses are those assigned by SD DANR as indicated in the 2024 South Dakota Integrated Report for Surface Water Quality Assessment at https://danr.sd.gov/Conservation/WatershedProtection/ReportsPublications/DANR_2024_IR_final.pdf
The codes are: (1) domestic water supply; (4) warmwater permanent fish life propagation; (5) warmwater semipermanent fish life propagation; (6) warmwater marginal fish life propagation; (7) immersion recreation; (8) Limited-contact recreation; (9) fish and wildlife propagation, recreation, and stock watering; (10) Irrigation; and (11) commerce and industry. TMDL is Total Maximum Daily Load.
[4] Impaired status per SD DANR's Surface Water Quality website; -- means there is no data, or an assessment has not been made.
[5] See footnote (3) for beneficial use codes; DO = dissolved oxygen, TDS = total dissolved solids; TSS = total suspended solids, E. coli = the bacterium *Escherichia coli; MeHg = Mercury found in fish tissue; pH = pH*.

Based on the Project's proposed construction activities, permits or certifications, the Project may be required to adhere to Sections 401 and 402 of the CWA. Section 401 gives states the authority to grant, deny, or waive certification of proposed federal licenses or permits that may discharge into waters of the U.S. The SD DANR is authorized to issue these certifications after reviewing federal permits and ensuring they will not impact SD water quality or violate SD water quality standards. The Applicant will use USACE NWP 58 (a federal permit) to meet the USACE requirements for building the Project. In December of 2020, the SD DANR granted water quality certification for USACE NWP 58 without conditions (SD DANR, 2020). Section 402 of the CWA prohibits the discharge of any pollutant from any point source to navigable waters unless authorized by a permit. SD DANR is authorized to enforce Section 402 of the CWA through the State's National Pollutant Discharge Elimination System. The proposed Project will likely require the below general permits:

- **SDG070000 General Surface Water Discharge Permit for Temporary Discharge Activities** (Authorizes hydrostatic test discharges from pipelines) - This permit authorizes hydrostatic testing wastewater discharges to be land applied or discharged into surface waters.
- **SDR100000 Construction Storm Water/Dewatering General Permit** – This permit is required and shall apply to storm water or non-storm water discharges and trench dewatering discharges associated with construction activity that causes land disturbance of equal to or greater than one acre and less than one acre.

5.6.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Construction impacts to water quality will be minimized and mitigated through BMPs including stream crossing methods, ECDs, sediment controls, and discharge monitoring and inspection. Further discussion of mitigation and restoration is discussed in the ECP. Additionally, the USACE will confirm the use of the NWP 58 that has conditions to protect waterbodies and water quality that will be required to be met, consistent with 401 water quality standards.

The general discharge permits for hydrostatic test water discharges will impose pollutant limits on those discharges that will be protective of the designated uses of the receiving waterbodies. In one-time construction and hydrostatic test water use will not result in appreciable short- or long-term impacts to water quality.

The Project crosses eight impaired waterbodies, which include the Big Sioux River, James River, Webber Gulch, North Fork Yellow Bank River, Willow Creek, West Fork Vermillion River, Moccasin Creek, and Lake Henry. Stream crossings of these impaired stream segments will be constructed using HDD construction techniques or will be crossed via bore, eliminating any further impacts to water quality (SD DANR, 2024b). Any water used in these streams for hydrotesting will be returned to the source or discharged to the ground (dust control), to avoid impacting other waterbodies.

Operation Impacts and Mitigation

Maintenance activities will not result in significant impacts to water quality or its uses since disturbances will be isolated, short-term, and infrequent and follow the BMPs and permit conditions described above for construction impacts.

5.7 Air Quality

The Clean Air Act (42 USC 7401 et seq. as amended in 1977 and 1990) is the principal federal statute governing air pollution. The Clean Air Act empowered the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These pollutants are called “criteria” air pollutants and include carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, particulate matter equal to or less than 10 microns in diameter, and fine particulate matter equal to or less than 2.5 microns in diameter. The NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare, including visibility and damage to crops and vegetation.

Areas of the country that do not meet the NAAQS are designated as “nonattainment” areas. Certain rural parts of the country do not have extensive air quality monitoring networks; these areas are considered “unclassifiable” and are presumed to be in attainment with the NAAQS. All areas in South Dakota currently meet the NAAQS (SD DANR, 2020). Because the proposed Project will occur in “attainment” areas for all criterial pollutants, Clean Air Act conformity requirements are not applicable and thus there are no

emissions thresholds that pertain to the construction phase of this Project. Air quality within the state of South Dakota is regulated by the SD DANR Air Quality Program.

5.7.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Project construction impacts to air quality will include both mobile source emissions and fugitive emissions. Mobile sources of emissions are the tailpipe emissions from employee commuter vehicles and equipment to be used during construction of the pipeline, pump stations, and other ancillary facilities. The SD DANR has no prescribed state-wide requirements for controlling mobile emissions such as those that may be released during construction of the Project. Fugitive sources of emissions include particulate emissions from paved and unpaved roadways and the particulate emissions from soil disturbance during construction activities. The quantity of fugitive dust emissions from soil-disturbance activities will depend on the moisture content and texture of the soils that will be disturbed, the type of construction equipment utilized, and the frequency and duration of precipitation events.

To mitigate mobile source emissions, the majority of construction equipment used by the Project will be low-emission and all equipment will be regularly maintained. The Project will minimize idling of construction equipment and diesel-powered vehicles to reduce exhaust emissions during construction.

Fugitive particulate emissions from roadways consist of heavier particles and tend to settle out of the atmosphere by gravity within a few hundred yards. Therefore, these fugitive particulate emissions will be limited to the immediate vicinity of construction; impacts to the surrounding region will be negligible. The majority of pipeline construction activities will pass by a specific location within a 30-day period; therefore, fugitive dust emissions during construction will be restricted to the brief active construction period along each segment of the Project pipeline route, with construction impacts diminishing once construction activities end and after disturbed areas are reclaimed. The Applicant will limit dust impacts in residential and commercial areas adjacent to pipeline construction by utilizing dust minimization techniques, such as minimizing exposed soil areas, reducing vehicle driving speeds, and applying water or soil stabilizers to the exposed soils of the ROW as needed. The Project will also, when possible, use tarps or dust covers when transporting materials with significant dust content (see **Appendix 19** for the Dust Control Plan).

Both mobile source and fugitive emissions will be concentrated at the construction sites, will steadily decrease with distance, and will be mitigated as described above resulting in only minor, short-term. localized air quality impacts during construction.

Operation Impacts and Mitigation

Since the proposed pump stations will be electrically driven, the pumps will not be an operations source of stationary emissions. While each pump station will include a back-up power supply for critical communications and control equipment, the stations will not have an emergency generator engine or other combustion source. Therefore, the pump stations will not require an air permit and will not result in air quality impacts during operations.

The Applicant does not anticipate air quality impacts during the operation of the Project. When fully developed, the MCE Project will have an infrastructure network capable of capturing and permanently storing up to 18.5 MMTPA of CO_2, which is equivalent to removing over 4 million cars from the road each year. In effect, the operation of the Project has the potential to improve South Dakota air quality.

5.8 Solid Wastes

Construction of the Project will generate non-hazardous pipeline construction wastes including human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, rock and other miscellaneous construction debris. Any waste which may contain (or has at any time contained) oil, grease, solvents, or other petroleum products will be segregated for handling and disposal as hazardous wastes.

5.8.1 Impacts and Avoidance/Mitigation Measures

Construction Impacts and Mitigation

Human sanitary waste and construction waste will be generated on the pipeline construction ROW and at the locations of above ground facility construction. Both types of waste will also be generated at project support facilities such as contractor yards, pipe yards, and staging areas.

Human sanitary waste will be handled and disposed of exclusively by means of portable self-contained toilets during all construction operations. Waste from these units will be collected by a licensed contractor for disposal at licensed and approved facilities.

All trash will be removed from the construction ROW on a daily basis unless otherwise approved or directed by the Applicant. All drill cuttings and drilling mud will be disposed of at approved locations. Disposal options may include spreading over the construction ROW in approved upland locations or hauling to an approved licensed landfill or other sites approved by the Project. All extraneous vegetation, rock, and other natural debris will be removed from the ROW by the completion of construction clean-up. All waste materials will be disposed of at licensed waste disposal facilities.

Operation Impacts and Mitigation

Waste is not expected to be generated during operations. There will be no sanitary facilities at the pump stations. Any repair work required along the system that generates waste will follow the same procedures as outlined above for construction impacts but on a much smaller scale.

Any solid waste generated on the Project's operations footprint will be mitigated as detailed above for construction.

6 Community Impact

6.1 Economic Impacts

The South Dakota portion of the MCE Project will be approximately 698 miles long and is expected to result in $1.9 billion of capital expenditures over the construction period. Of that amount, an estimated $476 million is resulting labor income.

Once the Project has been built, an estimated $86 million operations and maintenance spend is expected to add approximately 260 permanent direct, indirect, and induced jobs with an associated $23 million in labor income to the South Dakota economy. The increased economic activity that results during construction of the pipeline will generate an estimated $171.8 million in taxes, of which $69.2 million is state and local taxes.

During the first full year of operation the pipeline will generate an estimated $17.2 million in new property taxes for local governments.

6.1.1 Labor Market

Total labor force in South Dakota is 483,200 with 473,600 employed and 9,600 unemployed at a rate of 2.0 percent (2.00%) (SD DLR, 2024). The average unemployment rate (**Table 37**) for counties crossed by the Applicant is 1.95%, down from 1.96% the previous year based on data from August 2024.

Table 37: South Dakota County Labor Force Crossed by the Project

County	Labor Force	Employment	Unemployment	Rate
Beadle County	9,610	9,445	165	1.7%
Brookings County	19,104	18,648	456	2.4%
Brown County	19,968	19,563	405	2.0%
Clark County	2,201	2,163	38	1.7%
Codington County	16,626	16,329	297	1.8%
Davison County	11,287	11,085	202	1.8%
Edmunds County	2,038	2,000	38	1.9%
Grant County	4,573	4,480	93	2.0%
Hamlin County	3,874	3,817	57	1.5%
Hand County	1,841	1,813	28	1.5%
Hyde County	680	663	17	2.5%
Kingsbury County	2,876	2,833	43	1.5%
Lake County	6,817	6,687	130	1.9%
Lincoln County	38,476	37,790	686	1.8%
McCook County	3,234	3,179	55	1.7%
McPherson County	1,010	985	25	2.5%
Miner County	1,349	1,315	34	2.5%
Minnehaha County	119,302	117,001	2,301	1.9%
Sanborn County	1,251	1,221	30	2.4%
Spink County	3,209	3,139	70	2.2%
Sully County	867	852	15	1.7%
Turner County	4,949	4,860	89	1.8%
Union County	8,758	8,561	197	2.2%

Source:

Labor Market Information Center, South Dakota Department of Labor and Regulation, in cooperation with the U.S. Bureau of Labor Statistics, available at: https://dlr.sd.gov/lmic/lbtables/countylf.aspx. Accessed October 2024.

6.1.2 Employment Estimate

DIS conducted an analysis of the Project's economics and tax contributions during construction and operations. DIS estimated that construction of the Project would result in an estimated 1,086 annual jobs, including 854 jobs supported through the Applicant's suppliers and contractors and 232 jobs are

supported through induced contributions. There is a total labor income impact over the construction period of $475.7 million and $668.3 million in total value added to South Dakota's GDP (**Appendix 23**). With the relatively short construction schedule and the low unemployment rates in the Project counties (**Table 37**), it is likely that in addition to local labor, additional labor will be sourced from other areas of the state and outsourced from neighboring states.

The estimated number of direct jobs required to operate the system in South Dakota is approximately 40 employees annually that will be located within or in proximity to the counties and townships in which the facility is located. These direct jobs are estimated to directly produce $48.1 million to South Dakota's GDP and $140.4 million in sales throughout the state (**Appendix 23**). Annual estimated operations direct employment expenditures are anticipated to be the same for each of the first 10 years of commercial operation and direct job classifications include engineering, environmental, health and safety, field services, supply chain and field operators. After accounting for indirect and induced effects, the total economic impact of the Project's operations within the state is estimated to be 260 jobs, $23.2 million in labor income, $86.4 million in value added to the GDP, and $224.3 million in gross output (**Appendix 23**).

6.1.3 Agriculture

As the Applicant's 15 South Dakota ethanol partners earn more for producing low-carbon renewable fuel, it strengthens the economic prosperity and long-term viability of ethanol, and as a result, benefits South Dakota's family farms, and ultimately the entire state. A stable ethanol industry provides South Dakota's farmers with a reliable market for their corn and underpins the value of South Dakota farmland.

The Project will require approximately 7,655 acres of agricultural lands (pasture/hay and cultivated crops) for construction of the pipeline ROW, 24 acres for access roads, and approximately 29 acres for aboveground facilities. Of the approximately 7,708 acres of agricultural land required for construction, only 32 acres of agricultural land will be permanently converted to developed land for pump stations, MLVs, launcher and receivers, and permanent access roads.

Long-term impacts on agricultural production from the permanent pipeline ROW are not expected since the pipeline will be buried and will allow for agricultural practices to resume after construction.

Project disturbance of agricultural lands will generally be short-term, during construction, and mitigated by the following measures:

- Vegetation will be preserved and protected from damage that results from construction operations through the use of BMPs as applicable.
- The Applicant will be responsible for control of noxious weeds in the area proposed for construction. To minimize the spread of noxious weeds, all Contractor vehicles and equipment will arrive at the work site clean and free of noxious weed seeds or parts. Equipment will be cleaned using high-pressure cleaning devices if necessary (air or water). An EI will inspect and verify that vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds or parts prior to being allowed access to the ROW. Suppliers will ensure that gravel and fill imported to the site come from weed-free sources. The Applicant will adhere to the Noxious Weeds Management Plan (**Appendix 17**)
- Topsoil will be stripped across the entire work area before construction activities begin to prevent the mixing of topsoil and subsoil.
- When the trench is cut, the subsoil will be segregated from the topsoil on the opposite side of the ROW. When backfill activities take place, the subsoil will be placed first, followed by

topsoil. Tillable agriculture land will be deeply tilled before the topsoil is spread back onto the ROW to alleviate compaction.

- BMPs according to the ECP (**Appendix 4**) will be implemented.
- Measures outlined in the SD AIMP (**Appendix 6**) targeted to minimize impacts to and restore agricultural lands during and after pipeline construction will be implemented.
- Fencing, drain tiles, irrigation systems, or other agricultural-related facilities disturbed during construction will be restored to their pre-construction condition upon completion of construction activities.
- The Applicant will prohibit feeding or harassment of livestock or wildlife, firearms, and pets on the construction ROW. Food and food waste will be stored and secured.

Once construction has been completed, normal grazing and livestock movement over the permanent ROW along the pipeline route may resume.

6.1.4 Commercial and Industrial Sectors

Economic benefits to nearby businesses in counties crossed by the Project will likely be increased through the sales of food, goods, services, and lodging that will be generated by the temporary non-local workforce. The increase in consumer demand could impact local economies. Some construction materials and supplies will likely be purchased from local businesses. Local purchases could include consumables, fuel, and equipment rental. Long-term employment is anticipated during operations. As noted in Section 6.1.2, the Applicant expects it will have 40 full time operational employees allocated to South Dakota. Furthermore, capturing carbon at the 15 South Dakota ethanol facilities the Applicant has partnered with will reduce the environmental impact of each facility's ethanol product and improve each facility's ability to compete in Low Carbon Fuel Standard (LCFS) markets, which have increasingly stringent carbon reduction goals and market competition. LCFS markets represent a significant growth opportunity for lower carbon fuels, such as decarbonized ethanol, into the future. This will increase the economic viability of the facilities and ensure they are long-term employers in South Dakota.

The Project is anticipated to have economic benefits to various commercial sectors in the State during construction and operations of the Project.

6.1.5 Land Values

The Project pipelines and facilities will be constructed primarily within rural, generally agricultural areas. Landowners will be compensated for the conveyance of Project temporary construction and permanent ROW, MLV and other easements for Project aboveground facilities. Pump station locations will be acquired and operated by the Applicant.

Certain existing land uses will be converted to long-term utility use for the duration of pipeline operations. This conversion represents a long-term future impact on development of private land because dwellings cannot be placed on the permanent pipeline ROW for the duration of the easement.

It is anticipated that property values associated with the Project pipeline and associated features (MLVs, launcher and receivers, permanent access roads) will be minimally affected. As the Applicant's 15 South Dakota ethanol partners earn more for producing low-carbon renewable fuel, it strengthens the economic prosperity and long-term viability of ethanol, and as a result, benefits South Dakota's family farms, and ultimately the entire state. A stable ethanol industry provides South Dakota's farmers with a reliable market for their corn and underpins the value of South Dakota farmland.

6.1.6 Taxes

It is anticipated the Project will have a temporary positive impact on state sales and use tax during Project construction from the purchases of materials, equipment, supplies, and services by temporary construction employees of the Project. City sales tax will also be applicable on purchases made or deliveries received within a city that has a city sales tax. The city tax is in addition to the state sales tax and is typically 1-2%.

The state imposes a 1.5% tourism tax on lodging, amusement, entertainment, and other tourism related businesses. It is anticipated the Project will generate additional tourism revenues in locations utilized by the non-local construction work force.

Contractors providing Project construction work or operational repairs are required to have a South Dakota contractor's tax license. The excise tax imposed on the gross receipts for construction Projects is 2%.

Property taxes for pipeline Projects are calculated the same as they are for other commercial properties but are assessed by the South Dakota Department of Revenue (SDDOR). The Project will annually submit a report to the SDDOR that states the location of property by county, township, and school district. The SDDOR will certify the taxable value to the counties where the Project property is located.

The increased economic activity (direct, indirect, and induced) that results during construction of the pipeline will generate an estimated $171.8 million in taxes, of which $69.2 million is state and local taxes (**Appendix 23**).

The annual operation of the Project is estimated to generate $41.2 million in total tax revenue, with $34.4 million paid at the state and local levels and $6.9 million paid at the federal level by the Applicant directly, indirectly and induced by the Applicant's suppliers and contractors. This estimate includes an estimated $20.8 million in new property taxes for local government that will be generated during the first full year of operations (**Appendix 23**).

All tax revenue from Project properties will go to the appropriate county, township, school district and other taxing districts, generating revenue for local governments.

6.2 Infrastructure Impacts

6.2.1 Housing

It is expected that most non-local workers will use temporary housing, such as hotels/motels, recreational vehicle parks, and campgrounds. Most of the temporary workers will likely seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the Project construction sites. Based on a review of identified available hotels/motels, recreational vehicle parks and campgrounds it appears adequate temporary housing will be available for Project construction crews.

Table 38, as seen below, provides the housing statistics for South Dakota counties crossed by the Project. The data includes total housing units, occupied housing units, vacant housing units and rental vacancy rates. In addition, the data also includes recreational vehicle parks and campground spaces available, along with the number of hotel/motel rooms available near Project components. In reviewing the data, it appears adequate temporary housing will be available for Project construction crews.

Table 38: Estimated Housing Units and Vacancy Rates for South Dakota Counties Crossed by the Project						
South Dakota Counties	**Total Housing Units[1]**	**Occupied Housing Units[1]**	**Vacant Housing Units[1]**	**Rental Vacancy Rate (%)[1]**	**RV Parks / Campgrounds[2]**	**Hotel / Motels[3]**
Beadle County	8,436	7,443	993	8.1	1,224	353
Brookings County	14,882	13,366	1,516	5.6	166	477
Brown County	17,948	16,035	1,913	9.4	623	649
Clark County	1,619	1,360	259	1.8	~	~
Codington County	13,257	12,165	1,092	6.8	350	279
Davison County	9,506	8,448	1,058	17.3	371	474
Edmunds County	1,948	1,542	406	8.7	4	104
Grant County	3,444	3,031	413	1.1	40	82
Hamlin County	2,788	2,151	637	6.3	8	37
Hand County	1,705	1,386	319	8.5	40	48
Hyde County	641	541	100	14.3	10	21
Kingsbury County	2,636	2,003	633	7.3	281	58
Lake County	5,714	4,552	1,162	7.8	453	174
Lincoln County	26,398	25,697	701	1.6	273	449
McCook County	2,465	2,218	247	5.4	131	64
McPherson County	1,255	872	383	11.8	16	39
Miner County	1,214	910	304	0.0	167	104
Minnehaha County	84,770	79,887	4,883	5.9	533	5,184
Sanborn County	1,134	939	195	7.8	16	~
Spink County	3,007	2,526	481	6.0	62	27
Sully County	889	599	290	18.8	~	35

Table 38: Estimated Housing Units and Vacancy Rates for South Dakota Counties Crossed by the Project

South Dakota Counties	Total Housing Units[1]	Occupied Housing Units[1]	Vacant Housing Units[1]	Rental Vacancy Rate (%)[1]	RV Parks / Campgrounds[2]	Hotel / Motels[3]
Turner County	3,876	3,442	434	8.5	~	~
Union County	7,298	6,967	331	1.3	206	309

Sources: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates, DP04, https://data.census.gov/table/ACSDP5Y2022.DP04?q=dp04&g=050XX00US46005,46011,46013,46025,46029,46035,46045,46051,46057,46059,46069,46077,46079,46083,46087,46089,46097,46099,46111,46115,46119,46125,46127&moe=false ; RV Data search, available at: https://campgrounds.rvlife.com; and Hotel/Motel data search, available at: https://www.expedia.com/, accessed October 17, 2024.

[1] A housing unit is a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters, includes RV and mobile homes.

[2] Available campground and RV spaces near Project components.

[3] Available hotels and motels near Project components.

6.2.2 Energy

Temporary short-term use of electrical power during the Project construction phase will be through existing supply and is expected to be minimal to support construction.

Operational electrical service requirements for the Project, including the pump stations in Beadle, Edmunds, Lake, McPherson, Minnehaha, and Spink counties, will use existing service lines with the construction of new service and/or transmission lines as required. The operational needs of the Project are not anticipated to require an increase in existing power generation capacity. Any extensions to existing utility infrastructure would be constructed, owned, and operated by the local utilities. Load at pump station will range from 2,000 to 3,000 kW.

6.2.3 Sewer and Water

An increase of water and sewage utilization is anticipated due to the influx of construction workers using temporary housing, such as hotels/motels, recreational vehicle parks, and campgrounds. However, it is anticipated that the existing water and sewer capacity of local community water and sewer utilities will be sufficient for the influx of temporary construction workers since the workers will be using existing, permitted housing facilities.

Portable water and sanitary facilities will be used at designated areas along the construction ROW. Portable facilities will be maintained by a service provider and removed when construction is complete. Pump stations will not require permanent water or sanitary facilities.

6.2.4 Solid Waste Management

Increased utilization of solid waste management facilities will occur as a result of Project construction, the influx of temporary construction workers utilizing local lodging and services, and solid wastes from Project construction. Solid waste will be managed according to applicable federal, state, and local regulations. Local waste disposal transporters and landfills will be utilized where appropriate to dispose of construction waste.

All waste, which contains (or at any time contained) oil, grease, solvents, or other petroleum products will be segregated for handling and disposal as hazardous wastes. Hazardous wastes, which are anticipated to

be limited to very small volumes, will be transported to permitted hazardous waste disposal facilities by licensed transporters.

6.2.5 Transportation

Transportation routes to be utilized during construction will be established prior to construction as necessary to support state and local permitting. The Department of Public Safety Commerce, Division of Highway Patrol has jurisdiction over the federal and state highway system in South Dakota and is responsible for issuing transportation-related permits to accommodate oversized construction vehicles and traffic control.

The Project will initiate contacts with local permitting authorities for the purpose of establishing timelines for the construction of temporary and permanent access roads and the driveway entrances required to connect to a public road.

During Project construction, traffic on highways and secondary roads will be increased due to the construction activities and the influx of construction workers. Several types of light, medium, and heavy-duty construction vehicles, as well as private vehicles used by construction personnel, will travel to and from the Project area.

Hauling of line pipe and most construction equipment will be within state road and bridge weight limits. There will be isolated hauling of equipment that will require special permits for weight and/or width. There may be an increased temporary demand for permits for vehicle load and width limits. The primary impact will be deterioration of gravel or stone surfaced roads requiring grading and/or replenishment of the surface materials. The Project will be responsible for repairing damage to roads and restoring them to pre-construction or better condition. The Applicant will negotiate road haul agreements with counties impacted by construction use of their roads. This may culminate in the requirement for construction bonds to cover the potential impacts to public roads.

There will be minimal to no impacts on transportation during operations. There will be weekly truck or passenger vehicle traffic along existing roads and permanent access roads to inspect and operate the system. If repairs are needed, impacts similar to construction vehicle traffic, but at a much smaller scale and duration, will be necessary for the localized work to repair the system.

6.3 Community Services

6.3.1 Healthcare Services and Facilities

Remote medical units will be deployed in the field during construction and local healthcare facilities will provide healthcare services to Project construction workers during construction only if required. It is anticipated that impacts to local facilities will be minor and that local healthcare facilities will be able to manage minor increases to healthcare needs during construction. The Project health and safety procedures and policies will also limit the utilization of local healthcare facilities during the temporary influx of non-local construction workers.

During operation, the Project will have a limited number of local permanent employees; there will be no impact on healthcare services and facilities.

6.3.2 Schools

Construction workers for this type of Project typically will not travel with their families or enroll their children temporarily in local schools. Therefore, there will be no impact on area schools.

Due to the limited number of employees required for operations, no material impact on schools is anticipated from operation of the Project except the positive benefit of additional tax revenue sent to each county that can be used for the schools if so chosen by the county.

6.3.3 Recreation

Recreational opportunities in proximity to the Project include swimming, boating, hunting, camping, fishing, bird watching and photography. The area's lakes and rivers provide yearly recreational opportunities to residents and visitors with access for boating and fishing. The most heavily used areas will most likely occur where public access exists. Hunting is a popular activity throughout the state due to its public accessibility and quality management of its diverse game species. Walk-in access areas are found throughout the State of South Dakota, allowing public access on private lands.

Some Project construction workers may use recreational areas during Project construction when they are not working, but it is not anticipated that these workers will have greater than minor impacts to any recreational areas near the Project area.

Construction of the Project may temporarily limit access to certain areas used for recreation, hunting, fishing, and boating.

Impacts on recreation opportunities during construction will be minor and short-term. To the extent construction of the Project may temporarily limit access to specific areas used for public recreation, hunting, fishing, or boating, the Applicant will work with SDGFP, as well as the appropriate county highway department or other agencies, to communicate its plans and to minimize any temporary impact to the public.

No impacts associated with the operation of the Project are anticipated.

6.3.4 Public Safety Services

Law enforcement agencies and fire protection services in the communities adjacent to the pipeline may be affected during Project construction. The Applicant will coordinate with local law enforcement agencies and the South Dakota Highway Patrol on public safety issues and measures to accommodate the temporary influx of Project construction personnel and additional public safety risk.

The Project construction contractors will work with local and county emergency management to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems, and potential incidents concerning Project construction. The contractor will provide site maps, haul routes, Project schedules, contact numbers, training, and other requested Project information to local and county emergency management.

The Project construction contractor will maintain a current list of local emergency response providers and methods of contact/communication in all construction and operations vehicles. Designated construction and operations personnel will be trained in first aid.

The Applicant has met with the County EMs responsible for Beadle, Brookings, Brown, Clark, Codington, Davison, Edmunds, Grant, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Sanborn, Spink, Sully, Turner, and Union counties to discuss planning for emergencies and scheduling training of first responders in their respective areas. During those meetings, the County EMs indicated the best and preferred way to ensure coordination with first responders is to coordinate through the County Emergency Management Offices. Prior to commissioning and placing the pipeline system in operation, the Applicant plans to schedule first responder preparedness training through the County EMs after receipt of the SD PUC permit and before the start of construction. During those trainings, County

EMs, first responders, and representatives of Applicant will finalize all protocols and contact lists necessary to ensure coordination during Project construction. These same parties will adjust such protocols and contact lists as necessary as construction of the Project continues in order to ensure the best possible coordination of effort.

The Project construction contractor will maintain a current Master of Service Agreement with and ensure an up-to-date contact list of local emergency response providers and methods of contact/communication in all construction and operations vehicles.

During construction, response times to highway- or construction-related accidents may be lengthy given communication, dispatch, and travel time considerations. In these areas, it may be necessary to provide on-site first responder services; however, the Project will work with the local law enforcement, fire departments, and emergency medical services to determine the best course of action and coordinate for effective emergency response. Traffic impacts are discussed in Section 6.2.5.

During operations, the Applicant will coordinate with local and county emergency management to protect the public and the property related to the Project during natural, manmade or other incidents. In an effort to mitigate the risk of an emergency involving the pipeline that could result in inconvenience or undue injury, methods for promptly and effectively addressing such event will be fully addressed in the ERP and in the Public Awareness Program required under PHMSA rules and will be completed prior to commencement of operations on a timeline consistent with PHMSA requirements. The Applicant will prepare an operation manual for routine facility operations and an emergency response plan for abnormal operations per PHMSA regulations. A draft ERP is provided in **Appendix 9** and will be finalized by the Applicant prior to placing the Project in service in accordance with 49 CFR Part 195.402.

6.4 Cultural and Historical Resources

6.4.1 Results of Record Search

Perennial conducted a Level I literature review through the South Dakota Archaeological Research Center's Archaeological Resources Management System (ARMS) online database on August 27, 2021, prior to the start of fieldwork. Literature or background reviews are conducted to locate and evaluate previous cultural resources surveys and previously recorded archaeological sites within a 1.0 mi (1.6 km) radius of the Project center line. On March 8, 2022, Gray & Pape accessed the ARMS database to again review background records for additional areas added to the Project. On August 25, 2023, Gray & Pape accessed the ARMS database to review background records for the frozen centerline. In 2024, Gray & Pape accessed the ARMS database multiple times to review background records for additional areas added to the Project. The literature reviews were requested to the South Dakota State Historic Preservation Office (SDSHPO) on the following dates: February 12, July 19, August 8, August 15, and August 19, 2024.

The background reviews provided information on previously recorded cultural resources and previous surveys in the vicinity of the Project area in South Dakota. The literature review revealed that 318 cultural resources had been previously recorded within a 1.0-mi (1.6 km) radius of the Project environmental survey area. These resources consist of 137 prehistoric sites, 130 historic Euro-American sites, 9 multicomponent sites, 6 unknown depression sites, 3 unknown cairns, 1 unknown artifact scatter, 21 prehistoric isolated finds, 9 Euro-American isolated finds, and 2 unknown isolated finds. Of the 318 previously identified archaeological resources, 129 are considered eligible for inclusion to the National Historic Preservation Act (NRHP), 120 of the sites have not been evaluated, and 69 are recommended to be not eligible. Additionally, the background review revealed that 1,025 structures have been previously

recorded within a 1.0-mi (1.6 km) radius of the ESC, each of which was assigned its own unique SHPO ID number. Some examples of these structures include common residences or houses, farmsteads, barns, farm outbuildings like sheds, schools, and motels. Twenty-two cemeteries, 117 bridges, and two historic districts were also identified through the background reviews within a 1.0 mi proximity of the project ESC. The historic districts included the Karla Farming District and the Lake Preston Tourist Park Historic District.

Additionally, the background review determined that a total of 466 previous archaeological studies have been conducted within a 1.0-mi (1.6-km) radius of the environmental survey area. These Projects consisted primarily of compliance-driven work for roadway and bridge improvements, utility installations, and large pipeline corridors. The current Project is adjacent to, and crosses, the Northern Border Pipeline Project, the fieldwork for which was conducted between 1979 and 1981. This work resulted in the identification of 107 archaeological sites, several of which were investigated for the current Project. Surveys for the Dakota Access Pipeline Project were conducted between 2014 and 2015, which also crosses portions of the current Project. Eighty cultural resources were recorded during Dakota Access Pipeline Project surveys, and several of these archaeological sites were investigated during inventory of the current Project.

6.4.2 Summary of Field Surveys

The Level III cultural resources investigation was conducted in compliance with provisions of the National Historic Preservation Act of 1966 (as amended), South Dakota Codified Law 1-191-11.1 (11.1), the South Dakota Historic Preservation Office's South Dakota Guidelines for Compliance with the NHPA, South Dakota Codified Law 1-19A-11.1 as well as a scope of work approved by the SDSHPO dated September 27, 2021**.**

The first round of Level III survey investigations began on September 28, 2021, and continued until November 29, 2021, when weather conditions inhibited surveys. The results of this survey effort were documented in the South Dakota Main Report for the Project (Trader, 2021). The SDSHPO concurred with the Project recommendations included in this report in a letter dated August 24, 2022 (**Appendix 20**).

The second round of cultural resources surveys were conducted between November 30, 2021, and July 2, 2022, the results of which are documented in the South Dakota Addendum 1 report (Trader, 2022). The SDSHPO concurred with the Project recommendations in that report in a letter dated November 21, 2022 (**Appendix 20**).

The third round of cultural resources surveys were conducted between July 3, 2022, and November 18, 2022, the results of which are documented in the South Dakota Addendum 2 report (Trader, 2023). The SDSHPO concurred with the Project recommendations in that report in a letter dated May 22, 2023 (**Appendix 20**).

In 2023, a fourth round of cultural resources surveys were conducted between April 24, 2023, and August 31, 2023, the results of which are being documented in the South Dakota Addendum 3 report (Trader, 2024). The South Dakota Addendum 3 report is currently under review by the SDSHPO (**Appendix 20**).

In 2024, a fifth round of cultural resources surveys were conducted between May 5, 2024, and September 28, 2024. The results of which are currently being documented in the South Dakota Addendum 4 report (Trader 2024) that will be submitted to the SDSHPO after concurrence is received on the South Dakota Addendum 3 report.

To date, the Applicant has completed cultural resource surveys for approximately 70% percent of the Project route in South Dakota based on mileage. The cultural resources surveys will continue as access becomes available and will be completed for the entirety of the Project footprint, including all Project

workspaces and access roads. The ESC for the cultural surveys for the Project covered a 300-ft-wide corridor for all route corridors, a 50-ft (15.0 meter) wide corridor for access roads, and the total footprint of any aboveground facilities (i.e., pump stations, launcher, and receivers, and MLVs).

As of September 28, 2024, archaeological inventories have been conducted for approximately 495.17 miles (18,031.60 acres) of the current 300-ft wide centerline route through South Dakota. Archaeological inventories have also been conducted for 9.05 miles (104.23 acres) of access roads and 19.70 acres of project facilities along the current ESC. The total amount of cultural survey progress within the ESC includes 18,155.53 acres.

Surveys resulted in the documentation of 67 archaeological resources within the current ESC. These include 59 newly recorded archaeological sites, and eight previously recorded archaeological sites. Forty-one historic Euro-American sites, 19 prehistoric sites, 6 prehistoric isolated finds, and 1 multicomponent site were documented within the ESC. Euro-American site types include 22 railroads, 8 farmsteads, 6 historic artifact scatters, 2 historic foundation sites, 1 historic depression with an artifact scatter, 1 isolated historic depression, and 1 historic road. Of the prehistoric sites identified, 7 are prehistoric artifact scatters, 5 are stone circle sites, 4 are stone circle and cairn sites, 1 is a stone circle and prehistoric artifact scatter, 1 is a prehistoric habitation site, and 1 is a prehistoric mound site. Additionally, 6 newly recorded prehistoric isolated finds were identified and documented. The multicomponent site consists of a prehistoric and historic artifact scatter.

Of the 67 sites documented, 32 are recommended as eligible for inclusion to the NRHP, 6 remain unevaluated, and 1 is listed in the NRHP. These sites have all been avoided or will be avoided once minor route variances have been implemented. Twenty-two sites and the 6 isolated finds are recommended as not eligible, and no further work is required. Some of the newly recorded resources in the table below have not yet been assigned Smithsonian numbers. **Table 39** lists the resources identified during inventory of the Project.

Table 39: Resources Identified During Inventory of the Project

Site Number	Site Type	NRHP Recommendation	Management Recommendation	SHPO Concurrence
39BE0188	Historic depression and artifact scatter	Not Eligible	No further work	Yes
39BE0194	Prehistoric isolated find	Not Eligible	No further work	Pending
39BK0104	Railroad	Eligible	Avoided via HDD	Pending
39BN0058	Prehistoric artifact scatter	Unevaluated	Avoided via HDD	Pending
39BN0154	Prehistoric isolated find	Not Eligible	No further work	Yes
39BN2007	Railroad	Eligible	Avoided via HDD	Pending
39CK0021	Historic artifact scatter	Not Eligible	No further work	Yes
39CK0214	Historic foundations	Not Eligible	No further work	Yes
39CK0215	Historic artifact scatter	Not Eligible	No further work	Pending
39CK2007	Railroad	Eligible	Avoided via bore	Yes
39CK2072	Railroad	Eligible	Avoided via bore	Yes

Table 39: Resources Identified During Inventory of the Project				
Site Number	**Site Type**	**NRHP Recommendation**	**Management Recommendation**	**SHPO Concurrence**
39ED0066	Historic artifact scatter	Not Eligible	No further work	Yes
39ED2007	Railroad	Eligible	Avoided via HDD	Yes
39GT2000	Railroad	Eligible	Avoided via HDD	Pending
39GT2007	Railroad	Eligible	Avoided via HDD	Pending
39HD0017	Historic artifact scatter	Not Eligible	No further work	Yes
39HD0128	Historic farmstead	Eligible	Avoided via reroute	Yes
39HD0129	Stone Circle	Eligible	Avoidance pending	Yes
39HD0134	Stone circles and cairns	Eligible	Avoided via reroute	Yes
39HD0136	Stone circle	Eligible	Avoided via reroute	Yes
39HE0097	Stone circles and cairns	Eligible	Avoided via HDD	Yes
39KB0053	Prehistoric isolated find	Not Eligible	No further work	Yes
39KB0054	Historic Farmstead	Not Eligible	No further work	Yes
39KB0055	Historic foundation	Not Eligible	No further work	Yes
39KB2003	Railroad	Eligible	Avoided via HDD	Yes
39KB2013	Railroad	Eligible	Avoided via HDD	Yes
39LK0058	Historic farmstead	Not Eligible	No further work	Yes
39LK0088	Prehistoric artifact scatter	Not Eligible	No further work	Yes
39LK2013	Railroad	Eligible	Avoided via HDD	Yes
39LN2013	Railroad	Eligible	Avoidance pending	Pending
39MH0192	Prehistoric isolated find	Not Eligible	No further work	Yes
39MH0327	Prehistoric artifact scatter	Not Eligible	No further work	Yes
39MH2014	Railroad	Eligible	Avoided via HDD	Yes
39MP0023	Stone circle and Prehistoric artifact scatter	Unevaluated	No further work	Pending
39MP0033	Prehistoric artifact scatter	Not Eligible	No further work	Yes
39MP0039	Prehistoric isolated find	Not Eligible	No further work	Yes
39MP0109	Prehistoric artifact scatter	Not Eligible	No further work	Yes
39MP0118	Stone circle	Eligible	Avoided via reroute	Yes
39MP2051	Railroad	Eligible	Avoided via HDD	Yes
39SL0125	Stone Circle	Not Eligible	No further work	Yes
39SP0011	Prehistoric habitation site	Listed as Eligible in the NRHP	Avoidance pending	Pending

Table 39: Resources Identified During Inventory of the Project				
Site Number	**Site Type**	**NRHP Recommendation**	**Management Recommendation**	**SHPO Concurrence**
39SP0297	Prehistoric and Historic artifact scatter	Not Eligible	No further work	Pending
39SP2003 (Segment 1)	Railroad	Eligible	Avoided via HDD	Pending
39SP2003 (Segment 2)	Railroad	Eligible	Avoided via HDD	Pending
39TU0027	Historic artifact scatter	Not Eligible	No further work	Pending
CS6336KI001	Historic farmstead	Unevaluated	Avoided via reroute	Pending
CS6336MN001	Stone circle and cairn	Eligible	Avoided via reroute	Pending
CS6369BR002	Railroad	Eligible	Avoidance pending	Pending
CS6369CO001	Railroad	Eligible	Avoidance pending	Pending
CS6369GR003	Railroad	Eligible	Avoidance pending	Pending
CS6369KI001	Historic farmstead	Unevaluated	Avoided via reroute	Pending
CS6369MP004	Historic farmstead	Not Eligible	No further work	Pending
CS6369MP005	Historic farmstead	Not Eligible	No further work	Pending
CS6369MP006	Prehistoric mounds	Eligible	Avoidance pending	Pending
CS6369MP007	Prehistoric artifact scatter	Not Eligible	No further work	Pending
CS6369MP011	Prehistoric artifact scatter	Not Eligible	No further work	Pending
CS6369MP012	Historic farmstead	Not Eligible	No further work	Pending
CS6369MP014	Prehistoric isolated find	Not Eligible	No further work	Pending
CS6369MP015	Historic depression	Unevaluated	Avoided via HDD	Pending
CS6369MP016	Historic road	Unevaluated	Avoidance pending	Pending
CS6369SP001	Railroad	Eligible	Avoidance pending	Pending
CS6569BR001	Historic artifact scatter	Not Eligible	No further work	Pending
CS6569DA001	Stone circle	Eligible	Avoided via reroute	Pending
CS6569GR001	Railroad	Eligible	Avoidance pending	Pending
CS6569LI001	Railroad	Eligible	Avoidance pending	Pending
CS6569SA001	Stone circle and cairn	Eligible	Avoided via reroute	Pending
CS6569TU001	Railroad	Eligible	Avoidance pending	Pending

The Level III field survey methods included standard pedestrian survey of the entire Project ESC, and shovel testing across areas where surface visibility was less than 10 percent. Previously recorded and newly documented cultural resources were assessed and evaluated utilizing eligibility criteria to determine NRHP status. As previously stated, to date, the Applicant has completed cultural resource

surveys for approximately 70% percent of the Project route in South Dakota based on mileage. Surveys will be completed once access has been granted across the remaining properties during the 2025 field season, or when access becomes available. The Applicant anticipates completion of surveys and associated addendum reports in Q3/Q4 of 2025. The SDSHPO will provide their concurrence within 60 days of receipt of the report addendum. A copy of the letter of transmittal for the most recent addendum is included in **Appendix 20**.

Sixty-two Native American tribes were contacted and offered the opportunity to participate in field surveys to provide local/Tribal input and knowledge to the fieldwork. Nine tribes have so far agreed to participate in the archaeological field studies; in the state of South Dakota that included members of the Rosebud Sioux, Northern Cheyenne, Mandan, Hidatsa, and Arikara Nation - Three Affiliated Tribes, and Sisseton Wahpeton Oyate of the Lake Traverse Reservation. To date, all resources identified by the Tribal Cultural Specialists have been avoided. Government to Government consultation that will be initiated by the USACE will also allow for additional Tribal involvement in the Project.

6.4.3 Impacts and Avoidance/Mitigation Measures

Construction Impacts

The Project will attempt to avoid eligible archaeological sites and historic structures, and to date all eligible sites have been avoided via reroutes or construction methodology (e.g., HDD), or have reroutes pending. If future eligible sites cannot be avoided through design or construction efforts the Project will conduct formal evaluations in consultation with the SDSHPO and seek resolution through mitigation for those sites that meet the eligibility criteria for listing on the NRHP.

The area of potential effect (APE) for direct effects includes the pipeline ROW as well as the total footprint for aboveground facilities (e.g., pump stations, MLVs, launcher-receivers), access roads, and temporary workspace areas.

The APE for indirect effects will apply to any new aboveground facilities to be constructed for the Project and will include areas from which any permanent aboveground facilities have the potential to visually diminish or alter the setting of an NRHP-listed or -eligible property. The APE for indirect effects will consist of a review radius ranging between 0.5 mi (0.8 km) and 1.0 mi (1.6 km) for any permanent facilities. Only historic properties within visible range of the proposed permanent aboveground facilities will be evaluated. The viewshed analysis will be completed once the locations for permanent aboveground facilities have been finalized.

The Applicant will prepare Level III technical reports for the cultural resource studies and submit them to the SDSHPO for their review and comment. To protect these sensitive resources, the Applicant will not submit information about the location of cultural resources with this application, unless specifically requested by either SDSHPO or the Commission and agreed upon by both.

Only the title page and abstract of cultural resources technical reports will be submitted as documentation of the surveys and evaluations for this application and any other public filings. SDSHPO review and comment letters for technical reports will be submitted as supplemental filings to this application.

Operation Impacts

The Applicant has conducted pre-construction cultural surveys to identify cultural resources and assess their significance to the NRHP. Areas identified as culturally or historically important were avoided to the extent practical by rerouting the pipeline corridor, reducing ROW workspace, HDD or other means.

If an unanticipated cultural resource is discovered during construction, the procedures identified in the Unanticipated Discovery Plan (UDP) (**Appendix 21**) will be implemented, as well as the measure noted in Section 2.12 of the ECP (**Appendix 4**).

6.4.4 Unanticipated Discovery Plan

The Applicant has prepared a UDP (**Appendix 21**) that will be implemented should an unanticipated cultural discovery (i.e., archeological find or human remains) occur during the construction phase of the Project. Training will be provided to all construction personnel on unanticipated discovery procedures and notification protocols. In the event an unanticipated discovery is encountered, the Contractor will immediately halt all construction activities within a 100-foot radius, notify the EI, and implement the notification procedures listed in the UDP.

6.5 Other Impacts

Provide any additional information necessary to describe potential impacts not identified by South Dakota Code 49-41B.

6.5.1 Population and Demographics

Project construction is expected to take 12-18 months for installation of the pipeline and full restoration of the ROW. The influx of construction workers will be temporary and will not impact populations or demographics in the long term. The limited number of permanent employees associated with Project operations will not negatively affect local populations or demographics.

6.5.2 Public Safety Regulations

The Project is designed to meet or exceed state and federal safety requirements and, at a minimum, will be designed in accordance with 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline. **Appendix 2** is a table that identifies the voluntary safety measures that the Applicant has implemented into the design of the MCE Project that exceed the PHMSA requirements identified within 49 CFR Part 195. Facilities will be constructed and operated according to applicable regulations (see Section 2.2 of this application for a list of applicable regulations).

Congress reviews the Pipeline Safety Act every four years and PHMSA regularly reviews existing regulations. Drivers for change include directives from Congress, recent incidents, changes in technology, and policy priorities. A regulatory update is anticipated in fourth quarter of 2024, and drafts are focused on transportation of CO_2 in gas phase (not applicable to this application) and learnings from the PHMSA investigation of the incident to the Denbury CO_2 pipeline near Satartia, Mississippi. The Applicant has incorporated all known learnings from the Satartia incident and will comply with forthcoming regulatory enhancements.

Prior to construction, One-Call notifications will be made to identify potential buried hazards within the proposed construction ROW. Pipeline contractors will also conduct a sweep to confirm the location of foreign pipelines prior to excavation.

OSHA standards will be followed for safe excavation and trenching. The Applicant will ensure compliance with the requirements of OSHA's Excavation Standard, 29 CFR 1926, Subpart P to protect workers during trench excavation.

The Applicant will comply with federal Emergency Response requirements set forth in 49 CFR Part 195.402(e); a draft ERP is provided in **Appendix 9.** The draft ERP will be finalized prior to placing the Project in service and shared with County EMs of the counties crossed by the Project. The Applicant's personnel

will be trained in emergency response procedures and will coordinate with local first responders utilizing tabletop exercises to ensure preparedness prior to operations. The Applicant will have a public awareness program which includes public engagement meetings, including damage prevention programs, that meet or exceed industry standards and regulatory requirements concerning public awareness of pipelines and pipeline operations.

Potential incidents vary in type, scope, size, and risk. Therefore, the final ERP will be drafted to provide guidance and structure for a quick, effective, and coordinated response to protect the public, all responders, and the environment. The National Incident Management System Incident Command System would be used to manage the Applicant's emergency response activities because it is a response tool that is readily adaptable to incidents of varying magnitude. The Applicant's staffing levels would be adjusted to meet specific response team needs based on incident size, severity, and type of emergency. Local agencies and first responders would be trained in the Applicant's final ERP and may fill roles during a coordinated response effort.

The Applicant has met with the County EMs responsible for Beadle, Brookings, Brown, Clark, Codington, Davison, Edmunds, Grant, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Sanborn, Spink, Sully, Turner, and Union counties to discuss planning for emergencies and scheduling training of first responders in their respective areas. **Table 40** and the following is a summary of the Applicant's engagement with the County EMs.

- The County EMs have agreed training of first responders should not occur until after the SD PUC has issued the facility permit and construction can commence. This timing for the training will ensure that appropriate individuals receive the training, as some first responders are volunteers, and the personnel of those crews can change over time. Training and tabletop exercises will occur during construction activities so emergency responders will be prepared once the Project goes into operation.
- Training will include incorporating API Recommended Practice 1174: Recommended Practice for Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response[8], Carbon Dioxide (CO_2) Emergency Response Tactical Guidance Document developed by the API and the Liquid Energy Pipeline Association with input from the National Association of State Fire Marshals[9], discussions of CO_2 pipeline operations, use of monitoring equipment, potential response actions, and will incorporate tabletop exercises.
- The Applicant operations personnel and first responders will participate in tabletop exercises twice a year, which will include training new first responders and calibrating air monitoring instruments. The OCC will ensure a notification system is in place and all potentially affected, including the public and first responders, are educated regarding the notification procedure.
- Handheld CO_2 and oxygen (O_2) monitors will be necessary to safely respond to a CO_2 incident. The Applicant intends to purchase CO_2 and O_2 monitoring equipment for first responders and provide training on their proper use and care. The County EMs are gathering information on the proposed numbers of monitors needed. Other equipment requests or additional needs (e.g., additional training) for responding to a CO_2 release will be evaluated on a case-by-case basis. To facilitate the acquisition of additional equipment and address training needs, the

[8] https://www.api.org/~/media/files/publications/whats%20new/1174_e1%20pa.pdf
[9] https://www.api.org/-/media/files/policy/carbon-capture/co2-tactical-guidance.pdf

Applicant will offer to establish a grant program with each county crossed by the Project. The grant will be $50,000, plus an additional $1,000 mile per mile of pipeline within the county.

Table 40: County Emergency Management Engagement

County(S)	Emergency Management Directors	Date Of Meetings	Applicant Offered To Present Dispersion Analysis	Date That The Dispersion Analysis Was Presented
Beadle	Dave Jensen	5/4/2022	Yes	*To be scheduled*
Brookings	Robert Hill	3/24/2024; 10/1/2024	Yes	*To be scheduled*
Brown	Scott A Meints	3/24/2022; 9/26/2023; 11/1/2023; 5/7/2024	Yes	9/26/2023; 11/1/2023; 5/7/2024
Clark	David Lewis	5/5/2022	Yes	*To be scheduled*
Codington	Andrew Delgado	5/5/2022; 11/14/2023	Yes	12/18/2023
Davison	Jeff Bathke	4/4/2024; 7/10/2024	Yes	7/10/2024
Edmunds	Tracy Hutson	5/5/2022; 11/21/2023	Yes	11/21/2023
Grant	Kevin Schuelke	6/14/2024	Yes	*To be scheduled*
Hamlin	Brett Schutt	*To be scheduled*	Yes	*To be scheduled*
Hand	Arlen Gortmaker	5/4/2022; 10/10/2023	Yes	*To be scheduled*
Hyde	Jim Stephensen	5/5/2022, 1/24/2024	Yes	*To be scheduled*
Kingsbury	Cindy Bau	4/5/2022, 2/06/2024	Yes	*To be scheduled*
Lake	Kody Keefer	5/3/2022; 11/09/2023	Yes	11/9/2023
Lincoln	Harold Timmerman	3/23/2022	Yes	*To be scheduled*
McCook	BJ Stiefvater	5/3/2022; 10/11/2023; 9/19/2024	Yes	9/19/2024
McPherson	Dave Ackerman	5/17/2022	Yes	*To be scheduled*
Miner	Kent Terwilliger	5/3/2022	Yes	*To be scheduled*
Minnehaha	Jason Gearman	5/3/2022; 11/16/2023	Yes	*To be scheduled*
Sanborn	Josh Starzman	4/03/2024	Yes	*To be scheduled*

Table 40: County Emergency Management Engagement				
County(S)	**Emergency Management Directors**	**Date Of Meetings**	**Applicant Offered To Present Dispersion Analysis**	**Date That The Dispersion Analysis Was Presented**
Spink	Andrew Rindelaub	3/25/2022; 10/2/2023; 10/10/2023	Yes	10/2/2023
Sully	Curt Olson	5/4/2022; 10/18/2023	Yes	10/18/2023
Turner	Brad Georgeson	6/28/2022; 11/2/2023	Yes	*To be scheduled*
Union	Jason Westcott	2/5/2024	Yes	*To be scheduled*

Additionally, the Applicant held a round of safety open house meetings across the state to provide attendees the opportunity to learn more about safety around CO_2 pipelines and to speak directly with the Applicant's subject matter experts. Invitations to the safety open house meetings were extended to local and state governmental officials, local EMs and first responders, impacted landowners, and the Project's ethanol partners. The following is a list of the safety open house safety meetings that were held in summer 2023. The Applicant will conduct another round of safety open house meetings during March 2025.

- Onida Safety Tour Meeting held on November 30, 2023, in Sully County. Representatives from Sully, Hand, and Hyde County were invited.
- Aberdeen Safety Tour Meeting held on July 13, 2023, in Brown County. Representatives from Brown, Spink, Edmunds, and McPherson County were invited.
- Huron Safety Tour Meeting held on August 9, 2023, in Beadle County. Representatives from Beadle, Lake, Spink, Hand, and Kingsbury County were invited.
- Leola Safety Tour Meeting held on July 26, 2023, in McPherson County. Representatives from McPherson County were invited.
- Redfield Safety Tour Meeting held on July 26, 2023, in Spink County. Representatives from Spink County were invited.
- Sioux Falls Safety Tour Meeting held on July 12, 2023, in Minnehaha County. Representatives from Minnehaha, Lake, McCook, Spink, and Lincoln County were invited.
- Tea Safety Tour Meeting held on July 17, 2023, in Lincoln County. Representatives from Lincoln County were invited.

The Applicant also held “office hours” at the following dates and times. Office hours provided an opportunity for the public to visit directly with the Applicant and learn more about the Project and to have any Project-related questions answered.

- October 18, 2023 at the Aberdeen Recreation & Cultural Center in the C203 SE room from 4-6 pm
- October 19, 2023 at the Redfield Carnegie Library in the Library Meeting Room from 3-5 pm
- November 15, 2023 at the Aberdeen Recreation & Cultural Center in the Alumni Room from 7-9 am

- November 16, 2023 at the Redfield Carnegie Library in the Library Meeting Room from 10 am -12 pm
- November 16, 2023 at the Redfield Carnegie Library in the Library Meeting Room from 10 am -12 pm
- December 12, 2023 at the Aberdeen Recreation & Cultural Center in the Alumni Room from 11 am - 1 pm
- December 13, 2023 at the Redfield Carnegie Library in the Library Meeting Room from 12-2 pm

The Project construction contractor will maintain a current up-to-date contact list of local emergency response providers and methods of contact/communication. Designated construction and operations personnel will be trained in first aid (see Section 6.3.4 of this application).

The Applicant will utilize its risk modeling and dispersion modeling to inform its Public Awareness and Emergency Response Programs.

The Project will have an ERP and an O&M Manual for use during operations.

6.5.3 Noise Impacts

In South Dakota, the Project will occur primarily in over 98 percent rural agricultural areas, including cultivated crop land, hay/pastureland, and grassland. These areas typically have ambient noise levels that are generally quite low. It is estimated that day-night average levels currently are approximately 40 to 45 decibels on the A-weighted scale (dBA).

Ambient (background) noise levels occur from roadway traffic, farm machinery on a seasonal basis, pets, and various other household noises. The Project will produce ambient noise levels comparable to ambient levels and sources (e.g., agriculture equipment) during construction for populated places within 1,000 feet of the Project and localized during operations for populated places and residences within 500 feet.

Populated places within 1,000 feet of the Project include:

- Mina
- Huron
- Watertown
- Hazel
- Vienna
- Riverside Colony
- Loomis
- Aurora

6.5.3.1 Impacts and Avoidance/Mitigation Measures

During construction, residences within 1,000 feet of the ROW may experience intermittent short-term noise from construction equipment for a period of one week to 30 days. Construction activities will primarily be limited to daylight hours to limit noise impacts to sensitive receptors. The most likely construction activity that may extend into nighttime hours would be the use of HDD. The Applicant will use the HDD method to construct some waterbody, road, and railroad crossings; typically, drilling equipment operates at these crossings for 5 to 6 days; however, more time may be needed depending on length and depth of the drill. The HDD crossings for the Project are in rural locations with ambient noise

levels that are generally low. It is estimated that day-night average levels currently are approximately 40 to 45 decibels (dB) on the A[1]weighted scale (dBA), with higher baseline levels in more developed areas or when heavy agricultural machinery is working (USEPA, 1978).

Construction equipment will be properly muffled and maintained. Temporary sound barriers may be erected between the HDD location and any noise sensitive receptor. Construction equipment noise would be expected to decrease to levels below state daytime standards within 500 to 1,600 feet. The Applicant will work with landowners who are close to the HDD operations to inform them of the construction activity and potential noise impacts to determine other measures that would mitigate impact to the landowner. The Applicant will abide by applicable local noise ordinances regarding noise near residential and commercial/industrial areas. Contractors working on the Project will seek to minimize noise in the immediate vicinity of herds of livestock or poultry operations, which are particularly sensitive to noise. If an activity (e.g., HDD) extends into nighttime hours (10 PM to 7 AM) the following mitigation will be implemented by the contractor. Noise impacts from construction activities will be minimized as identified in the ECP **(Appendix 4).**

Noise levels at 50 feet are quantified in **Tables 41** and **42** for typical construction equipment and outdoor activities.

Table 41: Noise Levels at 50 Feet for Typical Construction Equipment

Equipment	Noise Levels at 50 feet (Leq, dBA)[1]
Backhoe	73–95
Compressors	75–87
Concrete Mixers (Truck)	75–88
Concrete Pumps (Truck)	81–85
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Front Loader	73–86
Generators	71–83
Jackhammers	81–98
Paver	85–88
Pile Driving (peaks)	95–107
Scraper/Grader	80–93
Tractor	77–98
Trucks	82–95
Vibrator	68–82

Source: EPA (1971)

Leq = Equivalent Sound Level, Dba = Decibels Weighted

[1] Machinery equipped with noise control devices or other noise-reducing design features do not generate the same level of noise emissions as shown in this table.

Table 42: Noise Levels at 50 Feet for Typical Outdoor Construction Activities		
Construction Phase	Noise Level at 50 feet(Leq, dBA)	Noise Level at 50 feet with Mufflers (Leq, dBA)
Ground Clearing	84	82
Excavation, Grading	89	86
Source: EPA (1971)		

All pumps and major equipment at pump stations will be installed within a shelter to minimize noise generated from operations. During operation of the Project, there is the potential that noise associated with the operation of pump stations may increase ambient noise levels for residences and other noise sensitive areas within 1,000 feet.

The pumps at the pump stations will be installed inside of shelters that will be built to the STC-39 acoustical specification. The anticipated noise levels emitted from the pump stations during normal operations are between 23 – 43 decibels (dB) at a distance of 500 feet from the operating pumps, and between 17 – 37 dB at a distance of 1,000 feet from the operating pumps. The distance to closest residence for each pump station is listed below.

- MPS-04 (Minnehaha County): approximately 1,588 feet
- MPS-05 (Lake County): approximately 2,480 feet
- MPS-06 (Beadle County): approximately 1,378 feet
- MPS-07 (Spink County): approximately 3,046 feet
- MPS-08 (Edmunds County): approximately 1,259 feet
- MPS-09 (McPherson County): approximately 4,610 feet

It is expected that noise levels emitted from the operational pump station would be less than 37 dBs at the residences greater than 1,000 feet from the pump stations. As stated above it is estimated that day-night average levels currently are approximately 40 to 45 dB on the dBA. The regular operation of a domestic refrigerator operates at a decibel range between 32 to 47 dB (O'Connor, nd). Noise levels between 500 and 1,000 feet of the pump stations would also be less than the average day-night noise levels for the area and noise from the operation of the pump station is not expected to result in a noticeable impact on ambient sound levels. The Applicant will abide by applicable local noise ordinances regarding noise near residential and commercial/industrial areas.

6.5.4 Visual Impacts

An analysis of the Project corridor did not identify any designated scenic outlooks or viewing areas on or along the route. The Project pipeline route and pump station locations were selected with the intent to avoid any visual resources to the extent possible.

6.5.4.1 Impacts and Avoidance/Mitigation Measures

Visual resource impacts associated with construction of the Project include the presence of construction equipment, removal of existing vegetation, exposure of bare soils, earthwork, and grading scars. Impacts from construction activities will be temporary with no significant long-term impacts due to

implementation of minimization and mitigation measures outlined in the ECP (see **Appendix 4**) and SD AIMP (see **Appendix 6**).

The Project's 6 pump stations are located on private land in rural agricultural settings near roads and will be fenced. The pump stations will have a small footprint ranging between 3.1 to 4.8 acres. Few structures exist within 1,000 feet of the 6 proposed pump stations and visual impacts will be limited to those who directly pass near them temporarily.

6.6 Amelioration of Potential Adverse Community Impacts

The Project is anticipated to have positive short- and long-term economic impacts on local economies. Local businesses—such as restaurants, grocery stores, hotels, postal services, equipment suppliers, packaging services, vehicle and equipment repair and maintenance shops, and gas stations—will see an increase in business from construction workers. Short-term construction personnel may be hired locally or from adjacent communities for both skilled and unskilled labor positions. Additionally, housing may be needed for non-local construction laborers.

During Project construction and operation, the Applicant will coordinate with state and local emergency management services to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, and potential incidents. The Applicant will register all Project facilities and pipeline structures with the rural identification / addressing (fire number) system and 911 systems.

The Applicant will work with state highway departments and local authorities to establish road use agreements that will be in place prior to construction to ensure the safe and efficient use of public roads and to minimize and mitigate adverse impacts. Roads used by the Project during construction will be repaired and restored to pre-construction or better condition. In locations where new access roads are necessary, they will be designed and constructed to the appropriate standard necessary to accommodate their intended function (e.g., traffic volume and weight of vehicles) and minimize erosion.

The Project is not anticipated to result in permanent impacts on transportation resources in the state of South Dakota. Temporary indirect effects may include increased traffic volume along local, state, and federal roadways. Impacts from potential construction associated with temporary workers are expected to be minor and limited in duration. Operation impacts are anticipated to be minor, as a relatively low number of workers and equipment will be accessing any one location within the Project area at any time during operations.

Project construction noise impacts will be minimized, as feasible, using procedures identified in the ECP (see **Appendix 4**). During Project operation if landowner noise concerns are identified the Project will investigate and assess the appropriate noise minimization/mitigation response.

7 Other Information

7.1 Tribal Outreach

The Applicant is committed to building relationships with Tribes, Tribal Communities, and Native American-Owned businesses as the Project is planned, constructed, and operated. The Applicant has identified and reached out to all 62 Tribes with current and historic ties to the MCE Project area, including the nine federally recognized Native American Tribes and Nations in South Dakota. Initial outreach occurred at the inception of the MCE Project in August 2021 with Project information and an invitation to participate in field studies. Annual informational webinars hosted by the Applicant are provided every year to inform the Tribes of MCE Project-related activities and to answer questions about the Project.

Tribes have been invited to conduct their own Traditional Cultural Properties (TCP) studies since 2021. The Applicant offered to compensate Tribes for conducting studies that seek to identify possible TCP/historic properties that could be located within the Project corridor. To date, no Tribe has requested to conduct a TCP study. If any TCP studies are completed by Tribes, they will be provided to the SDSHPO and USACE as privileged and confidential information and not available to the public.

The Applicant has elected to target 100 percent inventory or cultural survey of the Project route, not just high probability areas and federal jurisdictional areas. Where the Applicant has been granted permissions to access private property, the Tribes have been afforded the opportunity to accompany archaeological crews along the entire route, or to conduct their own studies if permitted by the landowner. In South Dakota, specifically, the following Tribes have participated in the cultural resources surveys: Rosebud Sioux Tribe, Northern Cheyenne Tribe, the Three Affiliated Tribes of the Fort Berthold Reservation, and Sisseton Wahpeton Oyate of the Lake Traverse Reservation. To date, all resources identified by the Tribal Cultural Specialists have been avoided.

The following are some additional examples of how the Applicant has engaged Tribes, Tribal Communities, and Native American-Owned businesses in South Dakota and across the larger MCE Project:

- In January 2024, the Applicant met with South Dakota legislators at the state capitol building in Pierre, SD to discuss the Project, Tribal outreach, and involvement on the Project to date, and the Coalition of Large Tribes' (COLTs') support letter on carbon footprint reduction, which discusses opportunities for Tribal nations to pursue similar projects of their own.
- In October 2021, an invitation was sent out to Tribes to join the Applicant's SharePoint site to review maps, shapefiles, route kmz's, and cultural resources reports.
- In December 2021, an invitation was sent out to all 62 Tribes to attend an MCE Tribal project webinar. The Applicant has conducted live webinars in a "town hall" format in which Tribal representatives are invited to learn more specifics about the Project and ask questions of the Project's cultural resources and Tribal outreach teams. The Applicant has hosted a series of webinars in 2022, 2023, and 2024, and will host another series of webinars in 2025.
- In February 2022, the Applicant and EXP reached out to Tribally owned and operated enterprises and Native American-owned businesses to explore job opportunities. This outreach includes working with Tribal Employment Rights Offices (TERO) to maximize potential job opportunities related to the Project.
- In March 2022, the Applicant met with the Standing Rock Sioux Tribal Council at their request to discuss the Project at Tribal Headquarters in Fort Yates, North Dakota.
- In May 2022, the Applicant sponsored a week-long Tribal Cultural Specialist training for the Mille Lacs Band of Ojibwe.
- The Applicant has sponsored and presented at a number of Tribal Coalition meetings including COLT, the Midwest Alliance of Sovereign Tribes, the Great Plains Tribal Chairmans Association, the Northern Plains TERO Coalition, the Great Lakes TERO Association, the Great Lakes Tribal Economic Summit, and the National TERO Conference.
- The Applicant has attended and hosted a booth at RES, the largest and longest running national American Indian business event in the nation held by the National Center for American Indian Enterprise Development.
- In Spring of 2023, the Applicant made donations to the Oglala Sioux and Rosebud Sioux Tribes of South Dakota to help aid in a winter storm relief effort.

- The Applicant is committed to workforce development in Indian Country and partnered with Five Skies Training and Consulting to host a Career Readiness Enhancement Training for Native Communities in May 2023 in Sioux City, Iowa. All 62 Tribes were invited to participate in the training.
- In October 2023, the Applicant sponsored and helped develop a law enforcement training hosted by COLT in Billings, Montana focused on the Missing and Murdered Indigenous Persons crisis. Several Tribes from across the nation were represented, law enforcement from Tribal nations participated, and law enforcement from "border towns" or those towns that border reservations were also present.

The Applicant recognizes that violence against Indigenous peoples is a crisis that has been underfunded in communities throughout Indian Country and that murders and missing persons cases go unsolved and unaddressed. The Applicant is fully committed to partnering with Tribes and Tribal communities to achieve justice and healing for families around the Project by investing in programs and services that: foster awareness of the issues related to Missing and Murdered Indigenous Women/ Missing and Murdered Indigenous Girls; address issues of human trafficking; domestic violence; honor Indigenous cultural values; educate on the prevention of sexual violence; support community self-defense training; and invest in the empowerment of Native women and girls. Furthermore, the Applicant supports the programs and services of agencies responsible for investigating and resolving these cases. Safe communities are the Applicant's priority and violence against Native people has no place in the communities in which the Applicant serves and operates. The Applicant will require that all its employees and contractors complete a Human Trafficking Prevention Training prior to construction work.

7.2 Monitoring of Impacts

The Applicant is committed to protecting the environment and complying with all applicable laws, regulations, and standards. The Applicant will ensure environmental compliance during and after construction through environmental training, environmental inspections, and post-construction monitoring. The Applicant will work with the SD PUC to establish an agreement to pay for a third party to conduct environmental inspection during construction. The Applicant will also pay for a public liaison officer for the Project for landowners to call concerning construction on their properties and keep the Commission informed of the Applicant's response to issues that arise before, during and after construction.

In addition, operations, and maintenance programs per the Applicant's O&M procedures will be performed. During operations, the Applicant will utilize a SCADA system that provides continuous, remote monitoring and control of pipeline operations. Additionally, visual surveillance will be conducted in accordance with 49 CFR Part 195.412.

The Applicant is proposing to implement training and monitoring on this Project to help ensure compliance with environmental, safety, landowner, and company requirements as follows.

7.2.1 Environmental Training

Experienced, well-trained personnel are essential for the successful construction and operation of the Project.

To communicate the Project requirements to personnel, the Applicant will require environmental training from all Project personnel prior to construction. In addition, the Applicant and its contractors will undergo prevention, response, and general safety training. The training program will be designed to improve

awareness of environmental and safety requirements, pollution control laws and procedures for proper operation and maintenance of equipment.

The Applicant will require that the contractors ensure that all persons (contractors' and subcontractors' personnel) engaged in work associated with the pipeline's construction are informed of the construction issues and concerns, and that they attend and receive training regarding these requirements as well as all laws, rules, and regulations applicable to the work. Environmental training and certification will be required for all personnel including the Applicant personnel visiting or working on the job site.

Distinct levels of training will be required for different groups of contractor personnel. Contractor supervisors, managers, field foremen, and other contractor personnel designated by the Applicant will attend a full-day, comprehensive environmental training session. All contractor personnel will attend a 1- to 2-hour group training session before the beginning of construction and during construction as new personnel are assigned or as environmental issues and incidents warrant. All visitors and any other personnel without specific work assignments will be required to attend a brief safety and environmental awareness orientation.

Training will be acknowledged on a training form and the records of proof-of-training will be maintained for the duration of the Project.

To provide on-site documentation of compliance, the Applicant will utilize a team of inspectors overseeing environmental safety and quality. The Applicant will require training of all inspectors to Project's construction specifications. A review of the landowner and permit requirements with the applicable inspectors will also be required.

7.2.2 Environmental Inspection

The Applicant is committed to environmental compliance. The Applicant's EIs will be responsible for overseeing the contractors' compliance with environmental requirements, Project specifications, permits, and landowner requirements during construction activities. The Applicant's Senior Environmental Program Manager will oversee the Environmental Inspection Program for construction in South Dakota. The final structure for the Environmental Inspection Program has not been finalized, but will follow the following model:

- Senior Environmental Program Manager (Applicant) will oversee Environmental Inspection Program
- Lead EI (contractor) will oversee construction in South Dakota
- One EI (contractor) will be responsible for each of the 5 construction spreads in South Dakota (5 separate EIs)
- There will be one Reporting Coordinator for South Dakota, that will also cover North Dakota and Nebraska.

The chain of command will follow that the spread EI will report to the Lead EI, who will report to the Senior Environmental Program Manager. The EIs will work in conjunction with all other activity inspectors as necessary and required. Reporting will occur daily and will be managed by the Reporting Coordinator. Reports will be submitted to all required external parties in compliance with all received permits and subsequent conditions and authorizations.

The EI's primary responsibility will be to observe construction-related activities and monitor compliance with, and provide interpretation of, the environmental requirements specific to the Project. The EI will be qualified to perform the environmental compliance evaluations and interpretations required to comply

with environmental permits. If environmental damage or risk to the safety of the workers or the public is imminent, EIs will have the authority to stop activities that violate the conditions of the Project's environmental permits or approvals, or landowner easement agreements, and to order appropriate corrective action. The following is a description of the responsibilities of the EI.

At a minimum, the EIs will be responsible for:

1. Inspecting construction activities for compliance with the requirements of Project Environmental Construction Plan and environmental permits or approvals, or landowner easement agreements;
2. Identifying, documenting, and overseeing corrective actions, as necessary, to bring an identified deficiency into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging that mark the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with specific requirements along the construction work area;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;
6. Ensuring that the design of slope breakers/diversion terraces/water bars will not cause erosion or direct water into sensitive environmental resource areas, including cultural resource sites, wetlands, waterbodies, and sensitive species habitats;
7. Verifying that dewatering activities are properly located and monitored to ensure no deposition of sand, silt, and/or sediment into sensitive environmental resource areas; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent recurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Advising the Chief Construction Inspector when environmental conditions (such as wet weather) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
9. Ensuring restoration of contours and topsoil;
10. Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;
11. Ensuring that ECDs are properly installed to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional ECDs;
12. Inspecting and ensuring the maintenance of temporary erosion control measures at least:
13. Once every 7 calendar days in areas of active construction or equipment operation, and
14. Within 24 hours of rainfall event of 0.5 inch or greater;

15. Ensuring all ineffective temporary erosion control measures be repaired or replaced within a reasonable time, as specified in Project SWPPPs, or as soon as conditions allow;
16. Keeping records of compliance with the environmental conditions of SD PUC permit, the mitigation measures in the Project's ECP (**Appendix 4**), and other federal or state environmental permits during active construction and restoration; and
17. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase.

7.2.3 Post-construction Monitoring and Maintenance Programs

The Applicant will conduct post-construction monitoring of the Project area to minimize the potential for long-term adverse impacts to the environment. Operations and maintenance programs such as vegetation management, pipeline maintenance, integrity surveys, hydrostatic testing, or other programs may have an impact on the final reclamation of the ROW. To ensure that the integrity of the facility and land surface reclamation of the ROW is maintained after completion of construction and that regulatory requirements are adhered to during operations, the following measures will be implemented unless otherwise directed by the Applicant in response to site-specific conditions or circumstances:

- Post-construction monitoring inspections will be conducted of disturbed non-cropland areas after the first growing season to determine the success of revegetation. Areas that have not been successfully re-established will be revegetated by the Applicant or through compensation to the landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring will be conducted.
- In non-agricultural areas, revegetation will be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover adjacent undisturbed lands. In agricultural areas, revegetation will be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- The Applicant will maintain communication with the landowners and/or tenants throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. The Applicant will provide the landowners with corporate contact information for these purposes. The Applicant will work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods will be implemented to control erosion. This may not be implemented if the property across which the pipeline is constructed is bare cropland, which the landowner intends to leave bare until the next crop is planted.
- In wetland areas, all timber riprap, timber mats, and prefabricated equipment mats will be removed upon completion of construction. The contractor will replace topsoil, as applicable, and spread as closely to its original contours in the wetland as possible with no crown over the trench. Any excess spoil will be removed from the wetland. The contractor will stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and re-vegetation, as applicable, during final clean up. For each standard wetland crossed, the contractor will install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. The contractor will locate the trench breaker immediately upslope of the slope breaker.
- Herbicides and pesticides will not be used in or within 100 feet of a wetland except as allowed by the appropriate land management agency or state agency.

The success of wetland re-vegetation will be monitored after construction until wetland revegetation is successful except in circumstances where property is purchased for aboveground facilities. Wetland re-vegetation will be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If re-vegetation is not successful at the end of 3 years, a remedial re-vegetation plan will be developed in consultation with a professional wetland ecologist to actively re-vegetate the wetland. Re-vegetation efforts will continue until wetland re-vegetation is successful.

7.3 Testimony and Exhibits

The Applicant is submitting the prepared direct testimony of the witnesses listed below in support of its application. Additional testimony will be submitted in accordance with the procedural schedule to be established by the SD PUC. The Applicant reserves the right to designate additional witnesses, as necessary. **Table 43** provides the portions of the document that each witness is responsible for.

The Applicant is submitting the prepared direct testimony of the witnesses listed below in support of its application. Additional testimony will be submitted in accordance with the procedural schedule to be established by the SD PUC. The Applicant reserves the right to designate additional witnesses, as necessary. **Table 43** provides the portions of the document that each witness is responsible for.

Table 43: Project Witnesses

Application Section	Application Subsections	Witness
1.0 Introduction	All Sections Section 1.8	Mr. James Powell Dr. Jon Schmidt/Mr. James Powell/ Mr. Alex Lange/Mr. Erik Schovanec
2.0 Project Description	All Sections Section 2.1.1 Section 2.1.2 Section 2.2 Section 2.2.7 & 2.2.8 Section 2.3.1 Section 2.3.2 Section 2.3.3	Mr. James Powell/Erik Schovanec Mr. Alex Lange Mr. James Powell Mr. Alex Lange Mr. Erik Schovanec Mr. Erik Schovanec Mr. David Daum Mr. James Powell
3.0 Demand for Facility	All Sections	Mr. James Powell/Mr. Jon Probst
4.0 Alternatives	All Sections	Dr. Jon Schmidt Mr. Erik Schovanec Mr. James Powell
5.0 Environmental Information and Impact on Physical Environment	All Sections	Dr. Jon Schmidt Mr. Erik Schovanec
6.0 Community Impact	All Sections Section 6.1 Section 6.2 Section 6.3	Mr. James Powell/Dr. Jon Schmidt Mr. James Powell/Mr. Jon Probst Mr. Erik Schovanec Mr. David Daum/Mr. Erik Schovanec

Table 43: Project Witnesses		
Application Section	**Application Subsections**	**Witness**
	Section 6.4 Section 6.5 Section 6.6	Ms. Erin Salisbury Mr. David Daum/Mr. Erik Schovanec Mr. James Powell/Mr. David Daum
7.0 Other Information	7.1 7.2	Ms. Erin Salisbury/Mr. Troy Eid Mr. Erik Schovanec/Mr. David Daum/Dr. Jon Schmidt
Appendices	1,6,7,11 2,3,10,13,24 4,5,12,14-19,22 8 9 20,21 23 25	Mr. Erik Schovanec Mr. Alex Lange Dr. Jon Schmidt Mr. James Powel/Mr. Alex Lange Mr. David Daum Ms. Erin Salisbury Mr. Jon Probst Mr. James Powell/ Mr. Alex Lange/ Mr. Erik Schovanec

8 References

American Carbon Alliance. n.d. Sustainable Aviation Fuel. Available online at https://americancarbonalliance.org/sustainable-aviation-fuel/. Accessed on October 21, 2024.

Amphibians and Reptiles of South Dakota. 2022. Lined Snake – Endangered. Available at: http://www.sdherps.org/species/tropidoclonion_lineatum. Accessed March 1, 2022.Austin, J.E. and A.L. Richert. 2001. A Comprehensive Review of the Observational and Site Evaluation Data of Migrant Whooping Cranes in the United States, 1943-99. U.S.

Anderson, Paul G., Fraikin, Christian G., Chandler, Trevor J. 1998. Impacts and Recover in a Coldwater Stream Following a Natural Gas Pipeline Crossing Installation. Available online at: .

Audubon. 2024. Audubon Important Bird Area Hub. Accessed 11/11/24 online at https://www.audubon.org/important-bird-areas

Beadle County. 2016. Beadle County Comprehensive Plan. Available online: https://beadle.sdcounties.org/files/2021/06/BEADLE-CO-PDM-2021-Update-FINAL.doc. Accessed December 2021.

Be Plant.org. https://bplant.org/region/37#:~:text=The%20West%2DCentral%20Semi%2DArid%20Prairies%20are%20a%20large%20region,and%20much%20of%20northern%20Nebraska. Accessed March 2024.

Brown County. ND. Brown County Ordinances, Second Revision, Title 4. Available online: https://brown.sd.us/department/planning-and-zoning/ordinances. Accessed December 2021.

Bureau of Transportation Statistics, 2021. - National Transportation Statistics 50th Anniversary. Available online at: https://www.bts.gov/sites/bts.dot.gov/files/2021-12/NTS-50th-complete-11-30-2021.pdf.

Canadian Wildlife Service (CWS) and U.S. Fish and Wildlife Service (USFWS). 2005. Draft International Recovery Plan for the Whooping Crane. Ottawa: RENEW and USFWS, Albuquerque, New Mexico. 196 pp.

Caramanna, G., Andre, N., Dikova, M. P., Rennie, C., & Maroto-Valer, M. M. (2014). Laboratory experiments for the assessment of the physical and chemical impact of potential CO2 seepage on seawater and freshwater environments. Energy Procedia, 63, 3138-3148. https://doi.org/10.1016/j.egypro.2014.11.339.

Central Flyway Council. 2013. Public comments of November 26, 2013. Central Flyway Council. Austin, TX.

CEC. 2011. North American Terrestrial Ecoregions—Level III dated April 2011. Commission for Environmental Cooperation, Accessed online at: http://www.cec.org/files/documents/publications/10415-north-american-terrestrial-ecoregionslevel-iii-en.pdf.

CH2M Hill. 2014. Draft Report - Waterbody Crossing Plan for the Washington Expansion Project.

Cochrane, J, and P. Delphey. 2002. Status assessment and conservation guidelines, Dakota skipper *Heperia dacotae* (Skinner), Iowa, Minnesota, North Dakota, South Dakota, and Manitoba. U.S.

Fish and Wildlife Service, Twin Cities Field Office. 92 pp. https://ecos.fws.gov/ServCat/DownloadFile/4020?Reference=4171.

Dieterman, D. and C. Berry, Jr. 1998. Fish Community and Water Quality Changes in the Big Sioux River. Prairie Naturalist 30(4): 199-224.

DSGNews 2024. USDA forecasting record high corn yield in South Dakota in 2024. Written by Jody Heemstra. October 14, 2024. Available online at https://drgnews.com/2024/10/14/usda-forecasts-us-corn-production-down-soybean-production-up-from-2023-south-dakota-on-track-for-record-corn-yields/. Accessed on October 20, 2024.

EPA. 1997. Ecological Regions of North America: Toward a Common Perspective. Accessed online at: https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/cec_na/CEC_NAeco.pdf.

EPA. 2013. Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States.

Federal Energy Regulatory Commission. 2013. Wetland & Waterbody Construction & Mitigation Procedures. Available online at: https://ferc.gov/sites/default/files/2020-04/wetland-pocket-guide.pdf.

EPA. 1997. Ecological Regions of North America: Toward a Common Perspective. Accessed online at: https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/cec_na/CEC_NAeco.pdf.

Galloway, D., D.R. Jones, and S.E. Ingebritsen. 2005. Land Subsidence in the United States. U.S. Geological Survey Circular 1182.

Geosyntec. 2024. Phase I Geohazards Assessment – South Dakota Rev 2.

GEVO. 2023. Gevo Meets with Community Leaders Highlighting the Importance of CCS for South Dakota. October 20, 2023. Available online at: https://gevo.com/wp-content/uploads/2023/10/pr-Gevo-Meets-with-Community-Leaders-Highlighting-the-Importance-of-CCS-for-South-Dakota.10202023.pdf Access on October 21, 2024.

GEVO. 2024. Gevo Secures Conditional Commitment from U.S. Department of Energy Loan Programs Office for its Net-Zero 1 Sustainable Aviation Fuel Plant in South Dakota. October 16,2024. Online at: https://investors.gevo.com/news-releases/news-release-details/gevo-secures-conditional-commitment-us-department-energy-loan. Accessed on October 21, 2024.

Gilbraith, D.M., M.J. Schwalbach, and C.R. Berry. 1988. Preliminary report on the status of the pallid sturgeon, *Scaphirhynchus albus*, a candidate endangered species. Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings. 76 pp.

Haig, S.M. 1986. Piping Plover Species Distribution. U.S. Fish and Wildlife Service, Endangered Species Information System Workbook I.

Haig, S.M., and J.H. Plissner. 1993. Distribution and abundance of piping plover: results and implications of the 1991 census. Condor 95:145-156.

Howe, M. A. 1987. Habitat Use by Migrating Whooping Cranes in the Aransas-Wood Buffalo Corridor. Pages 303-311, In: J. C. Lewis and J. W. Ziewitz, eds. Proc. 1985 Crane Workshop. Platte River Whooping Crane Habitat Maintenance Trust and USFWS, Grand Island, Nebraska.

IPaC. 2024. Information for Planning and Consultation. U.S. Fish and Wildlife Service website. Accessed June 2024. Available online at: https://ecos.fws.gov/ipac/location/index.

Interstate Natural Gas Association of America (INGAA). 1998. River and Stream Crossings Study (Phase I) Executive Summary. Available online at: https://ingaa.org/river-and-stream-crossings-study-phase-i/.

Johns, B. W., E. J. Woodsworth, and E. A. Driver. 1997. Habitat Use by Migrant Whooping Cranes in Saskatchewan. Proceedings North American Crane Workshop 7:123-131.

Jones, D. G., Beaubien, S. E., Blackford, J. C., Foekema, E. M., Lions, J., De Vittor, C., West, J. M., Widdicombe, S., Hauton, C. and Queirós, A. M. (2015). Developments since 2005 in understanding potential environmental impacts of CO2 leakage from geological storage. International Journal of Greenhouse Gas Control, 40 . pp. 350-377. DOI 10.1016/j.ijggc.2015.05.032.Lincoln County. 2005. Lincoln County Comprehensive Plan. Available online: https://lincolncountysd.org/DocumentCenter/View/688/Comprehensive-Plan-PDF. Accessed December 2021.

Lingle, G. R. 1987. Status of Whooping Crane Migration Habitat Within the Great Plains of North America. Pages 331-340 In: J. C. Lewis and J. Zewitz, eds. Proc. 1985. Crane Workshop. Platte River Whooping Crane Habitat Maintenance Trust and USFWS, Grand Island, Nebraska.

Lingle, G. R., G. A. Wingfield, and J. W. Ziewitz. 1991. The Migration Ecology of Whooping Cranes in Nebraska, U.S.A. Pages 395-401 In: J. Harris, ed. Proc. 1987 International Crane Workshop, International Crane Foundation, Baraboo, Wisconsin.

Little, M.G. and R.B. Jackson, (2010). Potential impacts of leakage from deep CO2 geosequestration on overlying freshwater aquifers. Environmental Science and Technology, 44(23), 9225-9232.

Martin, J.E., J.F. Sawyer, M.D. Fahrenbach, D.W. Tomhave, and L.D. Schulz. 2004. *Geologic Map of South Dakota.* South Dakota Department of Environment and Natural Resources, Geological Survey.

National Research Council. 2002. The Missouri River Ecosystem: Exploring the Prospects for Recovery. National Academy Press. Washington D.C. 175 pp.

Natural Resources Conservation Service (NRCS). 2014. *Prime and Important Farmlands*. U.S. Department of Agriculture. Available online at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ak/soils/surveys/?cid=nrcs142p2_035988 Accessed December 2021.

NRSC. 2019. *National Soil Survey Handbook*, *Title 430-VI*. U.S. Department of Agriculture. Available online at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054242 (accessed day month year). Accessed December 2021.

NRSC. 2024. Web Soil Survey. Available online at: https://websoilsurvey.nrcs.usda.gov/app/. Accessed 06/20/2024.

Pallid Sturgeon Recovery Program. 2021. Population Status page on The Pallid Sturgeon Recovery Program websites accessed 12/23/21 at: http://pallidsturgeon.org/recovery/upper-basin/population-status/.

Pearce, J.; Jones, D.; Blackford, J.; Beaubien, S.;Foekema, E.;Gemeni, V.; Kirk, K.; Lions, J.; Metcalfe, R.; Moni, C., Smith, K.; Stevens, M.; West, J.; Ziogou, F. (2014). A guide for assessing the potential impacts on ecosystems of leakage from CO2 storage sites. Energy Procedia, 63. 3242 3252. https://doi.org/10.1016/j.egypro.2014.11.351.

Perennial. 2021a. Wetland Delineation Report Midwest Carbon Express Project: Beadle, Brown, Clark, Codington, Edmunds, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Spink, Sully, and Turner Counties, South Dakota. Report prepared by Perennial Environmental Services, LLC for Summit Carbon Solutions, 15 pp.

Perennial. 2021b. Threatened and Endangered Species Report Midwest Carbon Express Project: Beadle, Brown, Clark, Codington, Edmunds, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Spink, Sully, and Turner Counties, South Dakota. Report prepared by Perennial Environmental Services, LLC for Summit Carbon Solutions, 32 pp.

Perennial. 2022a. Threatened and Endangered Species Report Midwest Carbon Express Project: Beadle, Brown, Clark, Codington, Edmunds, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Spink, Sully, and Turner Counties, South Dakota. Report prepared by Perennial Environmental Services, LLC for Summit Carbon Solutions, 42 pp.

Perennial. 2022b. Wetland Delineation Report Midwest Carbon Express Project: Beadle, Brown, Clark, Codington, Edmunds, Hamlin, Hand, Hyde, Kingsbury, Lake, Lincoln, McCook, McPherson, Miner, Minnehaha, Spink, Sully, and Turner Counties, South Dakota. Report prepared by Perennial Environmental Services, LLC for Summit Carbon Solutions, 25 pp.

Pflieger, W.L. 1997. The fishes of Missouri, revised edition. Missouri Department of Conservation, Jefferson City, Missouri. 343 pp.

Pipeline and Hazardous Materials Safety Administration (PHMSA) Report to Congress, 2018. Available online at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/news/70826/report-congress-shipping-crude-oil-truckrail-and-pipeline-32019.pdf.Runnia, T. and A. Solem. 2018. Prairie grouse occurrence models for South Dakota. Wildlife Division Report 2018-03, South Dakota Department of Game, Fish and Parks, Pierre, SD 93 pp.

Royer, R. A. and G. M. Marrone. 1992b. Conservation status of the regal fritillary (Speyeria idalia) in North and South Dakota. Report to the U.S. Department of Interior, Fish and Wildlife Service, Denver, CO. Minot State University.

Sauver, T. Undated. Past, Present and Future of Commercial Fishing in South Dakota. South Dakota Conservation Digest: Available at: https://sdleastwanted.sd.gov/docs/conservationdigest/CommercialFishing.pdf.

Schneider, R., M. Fritz, J. Jorgensen, S. Schainost, R. Simpson, G. Steinauer, and C. Rothe-Groleau. 2018. Revision of the Tier 1 and 2 Lists of Species of Greatest Conservation Need: A Supplement to the Nebraska Natural Legacy Project State Wildlife Action Plan. The Nebraska Game and Parks Commission, Lincoln, NE. http://outdoornebraska.gov/wp-content/uploads/2018/09/NE-SWAP-SGCN-Revision-Supplemental-Document-2018-Final.pdf.

Shearer, J.S. 2003. Topeka shiner (*Notropis topeka*) management plan for the state of South Dakota. South Dakota Department of Game, Fish and Parks, Pierre, Wildlife Division Report No. 2003-10, 82 pp online at: https://gfp.sd.gov/UserDocs/nav/TopekaShinerManagementPlan-Revised.pdf.

O'Connor, Mike. Nd. Refrigerator Noise Level Comparison. Available at: https://soundproofnation.com/refrigerator-noise-level-comparison/.

Soil Survey Staff. Natural Resources Conservation Service. United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for South Dakota. Available online. Accessed May 2024.

South Dakota Department of Agriculture and Natural Resources (SD DANR). 2020. Air Quality in South Dakota. Available online at: https://danr.sd.gov/Environment/AirQuality/PermitForms/default.aspx. Accessed November 17, 2021.

SD DANR. 2021. Wellhead Protection Program. https://danr.sd.gov/OfficeOfWater/DrinkingWater/WellheadProtection/default.aspx. Accessed December 2021.

SD DANR. 2023. Email correspondence with Adam Mathiowetz, PE Engineer, Water Rights Program Department of Agriculture and Natural Resources "*Subject: RE: SD Water Related GIS Data Request*." July 19, 2023.

SD DANR. 2024a. Oil and Gas Resources. https://usd.maps.arcgis.com/apps/webappviewer/index.html?id=e54c5063b19c49629560a86a7be2eb3d. Accessed May, 2024

SD DANR. 2024b. 2024 South Dakota Integrated Report for Surface Water Quality Assessment. Available online at: https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/docs/DANR_2024_IR_final.pdf. Accessed June 2024.

SD DANR. 2020. 2020 Renewal Section 404 Nationwide Permits South Dakota 401 Water Quality Certification. Pierre, SD.

South Dakota Department of Labor and Regulation (SD DLR). 2024. Overview of the Current Labor Market. https://dlr.sd.gov/lmic/overview.aspx#:~:text=The%20labor%20force%20increased%20over,August%202023%20level%20of%20481%2C700.

South Dakota Game Fish and Parks (SDG FP). 2014. South Dakota Wildlife Action Plan. Wildlife Division Report 2014-03. South Dakota Department of Game, Fish and Parks, Pierre. 583 pp Online at: https://gfp.sd.gov/images/WebMaps/Viewer/WAP/Website/SWGSummaries/SD_Wildlife_Action_Plan_Revision_Final.pdf

SDGFP. 2016. South Dakota Statewide fisheries survey: Brant Lake, Lake County. South Dakota Game, Fish, and Parks, Pierre, SD 16 pp. Available online at: SOUTH DAKOTA STATEWIDE FISHERIES SURVEY (sd.gov).

SDGFP. 2017a. South Dakota White-tailed Deer and Mule Deer Management Plan, 2017-2023. Completion Report 2017-02. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA Online at https://gfp.sd.gov/UserDocs/nav/deer-mgmnt.pdf.

SDGFP. 2019a. South Dakota Pronghorn Management Plan, 2019 – 2029. Completion Report 2019-05. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, 35 pp.

SDGFP. 2019b. Fisheries and Aquatic Resources Adaptive Management System, 2019 – 2023. Northeast Fisheries Management Area. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA Available online at: Microsoft Word - NEFMA Plan 2019 - 2023 Commission Adopted.docx (sd.gov).

SDGFP. 2019c. Fisheries and Aquatic Resources Adaptive Management System, 2019 – 2023. Southeast Fisheries Management Area. South Dakota Department of Game, Fish and Parks, Pierre, South

Dakota, USA Available online at: Microsoft Word - NEFMA Plan 2019 - 2023 Commission Adopted.docx (sd.gov).

SDGFP. 2021a. Statewide Combined Deer Harvest. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA Accessed online at: https://gfp.sd.gov/UserDocs/nav/STATEWIDE_DEER_SUMMARY.pdf.

SDGFP. 2024a. Antelope Page: Antelope (Pronghorn) Hunting Units Accessed 6/17/24 online at https://gfp.sd.gov/antelope/.

SDGFP. 2024b. 2023 Antelope Harvest Statistics. Accessed 6/17/24 online at https://sdgfp.maps.arcgis.com/apps/instant/portfolio/index.html?appid=04f2130d4d5c44edbd93d9ee5c83c294.

SDGFP. 2024c. 2022 Spring Pronghorn Density. Accessed 6/17/24 online at https://gfp.sd.gov/userdocs/docs/2022_pronghorn_density_thunderstorm_map.pdf.

SDGFP. 2021d. South Dakota Wild Turkey Management Plan 2021–2030. Completion Report 2021-01. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA https://gfp.sd.gov/UserDocs/docs/turkey_mangement_plan_2021-2030_final.pdf.

SDGFP. 2024e. Turkey Page. South Dakota Department of Game, Fish and Parks Website Accessed 06/07/2024 online at: https://gfp.sd.gov/turkey/

SDGFP. 2024f. Spring & Fall Turkey Harvest Statistics. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA Accessed 06/07/2024 online at: https://sdgfp.maps.arcgis.com/apps/MapSeries/index.html?appid=17b7e91b8d724229a0f87fa35bdf35f5

SDGFP. 2024g. Prairie Grouse Page: Prairie Grouse Survey Report. South Dakota Department of Game, Fish and Parks Website Accessed 06/07/2024 online at: https://gfp.sd.gov/userdocs/docs/prairie_grouse.pdf.

SDGFP. 2024h. Pheasant Page: South Dakota Pheasant Hunter & Harvest Distribution. South Dakota Department of Game, Fish and Parks Website Accessed on 06/17/2024online at: https://sdgfp.maps.arcgis.com/apps/webappviewer/index.html?id=cef82625dbd04142bd0542f2746eebe9.

SDGFP. 2021i. Pheasant Page: 2020 Pheasant Economics. South Dakota Department of Game, Fish and Parks Website Accessed online at: https://gfp.sd.gov/pheasant/.

SDGFP. 2024j. Threatened and Endangered Species Page: Interactive Wildlife Action Plan. Accessed 06/17/2024 online at: https://gfp.sd.gov/threatened-endangered/.

SDGFP. 2024k. South Dakota Wildlife Action Plan Explorer: Wildlife of South Dakota. Accessed 06/17/2024 online at: https://apps.sd.gov/gf43wap/Species.aspx.

SDGFP. 2024l. South Dakota Environmental Review Tool. Accessed online at: Map | South Dakota Environmental Review Tool (sd.gov).

SDGFP. 2024m. Biennial Commission Review of SD Threatened and Endangered Species List July 2022 Commission Meeting. Available at: https://gfp.sd.gov/threatened-endangered/

SDGFP. 2022. South Dakota Department of Game, Fish and Parks, Division of Wildlife. 2022. Management of prairie grouse in South Dakota. Wildlife Division Report Number 2022-11. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA. Accessed online at: https://gfp.sd.gov/UserDocs/docs/prairie_grouse_management.pdf

South Dakota Geological Survey (SDGS). 2024a. *Earthquakes in South Dakota*. Available online at: https://www.sdgs.usd.edu/earthquakes/index.html. Accessed May 2024.

State of South Dakota. 2021. *GIS Data: South Dakota Construction Aggregate and Mining Sites.* Available online at: https://opendata2017-09-18t192802468z-sdbit.opendata.arcgis.com/datasets/a4f30a70aed94168ac906384c67778ff_0/about. Accessed December 2021.

Suzuki, C. 2020. Development of Carbon Dioxide Barriers to Deter Invasive Fishes: Insights and Lessons Learned from Bighead Carp. Fishes 2020, 5, 25. https://doi.org/10.3390/fishes5030025 available online at: https://www.mdpi.com/2410-3888/5/3/25.

Swengel, A. B. 1996. Effects of fire and hay management on abundance of prairie butterflies. Biological Conservation 76:73-85.

TOMCO2 Systems. N.d. CO2 Transportation. Available online at: https://tomcosystems.com/product/co2-transportation/. Accessed September 2022.

Tomhave, D.W., L.D. Shulz. 2004. *Bedrock Geologic Map Showing Configuration of the Bedrock Surface in South Dakota East of the Missouri River.* South Dakota Department of Environment and Natural Resources, Geological Survey.

US Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2008. Plants Database. Retrieved from: http://plants.usda.gov/.

US Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2024. NRCS Conservation Easement Areas by State. USGS/NRCS Geospatial Data Gateway. Retrieved from: https://gdg.sc.egov.usda.gov/GDGOrder.aspx.

U.S. Army Corps of Engineers (USACE). 1987. *Wetland Delineation Manual*. (Wetland Research Program Technical Report Y-87-1) Waterways Experiment Station, Corps of Engineers, Vicksburg, MS. 92 pp.

U.S. Bureau of Economic Analysis, "SAGDP9N Real GDP by state 1" (accessed Monday, October 21, 2024).

U.S. Department of Energy (USDOE)– National Energy Technology Laboratory. 2007. FUTUREGEN Project Final Environmental Impact Statement DOE/EIS-0394. November 2007. Available at https://netl.doe.gov/node/7501.

U.S. Environmental Protection Agency (USEPA). n.d., Water Quality Portal. Available at: https://www.waterqualitydata.us/#statecode=US%3A46&countycode=US%3A46%3A119&sampleMedia=water&sampleMedia=Water&mimeType=csv&providers=NWIS&providers=STEWARDS&providers=STORET.

U.S. Fish and Wildlife Service (USFWS). 1985. Determination of Endangered and Threatened Status for the Piping Plover: Final Rule. U.S. Fish and Wildlife Service, Federal Register 50(238): 50726-50734.

USFWS. 1988. Recovery plan for piping plover breeding in the Great Lakes and Northern Great Plains. U.S. Fish and Wildlife Service, Twin Cities, Minnesota. 160 pp.

USFWS. 1996. Western Prairie Fringed Orchid Recovery Plan (*Platanthera praeclara*). U.S. Fish and Wildlife Service, Ft. Snelling, Minnesota. Available online at: https://ecos.fws.gov/docs/recovery_plan/960930a.pdf.

USWFS. 1999. Final Rule To List the Topeka Shiner as Endangered. U.S. Fish and Wildlife Service, Federal Register 60(240): 69008-69021.

USWFS. 2013. Threatened Status for Dakota Skipper and Endangered Status for Poweshiek Skipperling. U.S. Fish and Wildlife Service, Federal Register 78(206): 63573-63625.

USFWS. 2014a. Fact Sheet Dakota skipper *Hesperia dacotae*. 2 pp. Online at https://www.fws.gov/midwest/endangered/insects/dask/daskFactSheet.html.

USFWS. 2014b. Revised Recovery Plan for the Pallid Sturgeon (*Scaphirhynchus albus)*. U.S. Fish and Wildlife Service, Denver, Colorado. 115 pp. http://www.pallidsturgeon.org/wp-content/uploads/2012/11/Pallid-Sturgeon-Recovery-Plan-First-Revision-signed-version-012914_3.pdf.

USFWS. 2017. Draft Environmental Impact Statement on Issuance of an Incidental Take Permit and Implementation of a Habitat Conservation Plan for the R-Project Transmission Line (May).

USFWS. 2018a. Species Status Assessment report for Topeka shiner (*Notropis topeka*). (Version 1.0). U.S. Fish and Wildlife Service, Region 6, Denver, CO. 281 p. Online at https://ecos.fws.gov/ServCat/DownloadFile/143361.

USFWS. 2018b. Species status assessment report for the Dakota skipper (*Hesperia dacotae*). 97 pp. https://www.fws.gov/midwest/endangered/insects/dask/pdf/Species_Status_Assessment_Dakota_Skipper_September_2018.pdf.

USFWS. 2020a. Wetland Easement Program. U.S. Fish and Wildlife Service. 8 pp. Accessed online 12/2/21 at: https://www.fws.gov/refuges/get-involved/landowners/pdf/Wetland-Ease-Program-Brouchure-508-version.pdf.

USFWS. 2020b. Grassland Easement Program. U.S. Fish and Wildlife Service. 8 pp. Accessed online 12/2/21 at: https://www.fws.gov/refuges/get-involved/landowners/pdf/Grassland%20Easement-Program-Brouchure-508-version.pdf.

USFWS. 2020c. Species status assessment report for the rufa red knot (*Calidris canutus rufa*). Version 1.1. Ecological Services New Jersey Field Office, Galloway, New Jersey. https://www.fws.gov/species/rufa-red-knot-calidris-canutus-rufa.

USFWS. 2021a. South Dakota Listed Species by County List (updated February 12, 2021). U.S. Fish and Wildlife Service, South Dakota Field Office, Ecological Services, Pierre, SD 11 pp Accessed online at: https://www.fws.gov/sites/default/files/documents/SpeciesByCounty_Feb2021.pdf

USFWS. 2021b. Western prairie fringed orchid (*Platanthera praeclara*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Midwest Region Minnesota-Wisconsin Ecological Services Field Office Bloomington, MN 21 pp. Available online at: https://ecos.fws.gov/docs/tess/species_nonpublish/964.pdf.

USFWS 2021c. Birds of Conservation Concern 2021. U.S. Fish and Wildlife Service, Migratory Bird Program. 48 pp. https://www.fws.gov/migratorybirds/pdf/management/birds-of-conservation-concern-2021.pdf.

USFWS 2022. U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form: Danaus plexippus, Monarch butterfly. Region 3. Available online at: https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/publication/4118.pdf.

USFWS. 2023a. Northern Long-Eared Bat Assisted Determination Key – Selected Definitions. March 6, 2023.

USFWS. 2023b. Species Status Assessment for Regal Fritillary (Argynnis (Speyeria) idalia): Eastern Subspecies (Argynnis idalia idalia) and Western Subspecies (Argynnis i. occidentalis) Version 1.0. September 25, 2023. 288 pages.

U.S. Geological Survey (USGS). 2005. *South Dakota Geologic Map Data*. Available online at: mrdata.usgs.gov/geology/state/state.php?state=SD. Accessed November 2014. Accessed December 2021.

USGS. 2006. Ecoregions of North Dakota and South Dakota. Retrieved from: http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/sodak.htm.

USGS. 2014. *U.S. Karst Map.* U.S. Department of the Interior. Available online at: https://pubs.usgs.gov/of/2014/1156/downloads. Accessed December 2021.

USGS. 2019. *Minerals Yearbook Statistical Summary.* Available online at: https://www.usgs.gov/centers/national-minerals-information-center/mineral-industry-south-dakota. Accessed May 2024.

USGS. 2022. U.S. Landslide Inventory across the United States version 2. Available online at: https://www.usgs.gov/data/landslide-inventories-across-united-states-version-2. Accessed June 2024.

U.S. Government Accountability Office. 2023. Sustainable Aviation Fuel: Agencies Should Track Progress Toward Ambitious Federal Goals [Reissued with Revisions May 17, 2023]. GAO-23-105300. Available online at: https://www.gao.gov/products/gao-23-105300. Accessed October 21, 2024.

Weary, D.J., and Doctor, D.H. 2014. Karst in the United States: A digital map compilation and database: U.S. Geological Survey Open-File Report 2014–1156, 23 p., Available online at: https://dx.doi.org/10.3133/ofr20141156.