Consolidated Application for a Certificate of Corridor Compatibility and Route Permit

Project Name:
Summit Carbon Solutions Midwest Carbon Express

Applicant:
SCS Carbon Transport LLC

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Table of Contents

List of Tables

List of Appendices

Acronym List

ACRONYM/TERM	DESCRIPTION
APE	Area of Potential Effect
API	American Petroleum Institute
The Applicant	SCS Carbon Transport LLC
ASME	American Society of Mechanical Engineers
ATWS	Additional Temporary Workspace
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
CCS	Carbon Capture and Sequestration
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
ECD	Erosion Control Device
ECP	Environmental Construction Plan
EI	Environmental Inspector
ESA	Endangered Species Act
ESC	Environmental Survey Corridor
FBE	Fusion Bonded Epoxy
GIS	Geographic Information System
HCA	High Consequence Area
HDD	Horizontal Directional Drill
ICBM	Intercontinental Ballistic Missile
ICCP	Impressed Current Cathodic Protection
IPaC	Information for Planning and Consultation
ISP	Internet Service Provider
MBTA	Migratory Bird Treaty Act
MCE Project	Midwest Carbon Express Project
MLV	Mainline Valve
MMSCF	Million Standard Cubic Feet
MMTPA	Million Metric Tons Per Annum
MOP	Maximum Operating Pressure
MP	Milepost
MPC	Minnkota Power Cooperative

ACRONYM/TERM	DESCRIPTION
MPS	Mainline Pump Station
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDIC	North Dakota Industrial Commission
NDDEQ	North Dakota Department of Environmental Quality
NDDWR	North Dakota Department of Water Resources
NDGFD	North Dakota Game and Fish Department
NDGS	North Dakota Geological Survey
NDPDES	North Dakota Pollution Discharge Elimination System
NDPSC	North Dakota Public Service Commission
NDSHPO	North Dakota State Historical Preservation Office
NEC	National Electric Code
NLCO	National Land Cover District
NLEB	Northern Long Eared Bat
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
O&M	Operation and Maintenance
OCC	Operations Control Center
OD	Outside Diameter
PEM	Palustrine Emergent
PFO	Palustrine Forested
PFYC	Potential Fossil Yield Classification
PHMSA	Pipeline and Hazardous Materials Safety Administration
PRMMP	Paleontological Resource Monitoring and Mitigation Plan
Project	Portion of the MCE Project under ND PSC Jurisdiction
Project area	All areas of temporary, additional temporary workspace, permanent workspace.
psig	Pounds Per Square Inch Gauge
PSS	Palustrine Scrub-Shrub
QA/QC	Quality Assurance and Quality Control
ROW	Right-of-Way
RTTM	Real Time Transient Model
SCADA	Supervisory Control and Data Acquisition
SHSND	State Historical Society of North Dakota
SMYS	Specified Minimum Yield Strength

ACRONYM/TERM	DESCRIPTION
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Places
TPS	Trunkline Pump Station
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
WQC	Water Quality Certification

Combined Corridor Compatibility and Route Permit Application Checklist

AUTHORITY	DESCRIPTION	SECTION
Century Code – Title 49-22 Energy Conversion and Transmission Facility Siting Act		
49-22.1-06 Application for a Certificate of a Site or Corridor		
1.a	Description of size and type of facility	2.1, 2.2.7, and Appendix 1
1.b	Summary of any studies of environmental impacts	5
1.c	Need for the facility	2.2.1
1.d	Site for energy conversion facility	N/A
1.e	Preferred transmission pipeline corridor	2.2.11, Appendix 1
1.f	Analysis of merits and detriments of facility location	4, 5, and 8
1.g	Mitigating measures	10
1.h	Corridor evaluation pursuant to 49-22.1-09 and 49-22.1-03	8 and 9
1.i	Other relevant information	9
49-22.1-07Application for Route Permit		
1.a	Description of size and type of facility	2 and Appendix 2
1.b	Description and location	1, 2.1, 2.2.7, and Appendix 1
1.c	Route evaluation relative to 49-22.1-09 and 49-22.1-03	8 and 9
1.f	Mitigating measures	10 and Appendix 3
1.e	Right-of-way preparation, construction, and reclamation	2.2.12 and Appendix 3
1.f	Statement identifying how: Landowners' information of ROW acquisition How landowners will be compensated	2.2.13

AUTHORITY	DESCRIPTION	SECTION
1.g	Other information the utility considers relevant or the commission requires	9
49-22.1-09 Factors to be Considered in Evaluating Applications and Designation of Sites, Corridors and Routes		
1	Research and investigation into effects of the project on public health, welfare, natural resources, and the environment	5, 7.3, 7.7, 7.9, 8.1, 8.3 and 9.1
2	Effects of transmission technology and design to minimize adverse effects	9.2
3	Potential beneficial uses of waste energy from energy conversion facility	9.3
4	Unavoidable adverse direct and indirect environmental effects	9.4
5	Corridor or route alternatives developed during the hearing which minimize adverse effects	9.5
6	Irreversible and irretrievable commitments of natural resources if designated	9.6
7	Direct and indirect economic impacts of the facility	9.7
8	Existing plans for other developments at or in the vicinity	9.8
9	Effect of project on scenic areas, historic sites and structures, paleontological and archaeological sites	9.10
10	Effect of route on unique biological areas	9.11
11	Problems raised by federal, state, or local entities	9.12
Administrative Code – Article 69-06		
69-06-05-01 Application for Transmission Facility Permit		
2.a.(1)	Type of facility proposed	1.0

AUTHORITY	DESCRIPTION	SECTION
2.a.(2)	Purpose of facility	2.2.1
2.a.(3)	Technology to be deployed	2.2.4
2.a.(4)	Type of product to be transmitted	2.2.5
2.a.(5)	Source of product being transmitted	2.2.5
2.a.(6)	Final destination of product being transmitted	2.2.6
2.a.(7)	Size and design detail and any alternative size and design	2.1, 2.2.1, 2.2.3, and 4
2.a.(7)(a)	The width of right-of-way	2.2.7
2.a.(7)(b)	The approximate length of facility	2.2.8
2.a.(7)(c)	The estimated span length for electric facilities	N/A
2.a.7(d)	The anticipated type of structure for electric facilities	N/A
2.a.(7)(e)	The voltage for electric facilities	N/A
2.a.(7)(f)	The requirement for and general location of any new associated facilities	2.1.2, 2.1.3 and 2.2.10
2.a.(7)(g)	The estimated distance between pipeline surface structures	2.2.8
2.a.(7)(h)	The pipe size	2.1.1
2.a.(7)(i)	The maximum design for pipeline operating pressure and temperature	2.2.1, 2.2.4
2.a.(7)(j)	The maximum design pipeline flow rate	2.2.1, 2.2.3
2.a.(7)(k)	The number and general location of compressor or pumping stations	2.1.2, Appendix 1
2.b	Time Schedule	3
2.b.(1)	Obtaining the certificate of corridor compatibility	3
2.b.(2)	Obtaining the route permit	3

AUTHORITY	DESCRIPTION	SECTION
2.b.(3)	Completing right-of-way acquisition	3
2.b.(4)	Starting construction	3
2.b.(5)	Completing construction	3
2.b.(6)	Testing operations	3
2.b.(7)	Commencing operations	3
2.c	A copy of each evaluative study or assessment of the environmental impact of the proposed facility submitted to the agencies listed in section 69-06-01-05 and each response received	5, Appendices 4, 5, 6, and 8
2.d	Need for the facility	2.2.1
2.e	Description of alternatives	4
2.f	Corridor width	2.2.7, 2.2.11
2.g	Study area to enable the Commission to evaluate the factors in the Century Code section 49-22.1-09	5
2.h	Discussion of factors in Century Code 49-22.1-09 to aid Commission's evaluation	8 and 9
2.i	A discussion of Applicant's policies and commitments to limit the environmental impact of its facilities, including copies of the board resolutions and management directives	10.11
2.j	Map of criteria that led to route location	Appendix 1
2.k	Discuss relative value of each criteria and how the location was selected; how operation will affect criteria	2.2.10, 2.2.11, 8, and 9
2.l	Mitigating measures	10 and Appendix 3
2.m	Qualifications of each person involved in location study	11

AUTHORITY	DESCRIPTION	SECTION
2.n	Map identifying criteria that led to the route location and new facilities	Appendix 1
2.o	8 1/2 x 11 black and white map suitable for newspaper publication	Provided Separately
2.p	Discussion of present and future natural resource development in the area	9.8
2.q	Maps and GIS data meeting NDPSC requirements	Figure 1, Appendix 1; GIS data provided under separate cover
69-06-08-02 Transmission Facility Corridor and Route Criteria		
1	Exclusion areas	8.1
1.a	Designated or registered national: parks, sites, landmarks, monuments, wilderness	8.1.1
1.b	Designated or registered state: parks, sites, monuments, archeological sites, nature preserves	8.1.2
1.c	County parks and recreational areas, municipal parks, parks owned or administered by other governmental subdivisions	8.1.3
1.d	Areas of critical habitat	8.1.4
1.e	Areas where unique or rare species will be irreversibly damaged	8.1.5
1.f	Area within one thousand two hundred feet of intercontinental ballistic missile (ICBM) facility	8.1.6
1.g	Areas within thirty feet of direct line of ICBM launch facilities	8.1.7
2	Avoidance areas	8.2
2.a	Designated or registered national: historic districts, wildlife areas, wild,	8.2.1

AUTHORITY	DESCRIPTION	SECTION
	scenic, or recreational rivers, wildlife refuges, grasslands	
2.b	Designated or registered state: wild, scenic, recreational rivers, game refuges, game management areas, forest management lands, grasslands	8.2.2
2.c	Historical resources which are not specifically designated as exclusion or avoidance areas	8.2.3
2.d	Areas which are geologically unstable	8.2.4
2.e	Within five hundred feet of a residence, school, or place of business	8.2.5
2.f	Reservoirs and municipal water supplies	8.2.6
2.g	Water sources for organized rural water districts	8.2.7
2.h	Irrigated land (does not apply to underground transmission facility)	8.2.8
2.i	Area of recreational significance but not designated exclusion areas	8.2.9
3	Selection criteria	8.3
3.a	Impact on:	8.3
3.a.(1)	Agricultural production	8.3.1
3.a.(2)	Family farms and ranches	8.3.2
3.a.(3)	Land and economically suitable for irrigation	8.3.3
3.a.(4)	Surface drainage patterns and ground water flow patterns	8.3.4
3.b.(1)	Sound sensitive land uses	8.3.5
3.b.(2)	Visual effect on adjacent area	8.3.6
3.b.(3)	Extractive and storage resources	8.3.7

AUTHORITY	DESCRIPTION	SECTION
3.b.(4)	Wetlands, woodlands, and wooded areas	8.3.8
3.b.(5)	Radio and television reception and other communication or electronic facilities	8.3.9
3.b.(6)	Human health and safety	8.3.10
3.b.(7)	Animal health and safety	8.3.11
3.b.(8)	Plant Life	8.3.12
4	Policy criteria	7
4.a	Location and design	7.1
4.b	Training and utilization of instate labor	7.2
4.c	Economies of construction and operation	7.3
4.d	Use of citizen coordinating committees	7.4
4.e	Commitment of portion of transmitted product for use in state	7.5
4.f	Labor relations	7.6
4.g	Coordination of facilities	7.7
4.h	Monitoring of impacts	7.8
4.i	Using existing and proposed rights of way and corridors	7.9
4.j	Other existing or proposed transmission facilities	7.10

1 Introduction

SCS Carbon Transport LLC (the Applicant) submits this single consolidated application for a Certificate of Corridor Compatibility and Route Permit to the North Dakota Public Service Commission (NDPSC) for the Midwest Carbon Express Project (MCE Project) facilities under the NDPSC jurisdiction. The specific scope of this NDPSC application is comprised of approximately 320 miles of carbon dioxide (CO_2) pipelines ranging from 4 to 24 inches and associated facilities (Project) originating at the 1) North Dakota and Minnesota boarder south of Wahpeton, 2) North Dakota and South Dakota border southwest of Ashley, and 3) the Tharaldson Ethanol Plant (Figure 1). The terminus of the Project is located at a pump station in Oliver County, North Dakota, at which point the Applicant's CO_2 storage facilities and related gathering systems will fall under the regularity authority of the North Dakota Industrial Commission (NDIC)

The MCE Project, as proposed, includes approximately 2,000 miles of pipeline for the transportation of CO_2 from industrial facilities located in Iowa, Nebraska, Minnesota, South Dakota, and North Dakota to underground injection control facilities in North Dakota where the CO_2 will be safely and permanently stored approximately a mile underground in saline formations utilizing separately permitted Class VI injection wells (Gale et al., 2015; USDOE, 2020). The Project will include approximately 320 miles of pipeline that will be constructed in North Dakota under the NDPSC jurisdiction and will cross through Burleigh, Cass, Dickey, Emmons, Logan, McIntosh, Morton, Oliver, Richland, and Sargent counties. The Applicant is seeking approval for a Certificate of Corridor Compatibility for a Project Corridor that is 300 feet wide and will align with the centerlines of the mainline, trunkline, and lateral pipeline routes. The Applicant also includes the information necessary to approve the route within 300-foot-wide Project Corridor.

Information provided herein is in accordance with Chapter 49-22.1 of the North Dakota Century Code (NDCC), Section 69-06-08-02 of the North Dakota Administrative Code (NDAC) and NDPSC's Energy Conversion and Transmission Facility Siting Guidelines. The Combined Corridor Compatibility and Route Permit Application Checklist (see pages ix through xiv) outlines the information required to obtain a combined Corridor Certificate and Route Permit and where those requirements are addressed within this application.

2 Description of Proposed Facility

The Project under jurisdiction of the NDPSC consists of a series of laterals, trunklines, and a mainline pipeline to collect dense phase or supercritical CO_2 from industrial facilities in North Dakota and transport the dense phase or supercritical CO_2 from industrial facilities in other states to permanent geologic sequestration sites in North Dakota under the jurisdiction of the NDIC.

Approximately 320 miles of pipeline under the NDPSC jurisdiction will be constructed in North Dakota and will cross through 10 counties. A summary of the pipeline mileage for each county is provided in Table 2.

Table 2: Project Location

COUNTY	MAINLINE (MILES)	TRUNKLINE (MILES)	LATERALS (MILES)
Burleigh	41.2	--	--
Cass	--	--	22.0
Dickey	--	36.8	--

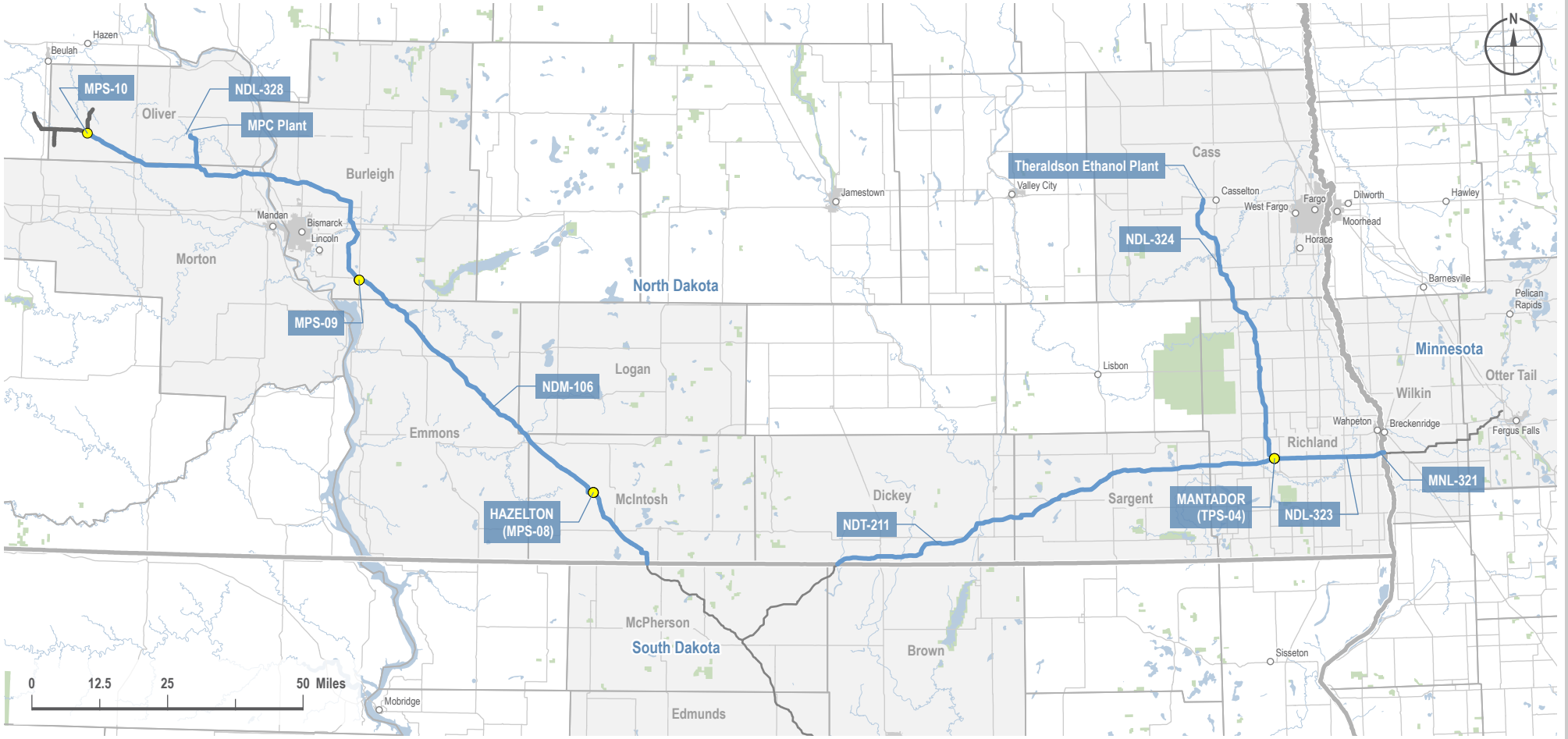
Table 2: Project Location

COUNTY	MAINLINE (MILES)	TRUNKLINE (MILES)	LATERALS (MILES)
Emmons	37.0	--	--
Logan	1.8	--	--
McIntosh	34.3	--	--
Morton	22.9	--	0.1
Oliver	12.7	--	6.4
Richland	--	12.2	53.1
Sargent	--	39.5	--
Total	**149.9**	**88.5**	**81.6**

The proposed pipeline will cross under roads, railroads, waterbodies, and other resources as they are encountered along the route. In North Dakota, the pipeline will be installed at a minimum of 48 inches below the ground surface (ground level to top of pipe) and will cross primarily agricultural and undeveloped lands. The minimum depth of cover will be increased to 60 inches at waterbody and drainage ditch crossings as well as private road crossings as measured at the bottom of the road ditch. Additionally, the depth of cover will be increased to 72 inches at undeveloped section lines per NDPSC requirements. The Applicant will utilize temporary construction workspace that typically varies from 50 to 110 feet wide, plus additional temporary workspace (ATWS) as needed, to facilitate construction.

In addition to the pipelines, the Project will include the construction of aboveground facilities (pump stations, pig/inspection tool launcher and receiver sites, and mainline valves [MLV]), and permanent and temporary access roads. The location of the pipelines and pump stations are provided in Figure 1, maps in Appendix 1, and discussed in Section 2.1.2 below.

PROJECT OVERVIEW MAP - NORTH DAKOTA



Disclaimer: Content on this figure is preliminary, and must be treated as confidential and proprietary. Sources are believed to be reliable and SCS does not assume responsibility for accuracy of data.

VICINITY MAP

LEGEND

- Proposed Centerline
- Summit Pipeline System
- Pump Station
- County Boundary
- State Boundary
- City / Town
- Urban Area
- Highway
- Sequestration Facilities under NDIC Authority
- River / Stream
- Waterbody
- Federal Land

PREPARED BY

Summit Carbon Solutions
2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com

REVISIONS

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Project Overview Map
North Dakota

Figure Number:
Figure 1.1

Scale:
1 : 1,750,000
1 inch equals 27.62 miles

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14N

Sheet:
1
1 of 1

Drawing Number:
1003-01-007
Revision 0

Path: I:\Projects\TAL-21015451-00 - Summit Carbon - MCE Project\0800 GEO\10_Mapping\02 Overview\01 General\1003-01-007 ND PSC Overview Mapping\APRX\1003-01-007 BW.aprx

2.1 Pipeline Design

The proposed pipeline and associated facilities will be designed, constructed, inspected, tested, and operated in accordance with applicable requirements and regulations, including, without limitation, the U.S. Department of Transportation (USDOT) regulations in Title 49 Code of Federal Regulations (CFR) Part 195, Transportation of Hazardous Liquids by Pipeline, American Society of Mechanical Engineers (ASME) Standard B 31.4, and American Petroleum Institute (API) Standard 1104 Welding of Pipelines and Related Facilities. The pipeline will be constructed of high-strength carbon steel pipe, exceeding the API 5L Pipe Specification. API 5L is the industry standard specification for seamless and welded steel line pipes used in pipeline transportation systems, including the energy industry.

These regulations and industry standards specify pipeline and associated facilities materials and qualification; minimum design and operating requirements; inspection and testing requirements; protection from internal, external, and atmospheric corrosion; and other controls to mitigate the risk of a pipeline incident while providing protection for the public and environment.

2.1.1 Type, Size and Design Flow, Pressure, and Temperature

The Project (Figure 1) will receive CO_2 from industrial facilities and deliver the CO_2 to a metering site within launcher and receive site, PLR-28, near the Minnkota Power Cooperative (MPC) and to a discharge flange located with pump station, MPS-10 in Oliver County, North Dakota, via a series of interstate pipelines including laterals, trunklines, and mainline comprising the larger MCE Project. The pipelines will be manufactured in the United States using a high-frequency electrical resistance welded or double submerged arc welded process. The seam joint factor, according to Title 49 CFR Part 195.106, will be 1.00. Pipeline design specifications are included in Table 2.1.1.

Based upon volume requirements and pressure service, pipe segments will range in size from 4.5 to 24 inches outside diameter (OD) and have a wall thickness ranging from 0.189 inches to 0.750 inches. Pipe wall thickness categories are 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). To protect against corrosion, an external fusion bonded epoxy (FBE) coating will be applied to the pipeline, and an impressed current cathodic protection (ICCP) system will be used. Pipeline installed by trenchless methods, such as by HDDs, and all road crossings will also have an Abrasion Resistant Overcoat installed as a secondary coating, over the FBE, prior to installation.

The mainline pipeline has been designed as follows:

- Maximum Operating Pressure (MOP): 2,183 pounds per square inch gauge (psig).
- Maximum Discharge Pressure (at pump stations or capture facilities): 2,150 psig.
- Typical Operating Pressure: 1,200 to 2,150 psig.
- Design Temperature (above grade piping): -50 to 120 degrees Fahrenheit.
- Design Temperature (below grade piping): 23 to 120 degrees Fahrenheit.
- Anticipated CO2 Stream Temperature Range: 30 to 115 degrees Fahrenheit.
- Maximum Design Flow Rate: 936 million standard cubic feet (MMSCF) per day which is approximately equivalent to 18 million metric ton per annum (MMTPA) of CO_2.

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 (SMYS) 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 Title 49 CFR Part 195.106.

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 scratches. The launchers and receiver facilities 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 at standalone sites in Oliver County.

Table 2.1.1: Project Design Specifications and Operating Parameters

PROJECT FEATURE	DESIGN SPECIFICATIONS AND OPERATING PARAMETERS
Pipeline Design Specifications	
Pipe Size (outside diameter)	4.5 - to 24-inch outside diameter
Pipe Type	High-strength carbon steel (API 5L)
Nominal Wall Thickness in Inches	0.189- to .750-inch
Pipe Design Factor	0.72
Longitudinal or Seam Joint Factor	1.00
Specified Minimum Yield Strength	52,000 – 70,000 pounds per square inch (psi)
Tensile Strength	66,700 – 82,000 psi
Flow Rate	
Expected Normal Flow Rate	18 million metric ton per annum (MMTPA) of CO_2
Maximum Design Flow Rate	936 MMSCFD, which is approximately 18 MMTPA of CO_2
Operating Pressure	
Operating Pressure	1,200 pounds per square inch gauge (psig) to 2,150 psig
Maximum Operating Pressure	The Maximum Operating Pressure as defined in Title 49 CFR 195 is 2,183 psig.
Operating Temperature	
Operating Temperature	115 to 30 degrees Fahrenheit
Maximum Operating Temperature	120 degrees Fahrenheit
Description of associated facilities	Pump stations; MLVs; launcher and receivers; temporary and permanent access roads
Product Capacity Information	
Planned Minimum and Maximum Design Capacity or Throughput	Minimum: 0 MMTPA Maximum: 18 MMTPA (see Section 3.3.2)
Product Description	CO_2

2.1.2 Aboveground Facilities

The Project will include approximately 34 permanent aboveground facilities. Table 2.1.2 provides a summary of permanent and temporary facilities for the Project in North Dakota.

Table 2.1.2: Facilities		
PROJECT FACILITIES	**PERMANENT**	**TEMPORARY**
Pump Stations	4	--
Launcher-Receivers	5[1]	--
Mainline Valves	28[2]	--
Access Roads	25	34

[1] Three launcher-receiver facilities are located within MPS-09 and TPS-04
[2] Twenty MLVs will be standalone. Eight MLV sites are located within the permanent footprint of other facilities.

2.1.2.1 Mainline Valves and ICCP System

The Applicant plans to construct one MLV within pump station MPS-08, one MLV within pump station MPS-09, one MLV within pump station MPS-10, three MLVs within pump station TPS-04, and one within each standalone launcher-receiver site PLR-23 and PLR-28, and 20 intermediate standalone MLVs along the Project route. The 20 intermediate standalone 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 right-of way (ROW). These intermediate valve sites will be located within a permanent aboveground easement obtained from landowners. The purpose of an MLV is to isolate segments of the pipeline during normal and abnormal operations. All MLVs in will be remotely controlled and will have power supplied by local utilities and where that is not practical, a solar power generation unit will be utilized. All MLVs will have an upstream and downstream pressure transmitter as well as temperature transmitter. Construction of intermediate MLV sites will start with civil pad work, followed by foundation installation, pipe and electrical installation, and finally commissioning activities. The typical layout of MLVs has been included in Appendix 2.

The spacing intervals between the MLVs were designed in accordance with Title 49 CFR Part 195.260, which requires the consideration of CO_2 release dispersion modeling where CO_2 in concentrations greater than 15,000 ppm could affect populated or unusually sensitive areas. In addition, the valve spacing complies with PHMSA's Final Rule published on April 8, 2022, prescribing new valve spacing requirements for gas and hazardous liquid and CO_2 pipelines. Newly constructed or "entirely replaced" hazardous liquid and CO_2 pipelines installed after April 10, 2023, are subject to new valve spacing requirements of 15 miles for segments located in or that could affect high consequence areas (HCAs) and 20 miles for non-HCA segments. In the unlikely event of an emergency, these valves can be manually or remotely activated to isolate sections of the pipeline and minimize potential impacts. The Applicant is currently evaluating communication systems that will utilize a cell modem with satellite backup for communications from valve sites back to the pipeline control center. Table 2.1.3 summarizes the projected MLVs associated with each respective pipeline. The planned locations of the MLV are provided in the map books in Appendix 1.

Table 2.1.3: Mainline Valve Locations			
VALVE NUMBER	**MILEPOST**	**COUNTY**	**PERMANENT AREA (ACRES)**
NDM-106 (Mainline)			
MLV-106-03	32.83	McIntosh	0.06
MLV-106-04	51.07	McIntosh	0.06
MLV-106-04-A	66.88	Emmons	0.06
MLV-106-05	88.43	Emmons	0.06
MLV-106-06 MPS-09	105.52	Burleigh	0.00[1]
MLV-106-08	121.04	Burleigh	0.06
MLV-106-09	138.46	Burleigh	0.06
MLV-106-10	141.70	Morton	0.06
MLV-106-12 MPS-10	175.65	Oliver	0.00[1]
NDT-211 (Trunkline)			
MLV-211-01 TPS-05	0.05	Richland	0.00[1]
MLV-211-02	20.29	Sargent	0.06
MLV-211-03	38.63	Sargent	0.06
MLV-211-04	57.96	Dickey	0.06
MLV-211-05	58.97	Dickey	0.06
MLV-211-06	76.00	Dickey	0.06
MLV-211-06-A	79.98	Dickey	0.06
MLV-211-07	86.14	Dickey	0.06
MLV-211-08	88.46	Dickey	0.06
NDL-324 (Lateral)			
MLV-324-01	0.00	Cass	0.00[1]
MLV-324-01-A	16.03	Cass	0.06
MLV-324-02	24.27	Richland	0.06
MLV-324-03	29.70	Richland	0.06
MLV-324-03-A	41.24	Richland	0.06
MLV-324-04 TPS-04	54.65	Richland	0.00[1]
MNL-321 (Lateral)			
MLV-321-05	28.38	Richland	0.06
NDL-323 (Lateral)			
MLV-323-01 TPS-04	16.95	Richland	0.00[1]
NDL-328 (Lateral)			
MLV-328-01	0.00	Oliver	0.00[1]
MLV-328-02[2]	6.55	Morton	0.00[1]
TOTAL	--	--	**1.2**

Notes:

[1] Located within another project facility. No additional disturbance.

[2] MLV-328-02 is also located at MP 151.6 of NDM-106 (within PLR-23)

The Applicant will install an ICCP system along the buried pipeline 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. The ICCP system components will be located within MLV footprints and the permanent ROW. The ICCP system will be continuously monitored and maintained for the life of the pipeline system.

The Applicant may determine the need for AC/DC mitigation where necessary to protect the pipeline and the ICCP system from the corrosive electromagnetic voltage and stray current from nearby electric powerlines. AC/DC mitigation systems, if required, will be installed within the permanent ROW.

2.1.2.2 Pump Stations

The four pump stations in North Dakota (Trunkline Pump Station [TPS] -04 and Mainline Pump Station [MPS] -08, -09, and -10) will be located in Richland, McIntosh, Burleigh, and Oliver counties, respectively (locations are included on Figure 1 as well as the map book located in Appendix 1). The typical layout of pump stations has been included in Appendix 2. Pump station sites will be acquired by the Applicant in fee, where possible. Construction of pump stations will start with civil pad work, followed by foundation installation, pipe and electrical installation, and finally commissioning activities. Pump stations will have security fence around the perimeter. All pumps and major equipment will be installed within a shelter.

Pump stations will be accessed using temporary access roads during construction which will be converted to and used as permanent access roads during operations. Pump stations will be designed and constructed to meet the requirements of ASME *Pipeline Transportation Systems for Liquids and Slurries Standard* (ASME B31.4), and relevant standards published in the National Electric Code. Each pump station will contain up to three pumps driven by electric motors, an electrical building, electrical substation, a pump shelter building, communications equipment, and parking area for station personnel. The Applicant will purchase electricity for its pump stations from local power providers. It is anticipated that the installed horsepower will range between 300 and 10,050 horsepower, including a fully redundant spare pump and motor. Actual power use will range between 100 and 5,000 horsepower, requiring 75 to 3,800 kilowatts of electricity.

Pump stations will utilize electricity for all pumps, lights, and heating in the buildings. Pump stations will be fully automated for unmanned operation. Remote start/stop set point controls and unit monitoring 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 monitoring and control equipment for communications between the pump station and the pipeline control center 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.

The Applicant is currently evaluating communication systems. The preferred communication method for pump stations will be through a local Internet Service Provider (ISP), 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 in height.

Pump station TPS-04 will be located at the junction of pipelines NDL-323, NDL-324 and NDT-211 in Richland County (NDT-211 milepost [MP] 0.0) – lateral lines NDL-323 and NDL-324 will terminate at the pump station, and trunkline NDT-211 will originate at the pump station. Pump Station TPS-04 will be 2.3 acres in size.

Pump station, MPS-08, will be located in McIntosh County along mainline NDM-106 at MP 43.9 and be approximately 4.3 acres in size. MPS-09 will be located in Burleigh County along mainline NDM-106 at milepost 105.5 and be approximately 3.5 acres in size. MPS-10 will be located in Oliver County at the terminus of NDM-106 at MP-173.8 and be approximately 2.9 acres in size.

2.1.2.3 Pig/Inspection Tool Launchers and Receivers

All pipeline segments will be piggable which requires two standalone launcher-receiver facilities (PLR-23 and PLR-28) that will be constructed along the Project route. Additional launcher-receivers will be collocated within pump stations MPS-09 and TPS-04. Within MPS-09 there will be one launcher and one receiver and within TPS-04 there will be two receivers and one launcher. The launcher will allow for insertion of internal maintenance and inspection devices (commonly referred to as "pigs"), which are designed to travel through the pipeline to detect internal and external anomalies in the pipe such as corrosion, dents, and other irregularities or to clean the pipeline and remove liquids. PLR-28 will be constructed at the terminus of lateral NDL-328 in Oliver County (NDL-328 MP 0.0) and PLR-23 will be constructed where lateral NDL-328 connects with mainline NDM-106 (NDM-106 MP 151.7). PLR-23 will be 0.23 acres in size and PLR-28 will be 5.74 acres in size.

2.1.3 Permanent and Temporary Access Roads

The Applicant will access the Project construction workspace via intersecting public roads, new permanent access roads, and new temporary access roads. Specifically, the Project will require approximately 59 access roads to be constructed during the project. Approximately thirty-four of these access roads will be constructed for temporary access roads to the construction area and will be removed following construction. Approximately twenty-five permanent access roads will be constructed for access during construction of the Project and will remain as access roads for continuing Project operations. Permanent access roads will provide access to approximately 21 MLVs and the four pump stations. All temporary access roads will be approximately 30 feet wide while and permanent access roads will generally be 20 feet wide but may vary in width up to 50 feet wide depending on site specific construction requirements. The access roads will be constructed by grading and applying gravel as required to provide a drivable surface and to prevent rutting. 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. All existing dirt or gravel roads used as temporary access roads will be restored. The locations of the access roads are shown in the maps in Appendix 1. Table 2.1.4 provides a summary of the anticipated number of access roads that will be utilized for each pipeline.

Table 2.1.4: Permanent and Temporary Access Roads

ACCESS ROAD	TOTAL NO. PERMANENT	AREA (ACRES)	TOTAL NO. TEMPORARY	AREA (ACRES)
Mainline				
NDM-106	11	0.84	9	17.12
Trunkline				
NDT-211	8	0.21	16	11.05
Laterals				
NDL-323	0	0.00	1	0.05
NDL-324	6	0.27	8	2.77
MNL-321	1	0.03	0	0.00
TOTAL	**25**	**1.34**	**34**	**31.85**

2.2 Design of the Proposed Facility

To comply with the regulations, industry standards, and the Applicant's internal quality standards, the Applicant will implement a Quality Assurance and Quality Control (QA/QC) Plan. The QA/QC Plan 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 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 Operations Control Center (OCC) and field personnel prior to commencement of operation.

2.2.1 Purpose and Need

The Applicant proposes to build a carbon capture, transmission, and sequestration MCE Project with the capacity to move and sequester up to 18 MMTPA of CO_2 from participating industrial facilities in North Dakota, as well as CO_2 from industrial facilities in Minnesota, South Dakota, Iowa, and Nebraska. Sequestration will occur in North Dakota and will be permitted by the NDIC.

The Applicant has long-term offtake agreements in place with 32 participating ethanol plants in its five-state footprint. Utilizing the MCE Project will enable participating ethanol plants and other industrial facilities to reduce their carbon intensity or footprint by as much as 50 percent. Doing so mitigates ethanol's environmental impacts and improves its 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, such as ethanol, in the future.

Without the MCE Project, ethanol plants in the five-state footprint lack a viable option to capture and permanently store their CO_2 emissions, because most states do not have proven subsurface geologic formations capable of economically storing the volume of CO_2 the plants produce. The MCE Project provides a CO_2 transportation and sequestration solution.

The MCE Project provides benefits not only for the ethanol industry, but for an even broader segment of the public, including the agriculture industry with which it partners. The Applicant has offered, and will continue to offer, carbon capture, transportation, and storage services to a variety of industrial facility owners in North Dakota and surrounding states, which for the first time, provides these producers a viable opportunity to reduce their carbon emissions. These facilities include other ethanol plants, nitrogen production, and more, which are undergoing pressure to reduce their carbon footprints.

In addition to these benefits, the MCE Project will generate significant tax revenue, including from the sale and use of goods and services during construction, and long term as required to operate and maintain the MCE Project, along with significant local property taxes.

The MCE Project will play an important role in reducing greenhouse gas emissions. As governments, industries, and consumers seek to reduce carbon emissions, a dramatic increase in carbon capture and sequestration (CCS), as well as associated pipelines, is crucial to achieving that goal. The MCE Project will reduce North Dakota's yearly CO_2 emissions by up to 0.54 MMTPA. The MCE Project will be capable of moving up to 18 MMTPA of CO_2 for safe and permanent storage, which is the equivalent of removing approximately 3.6 million cars from roads on an annual basis. Once operational, the MCE Project will provide the largest and single most meaningful technology-based reduction of carbon emissions in the world.

The MCE Project also represents the safest mode for transporting CO_2. As compared to rail and truck transportation, pipelines are the safest, most efficient, and most reliable means to transport fluids (i.e., liquids and gases), 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).

2.2.2 General Area to be Served

The Project will collect CO_2 from the existing Tharaldson Ethanol Plant in Cass County, North Dakota and transport it as well as CO_2 collected from other states, as part of the greater MCE Project, through North Dakota to a sequestration area located in Oliver and Mercer counties which are under NDIC permitting jurisdiction.

2.2.3 Capacity

The Project will be capable of capturing and safely transporting up to 18 MMTPA of CO_2, of which 0.54 MMTPA will originate from a plant in North Dakota.

2.2.4 Technology to be Deployed/Employed

At the emissions source, CO_2 will be captured and compressed into a dense phase for transportation. The CO_2 will then be transported by pipeline to the sequestration site where it will be injected into suitable geologic formations for permanent storage. Pursuant to existing PHMSA regulations, the Project will have an OCC located in Ames, Iowa (primary location). The OCC will employ experienced and trained staff who will continuously monitor and control pipeline operations. A Supervisory Control and Data Acquisition (SCADA) system will communicate with all field sites and provide real time information of the system's operations. Data such as pressure and flow will be trended to ensure pipeline operation is maintained within established, safe operating parameters. OCC personnel will have the capability to remotely shut down pump stations and isolate pipeline segments in the event abnormal operating conditions are observed.

A Real Time Transient Model (RTTM) leak detection system will be deployed. The RTTM is a real time hydraulic model of the pipeline system that runs in parallel to the SCADA system. If the monitored pressures and flows of the pipeline do not match the hydraulic model, the OCC is notified to investigate. Alarms will be established for pipeline controllers if the analysis detects a potential leak profile. If sudden pressure loss occurs, MLVs will automatically close to prevent uncontrolled release events per PHMSA regulations.

O&M procedures will be developed for training of and use by 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 Title 49 CFR Part 195.412. The pipeline permanent ROW will be patrolled not less than 26 times annually via walking, driving, flying or other appropriate mean of traversing the ROW. These inspections will check for abnormal conditions/appearances or dangerous activity (unauthorized excavation, unauthorized construction, etc.).

2.2.5 Product

The Project will capture CO_2 from the existing Tharaldson Ethanol Plant in Cass County, North Dakota and will also act as a carrier for CO_2 from multiple source generators as part of the larger MCE Project. The captured CO_2 will be high purity (i.e., greater than 96% CO_2) which is typical of CO_2 captured from the ethanol fermentation process near ambient temperature and pressure. Capture facilities at the source generators will further increase the CO_2's purity by removing water and ethanol vapor, before compressing the CO_2 into a dense phase prior to injection into the pipeline. Dense phase, or supercritical state, CO_2 will be the product transported in the pipeline.

2.2.6 Final Destination of Product

The CO_2 captured by the MCE Project will be securely stored in suitable underground geologic formations in Oliver and Mercer counties, North Dakota that are under the jurisdiction of the NDIC.

2.2.7 Width of Right-of-Way

The total land requirement for construction of the pipeline (or, the footprint of the pipeline construction workspace) is approximately 4,284 acres of land. For lines NDT-211, NDL-323, NDL-324, and MNL-321, a

construction ROW width of 100 feet will be needed to accommodate soil storage and allow for the safe operation of construction equipment associated with the installation of the new pipelines. For lines NDL-328, and NDM-106, a construction ROW width of 110 feet will be needed given the larger pipe diameter. SCS will reduce the construction ROW width to 75 feet in wetlands and at waterbodies. The construction workspace will be further reduced to 50 feet wide at HDD or bore crossings of waterbodies, roads, and railroads if a travel lane is not needed across the feature. The construction workspace will allow for temporary storage of spoil excavated from the pipeline trench, staging of the pipe, and safe travel and operation of construction equipment. Once construction has ended, temporary workspace will be allowed to revert to prior vegetation and use. A summary of the ROW requirements and footprint impacted for the Project pipelines is provided in Table 2.2.1.

Of the approximate 4,284 acres of land initially disturbed, the Applicant will retain approximately 1,959 acres as the permanent pipeline ROW, which includes the footprints of the 20 intermediate MLVs located in the permanent ROW. The permanent ROW will generally be 50-feet-wide, centered on the pipeline and will be wholly contained within the construction workspace.

Table 2.2.1: Right-of-Way and Footprint Required

PIPELINE	PERMANENT ROW AND FOOTPRINT		CONSTRUCTION ROW AND FOOTPRINT				NORTH DAKOTA PROJECT TOTAL AREA (ACRES)
	WIDTH (FEET)	AREA (ACRES)	TYPICAL WIDTH (FEET)1	TEMPORARY CONSTRUCTION AREA (ACRES)	ATWS (ACRES)	TOTAL TEMPORARY CONSTURCTION AREA (ACRES)	
Mainline							
NDM-106	50	**919.0**	60	1,068.9	132.2	**1,201.1**	**2,120.1**
Trunkline							
NDT-211	50	**538.3**	50	503.2	92.5	**595.7**	**1,134.0**
Laterals							
NDL-323	50	**102.6**	50	99.9	6.1	**106.0**	**208.6**
NDL-324	50	**332.8**	50	322.9	23.9	**346.7**	**679.5**
NDL-328	50	**45.4**	60	46.1	7.2	**53.4**	**98.8**
MNL-321	50	**20.8**	50	20.5	1.5	**22.0**	**42.8**
TOTAL	--	**1,958.9**	--	**2,061.5**	**263.4**	**2,324.9**	**4,283.8**

[1] Temporary construction area may vary depending on site specific conditions (i.e., wetland crossings)
NOTE: Discrepancies in acreage totals are due to rounding.

The Applicant will also use ATWS outside of the 50-110-foot-wide construction workspace to facilitate specific aspects of construction. The estimated total acreage of ATWS needed for the Project is included in the construction workspace acreage in Table 2.2.1. ATWS is typically used to stage equipment near waterbody, wetland, road, railroad, and foreign utility crossings, steep slopes, and for staging equipment and materials for specialized construction methods. Impacts from ATWS are temporary; ATWS will be restored to the original land use following construction. Dimensions of each ATWS will vary according to site-specific needs. Table 2.2.2 presents the typical dimensions of ATWS that will be used for pipeline construction for various types of features.

Table 2.2.2: Typical Dimensions of ATWS	
FEATURE	**APPROXIMATE DIMENSIONS ON EACH SIDE OF FEATURE (FEET)[1]**
Horizontal directional drills (waterbodies, highways, railroads)	200 x 50 on each side of the feature near the drill entry and exit points; an additional drill pullback ATWS may be required (e.g., 100 x 50) based on workspace alignment.
Open-cut or bored roads	100 x 25
Open-cut or bored waterbodies	75 x 30
Foreign pipeline/utility/other buried feature crossings	100 x 30
Traditional wetland crossings	75 x 30
Side hill slopes	Length of area x 25 (or larger if needed)
[1] Approximate dimensions will vary depending on site specific construction needs.	

2.2.8 Estimated Distance between Surface Structures for Pipeline Facilities

The Project pipelines are primarily installed underground. Unlike powerline facilities, there are few aboveground structures or facilities along the pipelines. As indicated in Section 2.1.2, four pump stations will be constructed as part of the Project across the 320 miles of pipeline in North Dakota. These pump stations will be overlaid on the permanent pipeline ROW and will be placed at strategic locations to ensure the consistent flow of the CO_2. Additional aboveground structures will be minor facilities such as pipeline markers, MLVs, and the standalone launcher and receiver facilities. Pipeline markers are placed along the ROW according to PHMSA regulations. MLVs and launcher and receiver facilities are generally placed miles apart, and the locations are based on regulatory requirements and operational needs. The planned locations of the pump stations and MLVs are depicted on the maps in Appendix 1. Pipeline markers are installed after construction and prior to operations.

2.2.9 Estimated Total Cost of Construction

The MCE Project is expected to have a $4.5 billion capital investment . The cost to build the portion of the MCE Project located in North Dakota (pipeline and associated facilities) is estimated at $898 million (E&Y 2022).

2.2.10 Preferred Location of Facility

In North Dakota, the Project is comprised of approximately 149.9 miles of mainline, 88.5 miles of trunkline, and 81.6 miles of lateral pipelines. The pipelines will cross through Burleigh, Cass, Dickey, Emmons, Logan, McIntosh, Morton, Oliver, Richland, and Sargent counties as shown on the map books in Appendix 1 and Figure 1. The location of the pump stations, MLVs, and launcher and receiver facilities are dictated by the location of the pipeline (see Sections 2.1.2.2 and 2.1.2.3) and operational and regulatory requirements.

The Applicant requests that the NDPSC issue a route permit consistent with the Project routes depicted in Appendix 1 and that said permit include a route deviation buffer of up to 150 feet directly adjacent to each side of the proposed route. The request provides flexibility during construction to allow for minor adjustments to accommodate landowner requests, environmental and culturally sensitive areas, and other unforeseen conditions during construction.

2.2.11 Preferred Location of Corridor

The Applicant is seeking approval of an approximately 300-foot-wide corridor (Project Corridor) generally centered on the proposed Project route and that generally aligns with the environmental survey corridor (ESC) used for

conducting environmental and cultural field surveys. The location of the 300-foot-wide corridor is provided on the map books in Appendix 1.

2.2.12 Description of ROW Preparation and Construction and Reclamation Procedures

2.2.12.1 Pipeline Construction

The Applicant will follow all regulations and industry-standard practices and procedures during construction, which involve a series of distinct activities conducted in a linear sequence. Pipeline construction activities will include clearing and grading, topsoil segregation, trenching, pipe stringing, bending, welding, pipeline installation and backfilling, hydrotesting, and restoration. Prior to construction, a survey crew will survey and stake the pipeline centerline and the limits of the construction ROW and additional ATWS areas. One-Call requests will be submitted and completed prior to any ground-disturbing activity that may occur as part of these steps. Wetland boundaries, waterbodies, other environmentally sensitive areas, and existing foreign utility lines will be marked.

Clearing and Grading

Following the surveys, the construction ROW will be cleared of vegetation. Cleared vegetation along the ROW will be disposed of in accordance with federal, state, and local regulations. Agricultural areas with crops present will be mowed or disced to ground level unless the landowners request for and remove the crops themselves. 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 areas directly over the trench or where ATWS is needed to ensure a safe work area.

Generally, no clearing of the surface between HDD entry and exit locations will occur, with the exception of limited hand clearing as necessary between HDD entry and exit locations to facilitate placement of “true tracker” wire and allow access for water for hydrostatic testing, where needed. Minor clearing activities may occur at bore locations where equipment bridges may occur. All clearing and grading work will be conducted in accordance with applicable permits.

Erosion control devices (ECDs) will be installed during or immediately following initial soil disturbance, but prior to grading activities, as site and as seasonal conditions warrant. If disturbance activities occur at the base of a sloped area near wetlands, waterbodies, water conveyances, or roads, ECDs will be installed prior to any ground disturbing activity to prevent erosion and siltation of waterbodies and wetlands downslope. Temporary ECDs will remain in place until the area is revegetated (See Appendix 3: Environmental Construction Plan [ECP] Sections 3.1, 4.2 and 5.2.)

Topsoil Segregation

Topsoil and subsoil will be separated when stripping the topsoil in certain areas. When separated, topsoil piles will be stabilized to reduce loss from erosion by utilizing measures such as sediment barriers, mulch, temporary seeding, or tackifiers, where necessary. Topsoil will be segregated where required by state regulation or as required by a landowner. In unsaturated wetlands, topsoil will normally be segregated up to a maximum of 12 inches per U.S. Army Corps of Engineers (USACE) requirements. Topsoil removal and segregation will not occur in wetlands which are saturated at the time of construction (See Appendix 3: ECP Section 2.7.2).

Topsoil cannot be used for padding the pipe, temporary erosion control methods such as slope breakers or trench plugs, roads, or as fill material. Topsoil removal will not be required where the pipeline is installed by plowing, jacking, boring, or other methods that do not require the opening of a trench.

Topsoil stockpile heights must not exceed 35 feet and slope must be 2:1 or flatter. Where applicable, topsoil and subsoil piles will be placed so that at least a 1-foot of separation will be maintained between the piles to prevent mixing. If a 1-foot separation gap cannot be maintained, approval from the Environmental Inspectors (EI) may be given to utilize a physical barrier such as a silt fence, geotextile fabric, or thick layer of mulch. Topsoil may be

tackified in excessive wind conditions. Once an area or stockpile is disturbed, it should be mulched and/or seeded per temporary stabilization guidelines within seven days if it will not be re-disturbed within 14 days.

Trenching

Trenching will consist of excavation of a ditch for pipeline placement using a trenching machine, backhoe, or similar equipment. Trench spoil will be deposited adjacent to the trench within the construction work areas with topsoil segregation utilized where necessary based on land use and/or landowner specifications. In standard conditions, the trench will be excavated to an approximate depth to allow for a minimum of 48 inches of cover over the pipe (See Appendix 3: ECP Section 3.2). Prior to trenching, contractors will submit One-Call requests per the Project's Damage Prevention Plan (Appendix 4).

Pipe Stringing, Bending, Welding and Inspection

Before or after trenching the new pipe will be strung and distributed along the ROW parallel to the trench. Once in place along the ROW, pipe lengths will be aligned, bends fabricated, and joints welded together on skids (i.e., temporary supports). Welding will be performed in accordance with Title 49 CFR Part 195 and API Standard 1104 Welding of Pipelines and Related Facilities, PHMSA regulations, and company welding specifications. Welds will be visually and radiographically inspected to ensure there are no defects and coated for corrosion protection.

Pipe Installation and Trench Backfilling

Prior to lowering-in the pipe, the trench will be visually inspected to ensure that it is free of rock and other debris that could damage the pipe or the coating. Completed sections of pipe will be lifted off the temporary supports by side boom tractors or similar equipment and placed into the trench. Tie-in welding and pipeline coating will occur within the trench to join the newly lowered-in section with the previously installed sections of pipe. After lowering-in the trench will be backfilled with the previously excavated material (See Appendix 3: ECP Section 3.3).

Hydrostatic Testing

The pipeline will be hydrostatically tested in accordance with Title 49 CFR Part 195 regulations prior to being placed into service. Test operations will occur following construction of the Project. Hydrostatic testing involves filling installed segments of the new pipeline with water, which will be appropriated from surface water, municipal, or groundwater sources

Restoration and Reclamation

After construction, the construction ROW will be restored to preconstruction conditions to the extent practicable. Temporary and permanent stabilization measures such as slope breakers, mulching, and seeding will be implemented where appropriate; fences removed for pipeline installation will be re-built as appropriate; and the land will be returned as close as practicable to its preconstruction use. Disturbed areas will be revegetated in accordance with ECP (Sections 5.5 and Section 7 in Appendix 3).

2.2.12.2 Facilities Construction

Construction of pump stations would start with civil pad work, followed by foundation installation, pipe and electrical installation, and finally commissioning activities. Pump stations will have security fence around the perimeter. All pumps and major equipment will be installed within a shelter. Pump stations will be designed and constructed to meet the requirements of American Society of Mechanical Engineers' *Pipeline Transportation Systems for Liquids and Slurries Standard* (ASME B31.4), and relevant standards published in the National Electric Code (NEC).

2.2.12.3 Special Construction Procedures & Other Construction Procedures

The ECP (Appendix 3) identifies specific construction procedures and protocols for adverse weather, drain tiles, terraces, waterbodies, wetlands, and irrigation systems (See Appendix 3: Section 2.5, Section 3.6, Section 3.7, Section 4, Section 5, and Section 7.2.4., respectively). Additionally, the ECP provides added detail for Environmental Inspectors, General Mitigation Measures, Water Management, Reclamation and Revegetation, Noxious Weeds and Invasive Species, Spill Prevention, Containment, Response, and Waste Management.

Drain Tile Repair

Drain tiles disturbed or damaged by pipeline construction will be repaired to its original or better condition (See Appendix 3: Section 3.6). Permanent repair and replacement of damaged drain tile will be performed in accordance with the following requirements:

- All damaged, broken, or cracked tile will be removed.
- Only unobstructed tile will be used for replacement.
- The tile furnished for replacement purposes will be of a quality, size, and flow capacity at least equal to that of the tile being replaced.
- Tile will be replaced using a laser transit, or similar instrument or method, to ensure that its proper gradient and alignment are restored, except where relocation or rerouting is required for angled crossings.

The temporary repair and replacement of damaged drain tile will be firmly supported to prevent loss of gradient or alignment due to soil settlement. The ends of the existing tile will not be plugged and continuous flow will be maintained in the tile system during construction, unless otherwise authorized by the landowner.

Winter Construction

During the winter months, erosion control devices will be utilized to mitigate erosion and the buildup of sediment during the freeze-thaw periods and spring runoff. Mulch may be applied to areas with exposed soil, if necessary. An erosion control blanket may also be used on freshly graded soil. The EI will coordinate with regulatory agencies, inspectors, and the Contractor to ensure BMPs are maintained through winter construction and that the Project is compliant with applicable regulations and permits.

Snow will be removed from the ROW and where necessary to allow for safe working conditions and access to the Project site. The Contractor will not push vegetation or soil off the ROW when removing snow. If it is planned to lower in the pipe during a snow event, snow will be removed from the trench as practical. The mixing of snow with spoil material will be prevented as much as possible. The trench will be backfilled with unfrozen soil as soon as practical after lowering-in activities (See Appendix 3: ECP Section 2.13).

2.2.13 Landowner Notification, Easement, Acquisition and Compensation

The Applicant is working to put into place easement agreements with all landowners along the Project route. Specific easement conditions and restrictions are discussed with landowners during easement negotiations. The Applicant is committed to providing landowners complete information about easement acquisition, the Project and associated facilities while also keeping landowners informed throughout the lifetime of the Project. The Applicant will coordinate with landowners to discuss potentially applicable payments for surface disturbance damages and crop loss and to address any unique property concerns as needed.

Compensation will be made to landowners for permanent easement rights, pump stations, temporary workspace use, access road use, and incidental damages that may occur. Compensation will be based on careful analysis of comparable property values and be agreed upon and deemed fair by both parties.

3 Project Schedule

The MCE Project will be built in 2023 and 2024, with commissioning and service starting in 2024.

- Obtaining Certificate of Corridor Compatibility: March 15, 2023
- Complete ROW Acquisition: October 2023
- Start Construction: August 2023
- Complete Construction: Third Quarter 2024
- Complete Testing Operations: Third Quarter 2024
- Commence Operations: Fourth Quarter 2024

4 Project Alternatives

4.1 No Action Alternative

The No Action Alternative will entail not building the MCE Project. As part of the larger MCE Project, the portion of the project under NDPSC jurisdiction would not be built, and no application would be filed with the NDPSC. Under the no action alternative, the status quo would continue. CO_2 would continue to be released into the atmosphere as no CO_2 transportation solution would be created and no geologic sequestration would occur. The No Action alternative does not meet the needs of the Applicant and its customers to reduce CO_2 emissions in North Dakota and the Midwest. More importantly, the No Action alternative runs contrary to the stated policy objectives of the State of North Dakota. Specifically, per NDCC § 38-22-01, North Dakota has declared that it is in the public interest to promote the geologic storage of CO_2 and that doing so will:

- benefit the state and the global environment by reducing greenhouse gas emissions; and
- allow for readily available CO2, a potentially valuable commodity, for commercial, industrial, or other uses.

The MCE Project sequesters the equivalent CO_2 from 3.9 million vehicles per year that will not occur if the Project is not built. Additionally, no jobs would be created in North Dakota and no additional tax revenue would be collected.

4.2 System Alternatives

Existing CO_2 pipeline infrastructure in North Dakota consists of pipelines that are dedicated to the source from which the CO_2 is being transported and sequestered. These existing pipelines do not provide a system that could be utilized for transportation of the CO_2 from industrial sources in Iowa, Minnesota, Nebraska, South Dakota, and North Dakota. As a result, there are no system alternatives that are feasible, reasonable, and meet the needs of the Project. Other pipelines that cross North Dakota are dedicated to the product they transport (e.g., natural gas, oil) and therefore are also not available as system alternatives.

4.3 Transportation Alternatives

CO_2 transportation by tanker truck and rail tankers is technically feasible but is better suited to the movement of small quantities of gas.

A typical tanker truck has a 2.27- to 10.9-metric ton capacity (TOMCO$_2$ Systems, n.d.). Using the maximum anticipated transport capacity for the Project of 18 MMTPA, this will equate to 7,929,515 to 1,651,376 tanker truck loads per year. Use of the tanker truck to transport CO_2 will result in additional CO_2 emissions to transport the CO_2. Additionally, this will create a considerable amount of truck traffic on the roads in the vicinity of the Project as well as a safety risk with the increased truck traffic.

A typical CO_2 rail car has an 84.3-metric ton capacity. Using the maximum estimated transport capacity for the Project of 18 MMTPA, this will equate to 213,523 rail tankers per year. In addition, rail lines will be needed to pick

up the CO_2 from the MCE Project's industrial sources of CO_2 and transport the CO_2 to the sequestration site. The impacts of these permanent rail facilities will be greater than the temporary surface impacts of pipeline installation.

These surface transport systems are not practical for the large-scale capture and storage of CO_2 required to meet the Project's purpose and need. The Project represents the safest mode for transporting CO_2. As compared to rail and truck transportation, pipelines are the safest, most efficient, and most reliable means to transport fluids (i.e., liquids and gases), according to statistics compiled by the U.S. Department of Transportation (USDOT) (PHMSA Report to Congress, 2018; Bureau of Transportation Statistics [BTS], National Transportation Statistics, 2021).

4.4 Evaluation of Project Area

The Project initially utilized a sophisticated and proprietary Geographic Information System (GIS) based routing program to determine the preferred pipeline route based on numerous publicly available and purchased datasets. Datasets utilized during the Project routing analysis included engineering (e.g., existing pipelines, railroads, karst geology, powerlines, etc.), environmental (e.g., critical habitat, wetlands, state parks, national forests, brownfields, national registry of historic places, etc.), and land (e.g., dams, airports, cemeteries, schools, mining, and military installations, etc.).

Each of these datasets were weighted based on the desire to co-locate with certain features (low values) and the desire to avoid others (higher value), while minimizing overall length of the route. For example, the existing pipelines dataset was assigned the lowest value so that the routing tool followed existing pipelines to the extent possible to minimize potential greenfield impacts. An example of a high weighted feature is the national wildlife refuge dataset; therefore, the GIS routing program excluded any national wildlife refuges from the preferred pipeline route to avoid impacts to these federal lands. The results of this analysis were used to develop preferred baseline routes for the mainline, trunkline, and laterals.

GIS datasets that were readily available at the time of the project development phases were analyzed by the Project team for applicable weighting prior to the execution of the GIS routing program. Once a route was generated, visual and tabular analysis was performed. A corridor of 1,500 feet (750 feet on either side of the preferred baseline routes) was used to create online and offline feature pipeline crossing reports for the tabular analysis. Visual analysis was performed through aerial mapping and data verification along the corridor and outside of the corridor through other GIS applications.

The baseline centerline route was the output of the GIS routing analysis that was completed during the Project development phase, and the basis of further investigation. As the Project moved into the design phase, coordination with agencies within states crossed by the Project advanced, survey data collection commenced, landowners were engaged, and additional datasets were collected. These more focused datasets were then utilized to incorporate reroutes as needed to optimize the route.

The proposed pipeline route has been modified in multiple locations for constructability issues and various other reasons including avoidance of U.S. Fish and Wildlife Service (USFWS) easements, environmental features such as wetlands and waterbodies, cultural resource sites, incompatible land uses (e.g., recently expanded quarries or landfills), buildings, irrigation systems, power poles/towers and other structures, trees planted for windbreaks where practicable, tribal lands, coal leases, and property corners. Route modifications were made through a process that included detailed review of recent aerial imagery, site visits, field surveys, the existing datasets, and helicopter reconnaissance as warranted.

The currently proposed Project corridors and routing most closely meet the objectives of the Project, while minimizing potential impacts to the environment and maintaining the health and safety of the public. Additional route modifications will continue through permitting and land acquisition processes to further reduce environmental impacts and landowner collaboration. The Project is committed to working with individual landowners along the route and believes this route maximized collaboration between landowners and the Applicant.

5 Environmental Studies

The Project used a 300-foot-wide ESC, generally centered on the pipeline route, for environmental and cultural resource field surveys. In areas where the pipeline is proposed to be co-located with existing corridors, the ESC was offset 100 feet on the side where the collocated features is found and 200 feet opposite of the collocated feature. At the pump stations, the field survey area was extended 50-feet beyond the proposed facility boundary. Field surveys were conducted in those areas where landowner survey permission was granted. There are areas of the Project where landowners have not yet provided survey permission, these areas are being negotiated, and the Applicant is committed to conducting cultural surveys for one hundred percent of the Project area.

The Project utilized Perennial Environmental Services, LLC (Perennial) to perform cultural, wetland and waterbodies, threatened and endangered species habitat assessment and land use surveys of the Project ESC in North Dakota. This application discusses field survey data collected through July 2, 2022.

Section 6.2 provides a discussion of agency correspondence for the Project including field surveys.

5.1 Cultural Resource Inventory

Perennial conducted a Class I literature review prior to the start of fieldwork in the Fall of 2021, through the State Historical Society of North Dakota (SHSND) (Appendix 5). This background review provided information on previously recorded cultural resources and previous surveys in the vicinity of the Project area in North Dakota. A total of 202 previously identified archaeological sites, 15 cemeteries (does not include cemeteries with a site trinomial), 76 site leads, 35 isolated finds, and 26 Cultural Heritage Sites have been documented within a 1.6-km (1.0-mi) radius of the Project centerline. Of the 354 cultural resources identified, 16 archaeological sites (32BL552, 32BL798, 32EM137, 32ME2646, 32MO1091, 32MO1094, 32MT74, 32MT287, 32OL1, 32OL322, 32OL331, 32OL538, 32OL540, 32OL611, 32OL614, 32OL668), 19 site leads (32BLX33, 32BLX83, 32BLX84, 32CSX112, 32DIX11, 32MOX109, 32MOX110, 32MOX111, 32MOX121, 32MOX166, 32MTX16, 32MTX49, 32MTX50, 32MTX51, 32OLX80, 32OLX83, 32OLX123, 32RIX38, 32RIX63), and one Cultural Heritage Site (CHFEM0048) were previously recorded within the Project ESC. None of the cemeteries are located within or immediately adjacent to the Project ESC.

The background review determined that a total of 212 previous archaeological studies have been conducted within a 1.0 mile (1.6 kilometer) of the Project. (Appendix 5). Seventy-four of the 212 studies overlap or intersect portions of the Project ESC. Most of these archaeological investigations consist of Class II and Class III Inventory surveys for large-scale energy infrastructure projects. Sixty-nine of these studies intersect very small portions of the Project area; the remaining five studies consist of large block surveys overlapping more substantial portions of the Project area.

The Class III cultural resources investigation was conducted in accordance with Section 106 of the *National Historic Preservation Act* and the SHSND survey standards. Additionally, survey efforts were conducted in accordance with a scope of work approved by the SHSND on October 11, 2021.

The Class III survey investigations for the Project, as presented herein, were conducted from September 28, 2021, through July 2, 2022. The cultural resources survey will eventually be performed for 100 percent of the Project footprint, including all Project workspaces and access roads. A 300-foot-wide corridor was surveyed for all route corridors; a 50 foot (15.0 meter) wide corridor was surveyed for access roads; and the total footprint was surveyed for any aboveground facilities (i.e., pump stations MLVs, and launcher and receiver sites). The APE (Area of Potential Effect) for direct effects includes the pipeline workspace for the mainline, trunkline, and lateral lines as well as the total footprint for aboveground facilities, and access roads.

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 above ground facilities. Only historic properties within visible range of the proposed permanent aboveground facilities will be evaluated.

Field methods included standard pedestrian survey of the entire Project route where land access was voluntarily provided, and shovel testing where ground surface visibility was less than 25 percent within a 300-foot-wide ESC corridor. As of July 2, 2022, a total of 183.5 miles (295.3 kilometers) and 6,368.10 acres of mainline pipeline and pipeline laterals were surveyed during these survey efforts. A total of 136.5 miles (219.7 kilometers) remains to be surveyed due to ongoing land access and routing modifications. Previously recorded and newly documented cultural resources were assessed and evaluated utilizing eligibility criteria to determine NRHP (National Register of Historic Places) eligibility status. The Applicant will complete the remaining surveys on outstanding parcels later in 2022 and likely 2023, and the results of these investigations will be provided in an addendum report. Additional work may involve the formal evaluation, mitigation, or avoidance of potentially eligible archaeological sites and historic structures.

The Phase I survey investigations for the Project included extensive pedestrian survey supplemented with shovel testing near waterbodies and within/adjacent to site boundaries). In all, the Class III survey included the revisit of 3 previously recorded sites, 13 previously recorded site leads, the documentation of 56 newly recorded archaeological sites, and the documentation of 69 isolated finds. A summary of all cultural resources and associated management recommendations is presented in Table 5.1.

Twenty-seven newly recorded sites and one previously recorded site were found to consist of precontact stone features, including stone circles, cairns, and effigy sites. These sites do possess sufficient data yield, integrity, or research value to meet NRHP eligibility criteria, and are recommended as eligible for listing in the NRHP. These sites have all been or will be avoided via reroutes and will not be impacted by the Project. No further work is recommended for any of these sites.

Sites 32BL1215, 32BL1216/32BLX33, 32SA408, 32RI914, 32CS5363, 32BL1227, 32ME2724, 32MT438 and 32MT439 are newly recorded sites that consist of historic artifact scatters, while sites 32EM1214, 32EM1217, 32MO1590, and 32OL973 consist of historic farmsteads. 32OL974 is an historic marker. These sites do not possess sufficient data yield, integrity, or research value to meet any of the NRHP eligibility criteria and are recommended as not eligible for listing in the NRHP. No further work is recommended for any of these sites.

Sites 32MT440 and 32RI913 consist of a historic church and a historic farmstead, respectively. Based on an assessment by a qualified Architectural Historian, these sites do possess sufficient data yield, integrity, or research value to meet NRHP eligibility criteria, and are recommended as eligible for listing in the NRHP. All contributing features have been avoided via reroutes. As such, no further work is recommended on either site.

32MTX16 consists of a historic farmstead and possible post office site located within the Project APE. Currently, the site is considered to have an undetermined NRHP eligibility status. Due to constraints of the 2021/2022 field season, additional research is needed at the State Archives to determine eligibility. The Applicant has implemented avoidance measures for this site via reroute.

Six prehistoric open camps were recorded, three of which are recommended eligible to the NRHP (32MO1607, 32MO1610, 32MO1611), and three of which are recommended not eligible (32ME2725, 32MO1609, 32MO1615). Five prehistoric lithic scatters were recorded, all of which are recommended as not eligible for listing in the NRHP (32ME2726, 32ME2727, 32OL957, 32OL958, and 32OLX443). One multicomponent prehistoric lithic scatter and historic artifact scatter (32OL972) was recorded and recommended as not eligible for listing on the NRHP.

Previously recorded sites 32EM137 and 32MT74 are historic railroad sites considered not eligible for inclusion in the NRHP, and no further work is being recommended in conjunction with the Project.

Site 32OL1 is an unknown historic site that was partially revisited during the 2021 field season due to land access and is now avoided by a reroute. No further work is planned to revisit this site at this time.

The 69 isolated finds are resources that do not possess sufficient data yield, integrity, or research value to meet any of the NRHP eligibility criteria and are recommended as not eligible for listing in the NRHP. No further work is recommended for any of these sites.

Table 5.1: Cultural Resources Recorded in the ESC

SITE NUMBER	SITE TYPE	NRHP RECOMMENDATION	MANAGEMENT RECOMMENDATION
32EM137	Railroad	Not Eligible within Project ESC	No further work
32MT00287	Cairn	Eligible	Avoided via reroute
32MT74	Railroad	Not Eligible within Project ESC	No further work
32BL1215	Historic artifact scatter	Not eligible	No further work
32BL1216	Historic artifact scatter	Not Eligible within Project ESC	No further work
32BL1226	Stone circle, cairn	Eligible	Avoided via reroute
32CS5363	Historic artifact scatter	Not eligible	No further work
32EM1214	Farmstead	Not Eligible	No further work
32EM1215	Stone circle	Eligible	Avoided via reroute
32EM1216	Cairn	Eligible	Avoided via reroute
32EM1217	Farmstead	Not Eligible	No further work
32EM1218	Stone circle	Eligible	Avoided via reroute
32EM1219	Stone circle	Eligible	Avoided via reroute
32EM1220	Stone circle, cairn	Eligible	Avoided via reroute
32EM1221	Stone circle	Eligible	Avoided via reroute
32MT438	Historic artifact scatter	Not eligible	No further work
32MT439	Historic artifact scatter	Not eligible	No further work
32MT440	Church and artifact scatter	Eligible	Avoided via reroute
32MT441	Cairn	Eligible	Avoided via reroute
32MT442	Stone circle	Eligible	Avoided via reroute
32MT443	Stone circle	Eligible	Avoided via reroute
32MT444	Cairn and linear stone feature	Eligible	Avoided via reroute
32MT445	Stone circle	Eligible	Avoided via reroute

Table 5.1: Cultural Resources Recorded in the ESC			
SITE NUMBER	**SITE TYPE**	**NRHP RECOMMENDATION**	**MANAGEMENT RECOMMENDATION**
32MT446	Stone circle	Eligible	Avoided via reroute
32MT447	Stone circle	Eligible	Avoided via reroute
32MT448	Stone features	Eligible	Avoided via reroute
32MT449	Stone circle	Eligible	Avoided via reroute
32ME2724	Historic artifact scatter	Not eligible	No further work
32ME2725	Prehistoric open camp	Not eligible	No further work
32ME2726	Prehistoric lithic scatter	Not eligible	No further work
32ME2727	Prehistoric lithic scatter	Not eligible	No further work
32MO1590	Farmstead	Not Eligible	No further work
32MO1591	Stone circle	Eligible	Avoided via reroute
32MO1592	Stone feature and lithic scatter	Eligible	Avoided via reroute
32MO1602	Stone circle	Eligible	Avoidance
32MO1603	Stone circle and cairn	Eligible	Avoidance
32MO1605	Stone circle and cairn	Eligible	Avoidance
32MO1606	Stone circle and cairn	Eligible	Avoidance
32MO1607	Prehistoric open camp	Eligible	Avoidance
32MO1609	Prehistoric open camp	Not Eligible	No further work
32MO1610	Stone features	Eligible	Avoidance
32MO1611	Stone features	Eligible	Avoidance
32MO1612	Stone features and lithic scatter	Eligible	Avoidance
32MO1613	Prehistoric open camp	Eligible	Avoided via reroute
32MO1614	Prehistoric open camp	Eligible	Avoided via reroute
32MO1615	Prehistoric open camp	Not eligible	No further work
32OL957	Prehistoric lithic scatter	Not eligible	No further work

Table 5.1: Cultural Resources Recorded in the ESC			
SITE NUMBER	**SITE TYPE**	**NRHP RECOMMENDATION**	**MANAGEMENT RECOMMENDATION**
32OL958	Prehistoric quarry	Not eligible	No further work
32OL970	Stone features	Eligible	Avoidance
32OL971	Historic homestead	Eligible	Avoided
32OL972	Historic artifact scatter, prehistoric lithic scatter	Not eligible	No further work
32OL973	Historic farmstead	Not eligible	No further work
32OL974	Historic marker	Not eligible	No further work
32OL975	Stone features	Eligible	Avoided via reroute
32OLX443	Prehistoric lithic scatter	Not eligible	No further work
32RI913	Farmstead	Eligible	Avoided
32RI914	Historic artifact scatter	Not eligible	No further work
32SA408	Historic farmstead	Not eligible	No further work
32BL1227	Historic artifact scatter	Not Eligible	No further work
32BLX431	Isolated Find	Not Eligible	No further work
32BLX432	Isolated Find	Not Eligible	No further work
32BLX433	Isolated Find	Not Eligible	No further work
32CSX428	Isolated Find	Not Eligible	No further work
32CSX429	Isolated Find	Not Eligible	No further work
32EMX1487	Isolated Find	Not Eligible	No further work
32EMX1488	Isolated Find	Not Eligible	No further work
32MEX863	Isolated Find	Not Eligible	No further work
32MEX862	Isolated Find	Not Eligible	No further work
32MTX116	Isolated Find	Not Eligible	No further work
32MTX117	Isolated Find	Not Eligible	No further work
32MTX118	Isolated Find	Not Eligible	No further work
32MTX119	Isolated Find	Not Eligible	No further work
32MTX103	Isolated Find	Not Eligible	No further work
32MTX104	Isolated Find	Not Eligible	No further work
32MTX105	Isolated Find	Not Eligible	No further work
32MTX106	Isolated Find	Not Eligible	No further work

Table 5.1: Cultural Resources Recorded in the ESC			
SITE NUMBER	**SITE TYPE**	**NRHP RECOMMENDATION**	**MANAGEMENT RECOMMENDATION**
32MTX107	Isolated Find	Not Eligible	No further work
32MTX108	Isolated Find	Not Eligible	No further work
32MTX109	Isolated Find	Not Eligible	No further work
32MTX110	Isolated Find	Not Eligible	No further work
32MOX656	Isolated Find	Not Eligible	No further work
32MOX657	Isolated Find	Not Eligible	No further work
32MOX658	Isolated Find	Not Eligible	No further work
32MOX659	Isolated Find	Not Eligible	No further work
32MOX660	Isolated Find	Not Eligible	No further work
32MOX661	Isolated Find	Not Eligible	No further work
32MOX662	Isolated Find	Not Eligible	No further work
32MOX663	Isolated Find	Not Eligible	No further work
32MOX664	Isolated Find	Not Eligible	No further work
32MOX665	Isolated Find	Not Eligible	No further work
32MOX666	Isolated Find	Not Eligible	No further work
32MOX667	Isolated Find	Not Eligible	No further work
32MOX668	Isolated Find	Not Eligible	No further work
32MOX669	Isolated Find	Not Eligible	No further work
32MOX670	Isolated Find	Not Eligible	No further work
32MOX648	Isolated Find	Not Eligible	No further work
32MOX649	Isolated Find	Not Eligible	No further work
32MOX650	Isolated Find	Not Eligible	No further work
32MOX651	Isolated Find	Not Eligible	No further work
32MOX652	Isolated Find	Not Eligible	No further work
32OLX440	Isolated Find	Not Eligible	No further work
32OLX444	Isolated Find	Not Eligible	No further work
32OLX445	Isolated Find	Not Eligible	No further work
32OLX446	Isolated Find	Not Eligible	No further work
32OLX447	Isolated Find	Not Eligible	No further work
32OLX448	Isolated Find	Not Eligible	No further work
32OLX458	Isolated Find	Not Eligible	No further work
32OLX449	Isolated Find	Not Eligible	No further work
32OLX450	Isolated Find	Not Eligible	No further work

Table 5.1: Cultural Resources Recorded in the ESC			
SITE NUMBER	**SITE TYPE**	**NRHP RECOMMENDATION**	**MANAGEMENT RECOMMENDATION**
CHFOL153	Isolated Find	Not Eligible	No further work
32OLX451	Isolated Find	Not Eligible	No further work
32OLX452	Isolated Find	Not Eligible	No further work
32OLX453	Isolated Find	Not Eligible	No further work
32OLX454	Isolated Find	Not Eligible	No further work
I32OLX455	Isolated Find	Not Eligible	No further work
32OLX456	Isolated Find	Not Eligible	No further work
32RIX403	Isolated Find	Not Eligible	No further work
32RIX404	Isolated Find	Not Eligible	No further work
32RIX405	Isolated Find	Not Eligible	No further work
32SAX103	Isolated Find	Not Eligible	No further work
32SAX104	Isolated Find	Not Eligible	No further work
32SAX105	Isolated Find	Not Eligible	No further work
32SAX106	Isolated Find	Not Eligible	No further work
32SAX107	Isolated Find	Not Eligible	No further work
32SAX108	Isolated Find	Not Eligible	No further work
32SAX109	Isolated Find	Not Eligible	No further work
32SAX110	Isolated Find	Not Eligible	No further work
32SAX111	Isolated Find	Not Eligible	No further work

The Applicant is committed to avoiding all impacts to eligible cultural resources; therefore, route variances have been or will be assessed and implemented for these areas during the 2022/2023 field seasons.

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 agreed to participate in the archaeological field studies including Fort Peck Assiniboine and Sioux; Rosebud Sioux; Northern Cheyenne; Mille Lacs Band of Ojibwe; Mandan, Hidatsa, and Arikara Nation - Three Affiliated Tribes; Turtle Mountain Band of Chippewa; and Sisseton Wahpeton, Oyate of the Lake Travers Reservation, Little Shell Chippewa, and Yankton Sioux. Of these tribes only the Mille Lacs Band of Ojibwe did not participate in field surveys in the State of North Dakota, as they focused on Minnesota field surveys. A Traditional Cultural Property (TCP) study was also offered in the Spring and Summer of 2022 to Native American Tribes who wished to participate. While no tribes agreed to partake in a TCP study, the Applicant financed a week-long cultural resources training course for the Mille Lacs Ojibwe tribe in Minnesota in April 2022.

The Applicant has prepared technical reports for the cultural resource studies and will send them to the SHSND/NDSHPO and share them with the contacted Tribes concurrently with this application filing for their review and comment. To protect these sensitive resources the Applicant will not submit information about the location of

historic properties with this application, unless specifically requested by either SHSND or the NDPSC and agreed upon by both.

Only the title page and abstract of cultural resources technical report will be submitted with this filing (Appendix 5) as documentation of the surveys and evaluations for this application and any other public filings. SHSND review and comment letters for technical reports will be submitted as supplemental filings to this application.

5.2 Paleontological Resources

The Applicant conducted an evaluation using paleontological records from the North Dakota Geological Survey Fossil (NDGS) Resource Management Program (NDGS, 2021), a review of the most recent geologic mapping and relevant scientific literature, and a search of the Paleobiology Database. The full Paleontological Resource Impact Evaluation has been included as part of this application in Appendix 6.

This research was used to apply Potential Fossil Yield Classification (PFYC) rankings of the Bureau of Land Management (BLM) (2016, 2020) for the geologic units present in the Project area, either at the surface or in the subsurface. Although there is no BLM involvement in the Project, the PFYC is widely used by both federal and non-federal agencies as a predictive tool for evaluating potential impacts for scientifically important paleontological resources.

The evaluation indicated there are 22 mapped geologic units present in the Project area:

- 15 facies of Holocene-aged surficial sediments that are assessed by the BLM (2020) as having low paleontological potential (PFYC 2).
- Sands of the Oahe and older formations that date from the Holocene to the Pliocene and are assessed as having moderate paleontological potential (PFYC 3).
- The Sentinel Butte Formation, Bullion Creek Formation, and Cannonball Formation with high paleontological potential (PFYC 4).
- The Slope Formation, with moderate paleontological potential (PFYC 3), all of which date to the Paleocene.
- The Hell Creek Formation which dates to the Late Cretaceous and has very high paleontological potential (PFYC 5).
- The Fox Hills Formation, which dates to the Late Cretaceous and has high paleontological potential (PFYC 4).

Paleontological mitigation measures identified for the Project will be dependent on whether it was private land or state land. There are no laws or regulations that require the mitigation of construction impacts to paleontological resources on private lands. Paleontological resources on state lands are protected under NDCC Chapter 54-17.3 - Paleontological Resource Protection and NDAC Article 43-04.

For private lands, the Applicant will develop a Worker's Environmental Awareness Program training that educates construction personnel on the types of fossils that could be encountered during construction and communicates the requirements and procedures for the inadvertent discovery of paleontological resources. Anything found on private property will be returned to the landowner.

The Applicant will, in accordance with North Dakota law, implement the following with respect to state lands:

- Retain a qualified paleontologist to oversee all aspects of paleontological mitigation.
- Complete initial analysis to determine if state lands crossed by the project contain exposures of geologic units with moderate (PFYC 3) to very high paleontological potential (PFYC 5) and if these geologic units will be disturbed by construction. If possible, the depth of surficial sediments should be taken into consideration. For areas identified the following additional steps will be conducted.

- The development and implementation of a Paleontological Resource Monitoring and Mitigation Plan (PRMMP).
- The development of a Worker's Environmental Awareness Program training.
- A field survey of areas identified in the second step. This survey can be completed immediately prior to construction as a preliminary step to the monitoring program. The field survey should include specific recommendations made by the NDGS.
- Construction monitoring of areas identified in the second step. The monitoring should be conducted by a qualified paleontological monitor.

- In the event paleontological resources are encountered during construction activities, all work must stop in the immediate vicinity of the finds while the paleontological monitor documents the find and the paleontological principal investigator evaluates its scientific importance. Further treatment of the find (i.e., salvage, curation, etc.) shall be determined pending the outcome of the assessment and in consultation with the Applicant and the NDGS.

With the incorporation of the mitigative measures identified above, the Project is not anticipated to cause an adverse impact to paleontological resources on state lands.

5.3 Wetland and Waterbodies Analysis

5.3.1 Wetlands

Wetlands and riparian areas were identified along the Project by completing field surveys and reviewing aerial photographs for areas where access was not granted. Wetlands and waters of the U.S. along the route were delineated in accordance with the direction provided by the USACE – Omaha District. 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). A report detailing methods and findings of wetland delineations conducted for the Project is attached in Appendix 7.

Wetlands impacts within the Project area in North Dakota are limited to PEM wetlands and PFO wetlands, and PSS wetlands. Table 5.3.1 summarizes wetland impacts in the Project area.

Table 5.3.1: Wetlands Impacted by the Project

FEATURE TYPE	TEMPORARY IMPACTS (ACRES)	PERMANENT CONVERSION OF WETLANDS (ACRES) [1]	PERMANENT IMPACTS (ACRES) [2]	CROSSING LENGTH (FEET)
PFO	2.425	2.425	-	1,384
PSS	0.159	0.159	-	134
PEM	89.319	-	0.093	51,817
Total	**91.903**	**2.584**	**0.093**	**57,886**

PFO – palustrine forested wetland; PSS – palustrine scrub-shrub wetland; PEM – palustrine emergent wetland

[1] PFO/PSS wetlands will be permanently converted to PEM wetlands as a result of the Applicant's routine maintenance activities along the proposed 50-foot-wide permanent ROW.
[2] Permanent impacts to wetlands will only occur as a result of the construction of one MLV and three permanent access roads.

PEM 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 (Cowardin et al. 1979). 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*) occupy areas where water persists throughout the year (U.S. Department of Agriculture [USDA], National Resource Conservation Service [NRCS] 2008; U.S. Geological Survey [USGS], 2006).

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

PFO wetlands are dominated by woody vegetation that is at least 20 feet tall (Cowardin et al., 1979). The dominant woody vegetation in PFO in the ESC consists of redtop (*Agrostis gigantea*), hybrid cattail (*Typha X glauca*), Kentucky bluegrass (*Poa pretensis*), cloaked bulrush (*Scirpus pallidus*), peachleaf willow (*Salix amygdaloides*), green ash (*Fraxinus pennsylvanica*), reed canarygrass (*Phalaris grundinacea*) and river bulrush (*Schoenoplectus fluvitilis*). The report (Perennial, 2022) provided in Appendix 7 provides complete lists of dominant species in the wetlands as well as descriptions of soils and hydrology.

Wetland impacts are indicated in Table 5.3.1. To mitigate the potential for these impacts, the Applicant will implement specific procedures as outlined in the ECP (Appendix 3) and summarized in this report. Impacts on wetland vegetation will be greatest during and immediately following construction. The Applicant will restore soil grade and replace topsoil to allow wetlands affected by construction activities to naturally revegetate.

Smaller streams and ephemeral or intermittent drainages will likely be open cut and wetlands located in these areas will be crossed by trenching. The installation of permanent aboveground facilities will not occur in wetlands. Construction of three permanent access roads and the installation of one MLV will result in the permanent fill of approximately 0.09 acres of wetlands. Herbaceous vegetation in PEM wetlands is expected to re-establish to preconstruction 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 2.43 acres of PFO wetlands in the construction workspace to PEM wetlands. PFO wetlands within the temporary construction workspace will not return to preconstruction conditions for an extended length of time, typically 10 years or more to reach mature habitat.

The ECP (Appendix 3) contains mitigative procedures to be followed in wetlands. All work shall be conducted in accordance with applicable permits. The Applicant will work directly with USACE for any Section 404 permit authorizations as applicable.

Over the operational life of the pipeline, vegetation will be allowed to re-establish in emergent and scrub-shrub wetlands with the exception of 0.09 acres of PEM wetlands as a result of a permanent access roads (Table 5.3.1). Woody vegetation in PFO wetlands will be removed during construction (approximately 0.81 acres) and will regrow over many years. This removal will result in long-term, permanent impacts by converting the previously 30-foot-wide PFO and PSS wetland areas to PEM wetland areas. Permanent conversion of 2.58 acres of PFO and PSS wetlands to PEM wetlands in the permanent ROW will result in loss of the incremental portion of functional value associated with loss of tree cover, but these wetlands will retain other wetland values such as water retention, water filtration, and aquatic habitat. As part of its Section 404 application to the USACE, the Applicant will abide by all required mitigation measures regarding vegetation conversion impacts on PFO wetlands.

All wetland areas within conservation lands or easements will be restored to a level consistent with any additional criteria established by the relevant managing agency.

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 conditions of the wetland at the time of the release.

Carbon dioxide released from the pipeline within a wetland could reach the soil surface. The CO_2 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. If the water table reaches the surface, the release will manifest as dissipating CO_2 to its natural state. The general lack of surface flow within a wetland will restrict CO_2 movement. Where surface water is present within a wetland, the release 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, pH will increase in an isolated wetland due to the carbon incorporation of the fresh water. However, this release will be diluted and dissipate 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, the Project in North Dakota will impact approximately 91.90 acres of wetlands during construction and result in the conversion of 2.58 acres and permanent fill of approximately 0.09 acres of wetlands during operations. 'If an inadvertent release occurs during HDD operations, the Applicant and its contractors will initiate its HDD inadvertent release plan procedures (Appendix 7) cleanup the release and restore the ROW where the release occurred. Restoration of any vegetative damage from a release will follow the timelines established within the ECP (see Appendix 3) and will be localized and small scale to the immediate area around the release.

Wetlands are discussed in Section 5.3.1 Wetlands. A Project report (Perennial, 2022) on the delineation of waterbodies and wetlands is provided in Appendix 7.

5.3.2 Waterbodies

The Project footprint lies within 13 watersheds as defined by sub-basin 8-digit hydrological unit codes. Construction of the Project will involve approximately 101 crossings of waterbodies within these watersheds, including 60 ephemeral stream crossings, 17 intermittent stream crossings, and 16 perennial stream crossings, and eight pond crossings. A listing of all waterbody crossings is provided in Appendix 7. Crossing methods, locations, and lengths of the perennial stream crossings are indicated below in Table 5.3.2.

Table 5.3.2: Perennial Streams Crossed by the Project

PERENNIAL STREAM	LINE	MILEPOST	FEATURE ID	CROSSING LENGTH (FEET)[1]	COUNTY	CROSSING METHOD
Wild Rice River	NDL-323	4.27	S2006RI017	68	Richland	Open cut
Unnamed Ditch	NDL-324	1.89	S2015CA044	43	Cass	Open Cut
Sheyenne River	NDL-324	27.39	S2006RI001	124	Richland	HDD
Unnamed	NDL-328	4.39	S2021OL012	35	Oliver	Bore
Beaver Creek	NDM-106	60.21	S2008EM002	42	Emmons	Open Cut
Beaver Creek	NDM-106	61.21	S2008EM001	70	Emmons	Open Cut
Hawk Creek	NDM-106	88.38	S2002EM007	189	Emmons	Open Cut
Apple Creek	NDM-106	119.01	S_2_BU_023_DT	131	Burleigh	HDD
Apple Creek	NDM-106	119.06	S_2_BU_022_DT	27	Burleigh	HDD
Burnt Creek	NDM-106	131.7	S_2_BU_005_DT	67	Burleigh	Open Cut
Missouri River	NDM-106	140.01	S2004MO017	1,791	Burleigh/Morton	HDD
Wild Rice River	NDT-211	13.86	S2006SA022	39	Sargent	HDD

Table 5.3.2: Perennial Streams Crossed by the Project

PERENNIAL STREAM	LINE	MILEPOST	FEATURE ID	CROSSING LENGTH (FEET)[1]	COUNTY	CROSSING METHOD
Unnamed Ditch	NDT-211	55.77	S2005DI003	27	Dickey	HDD
Upper James River	NDT-211	58.37	S_2_DI_013_DT	305	Dickey	HDD
Maple River	NDT-211	76.10	S2015DI025	126	Dickey	Open Cut
Elm River	NDT-211	87.60	S2015DI024	355	Dickey	HDD

[1] Crossing length is measured along the centerline from bank to bank

Construction of the Project will have only minor and temporary impacts on surface drainage. Best management practices (BMPs) (Appendix 3) will be implemented to ensure that any impacts on surface drainage and hydrology are minor.

Potential impacts to surface water drainage from Project construction could result from such things as altering the contours of the ground thereby altering surface water runoff paths, changing the consistency and porosity of the surface which can alter the amount and rate of surface water runoff, blocking existing drainage channels such as agricultural drainage tiles and culverts which can lower surface drainage capabilities and result in ponding or flooding; or alteration of stream banks and bottoms which can cause the stream to widen, meander, or infill, resulting in changes to runoff and discharge.

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

- Work with landowners to identify and repair drain tile systems within the pipeline ROW. Appropriate erosion and sediment control BMPs will be installed for those with potential to receive stormwater discharge due to the Project's activities.
- Work with landowners to ensure restoration of all terraces to pre-construction condition. Civil surveys will be conducted to document the terraces and contours before disturbance occurs. Preconstruction drainage along the terrace channel will be maintained and additional BMPs may be installed if necessary. Post-construction monitoring and inspection will be done to ensure restoration methods of the terraces are sufficient and that they are to their preconstruction elevation and condition.
- Permanent slope breakers will be constructed across the ROW, where necessary, to limit erosion (except in actively tilled agricultural fields). Slope breakers will divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices.

The HDD crossing method will be used at several river crossings: the Missouri River, Sheyenne River, Wild Rice River, James River, Apple Creek, and the Elm River. One unnamed ephemeral stream associated with a railroad crossing will also be crossed by HDD. Descriptions of HDD and other waterbody crossing methods are provided in Appendix 3. Additionally, one bore will be used to cross the Maple River. Because HDD and boring does not involve any intended direct contact with the waterbody, channel bed, or banks, no impacts to hydrology are expected at these crossings. Other crossing methods will involve disturbance of stream banks and channel bottoms, but the ECP (Appendix 3) includes procedures for limiting the extent of this disturbance, restoring disturbed areas, and minimizing hydrological impacts. For waterbody crossings these measures include:

- Waterbody banks will be restored to the preconstruction contour unless too steep for restoration, in which case the banks will be restored to a stable angle of repose.
- Stream bottoms will be restored to near pre-construction condition with no impediments to normal water flow.

- Trench breakers will be installed at wetland boundaries where the pipeline trench may cause a waterbody to drain.

Restoration includes grading, stabilization, and revetment BMPs. These BMPs embrace bioengineering concepts, which encourage the restoration of natural streambanks. After the installation of the pipeline, the disturbed ROW will be backfilled and restored to its pre-construction grade thus avoiding any change to the pre-existing surface water drainage patterns.

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 and adjacent floodplains 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.

Stormwater Pollution Prevention Plans (SWPPPs) will be prepared just prior to construction for the pipelines and all facilities (e.g., pump stations) and will identify how surface runoff will be handled once contractors are known and their construction plans finalized.

Operation should have no impact on surface drainage. Maintenance activities along the pipelines will not result in long-term substantive alterations of stream banks or channel morphology. Impacts from maintenance activities will be minor because disturbances will be isolated, short-term, and infrequent and include clearing the permanent pipeline ROW of vegetation and identifying corrosion through regular inspections. If in-stream work is required, the same mitigation measures as for construction will be employed. Access roads along with any required culverts will be maintained as will SWPPP requirements at facilities.

See Appendix 4 for the locations of the wetland and waterbodies crossed by the Project.

5.4 Vegetation Resources

Based on a review of the 2019 National Land Cover Dataset (NLCD) cultivated crops and grassland/herbaceous are the predominant vegetation type crossed by the Project. A summary of the vegetations resources impacted by the construction footprint is provided in Table 5.4.1. Please note that the values in the table are based on desktop review and may vary from field verification.

Table 5.4.1: Summary of Vegetation Resources

COVER TYPE	PROJECT[1]		DESCRIPTION [1]
	MILES	PERCENT	
Open Water	0.88	0.3	Areas of open water, generally with less than 25 percent cover of vegetation or soil.
Barren Land (Rock/Sand/Clay)	0.05	<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 percent of total cover.

Table 5.4.1: Summary of Vegetation Resources			
COVER TYPE	**PROJECT[1]**		**DESCRIPTION [1]**
	MILES	**PERCENT**	
Developed	10.9	3.4	Developed lands include 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 (<0.2 mile) identified as rural residence. ROW corridors include roads, utility corridors and railroads. These areas have often been replanted with a mixture of grass and forbs.
Cultivated Crops	207.3	65.0	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 percent of total vegetation. This class also includes all land being actively tilled.
Pasture/Hay	14.1	4.4	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation. Dominant vegetation observed in hayfields within the Project area consisted Canadian thistle, Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), western snowberry (*Symphoricarpos accidentalis*), quackgrass (*Elymus repens*), alfalfa (*Medicago sativa*), prickly Russian-thistle (*Salsola tragus*), green bristlegrass (*Setaria viridis*), cereal rye (*Secale cereale*), annual bluegrass (*Poa annua*), big bluestem (*Andropogon gerardii*), and Indiangrass (*Sorghastrum nutans*).
Emergent Herbaceous Wetlands	13.8	4.3	Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water. See descriptions of PEM wetland vegetation in **Section 5.3.1**. Further description is provided in the Project wetlands report provided in **Appendix 7**.
Woody Wetlands	0.7	0.2	Areas where forest or shrubland vegetation accounts for greater than 2 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water. See descriptions of PSS and PFO wetland vegetation in **Section 5.3.1**. Additional information is provided in the Project wetlands report provided in **Appendix 7.**

Table 5.4.1: Summary of Vegetation Resources			
COVER TYPE	**PROJECT[1]**		**DESCRIPTION [1]**
	MILES	**PERCENT**	
Deciduous Forest	1.3	0.4	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent 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 beggarslice (*Hackelia virginiana*), eastern woodland sedge (*Carex blanda*), burr oak (*Quercus macrocarpa*), green ash (*Fraxinus pennsylvanica*), American plum (*Prunus americana*), American basswood (*Tilia americana*), common snowberry (*Symphoricarpos albus*), American elm (*Ulmus americana*), purple meadow-rue (*Thalictrum dasycarpum*), reed canarygrass (Phalaris arundincea), boxelder (*Acer negundo*), European buckthorn (*Rhamnus cathartica*), buffelgrass (*Cenchrus ciliaris*), common milkweed (*Asclepias syriaca*), Siberian elm (*Ulmus pumila*) smooth brome (*Bromus inermis*), stinging nettle (*Urtica dioica*), stiff goldenrod (*Solidago rigida*), Kentucky bluegrass, and western snowberry.
Scrub / Shrub	0.5	0.2	Shrub/scrub- areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Grassland / Herbaceous	70.5	22.0	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.
Notes: [1] Please note that the values in the table are based on desktop review and may vary from field verification			

Grasslands in the Project area (not classified as wetlands, agricultural lands, or hayfields) were categorized as 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 consists of blue grama (*Bouteloua gracilis*), prairie dropseed (*Sporobolus heterolepis*), coralberry (*Symphoricarpos orbiculatus*), Kentucky bluegrass, western snowberry (*Symphoricarpos occidentalis*), perennial ragweed (*Ambrosia psilostachya*), smooth brome (*Bromus inermis)*, Siberian elm (*Ulmus pumila),* white sagebrush (*Artemisia ludoviciana*), little bluestem (*Schizachyrium scoparium*), western wheatgrass (*Pascopyrum smithii*), lambsquarters (*Chenopodium album*), crested wheatgrass (*Agropyron cristatum*), prairie sagewort (*Artemisia frigida*), porcupinegrass (*Stipa spartea*), tarragon (*Artemisia dracunculus*), dwarf false indigo (*Amorpha nana*), prairie sandreed (*Calamovilfa longifolia*), upright prairie coneflower (*Ratibida columnifera*), curlytop gumweed (*Grindelia squarrosa*), stiff goldenrod (*Solidago rigida*), quaking aspen (*Populus tremuloides*), needle and thread (Stipa comata), common milkweed (*Asclepias syriaca*), common dandelion (*Taraxacum officinale*), Mexican fireweed (*Bassia scoparia*),

Canadian thistle (*Cirsium arvense*), creeping wildrye, mountain rush (*Juncus balticus*), field sowthistle (*Sonchus arvensis*), and wavyleaf thistle (C*irsium undulatum).* 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 consists of Kentucky bluegrass *(Poa pratensis)*, white sagebrush (Artemisia ludoviciana), Woods' rose (*Rosa woodsii*), blue grama (*Bouteloua gracilis*), smooth brome, desert lily (*Hesperocallis undulata*), needleleaf sedge (*Carex duriuscula*), common wheat (*Triticum x aestivum*), yellow foxtail (*Setaria pumila*), western snowberry, carpet vervain (*Verbena bracteata*), quackgrass (*Elymus repens*), curlytop gumweed (*Grindelia squarrosa*), marsh bristlegrass (*Setaria parviflora*), alfalfa (*Medicago sativa*), prairie rose (*Rosa arkansana*), and fourwing saltbush (*Atriplex canescens*). Additional information is provided in the Wetland Delineation Report provided in Appendix 7.

Construction of the Project will disturb approximately 4,284 acres of land within North Dakota. Most of these lands are agricultural lands in crop production or herbaceous vegetation. Land that is not in agricultural production is barren, open water, or hay/pasture, so impacts will be short term. Approximately 27 acres are classified as wooded, of which approximately half is a temporary impact and half is a permanent impact. Trees will be removed and either 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.

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.

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. Generally, no clearing of the surface between HDD entry and exit locations will occur, with the exception of limited hand clearing as necessary between HDD entry and exit locations to facilitate placement of “true tracker” wire and allow access for water for hydrostatic testing, where needed. Minor clearing activities may occur at bore locations where equipment bridges may occur. Most of the 4,284 acres disturbed will be allowed to revert to pre-construction vegetative conditions. This includes all of the temporarily impacted lands totaling approximately 2,325 acres and much of the permanent ROW (approximately 1,959 acres). Exceptions in the permanent ROW include maintenance of an herbaceous corridor over the centerline through wooded areas and the permanent loss of vegetation at aboveground facilities, including pump stations, MLVs, launcher-receiver sites, and permanent access roads, which total approximately 21.6 acres.

Soil compaction and rutting can occur with the movement of heavy construction vehicles along the pipeline ROW and on temporary access roads during construction. 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 trenching has occurred, topsoil will likely adhere to tires and/or tracked vehicles and be carried away.

Rutting occurs 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.

Compaction and rutting impacts will be mitigated in sensitive areas using timber mats and special crossing techniques. 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 and work in cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction. Work may be suspended during wet weather when there is potential of material mixing soil horizons or the potential for excessive compaction. To minimize potential impact to soil resources, soil will be prepared after final grading to facilitate revegetation in undeveloped areas. This could include tilling compacted soil or other measures depending on the extent and severity of compaction.

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.

5.4.1 Tree/Sapling/Shrub Analysis

Tree, shrub, and woody vegetation surveys were not conducted during the 2021/2022 field survey effort but are planned to be completed prior to construction on the finalized route. The Applicant will conduct a tree/sapling/shrub inventory prior to construction so an accurate inventory of woody vegetation is collected for minimization and mitigation. The survey will be conducted in those areas of the Project Corridor where trees, shelter belts, and riparian habitat have been identified.

5.5 Wildlife Resources

The Applicant conducted biological field surveys from August through November 2021 and March through July 2022, using the ESC. Species-specific habitat and presence/absence surveys have been conducted, no effects on rare or endangered species and their habitats are expected. Additional follow up surveys, if required, will be conducted in 2022 and 2023.

The results of the field studies are submitted as part of this application (see Threatened and Endangered Species Report, Burleigh, Cass, Dickey, Emmons, Logan, Oliver, McIntosh, Morton, Richland, Sargent counties, North Dakota in Appendix 7).

5.5.1 Federally Protected Species Review

The USFWS is responsible for maintaining lists of terrestrial and aquatic species that meet the definition of threatened or endangered under the Endangered Species Act of 1973. Review of the USFWS, Environmental Conservation Online System (2022), listed seven federally listed species believe to or known to occur in North Dakota and Project area; three Endangered and four Threatened species which are listed in Table 5.5.1. Specific information on each species and the results of the 2021 and 2022 habitat survey are found in Appendix 7.

Table 5.5.1: Threatened and Endangered Species which may occur			
FAMILY	**COMMON NAME**	**SCIENTIFIC NAME**	**FEDERAL STATUS**
Mammals	Northern long-eared bat	*Myotis septentrionalis*	Threatened
Birds	Piping plover	*Charadrius melodus*	Threatened
Birds	Red knot	*Calidris canutus rufa*	Threatened
Birds	Whooping crane	*Grus americana*	Endangered
Insects	Dakota skipper	*Hesperia dacotae*	Threatened
Insects	Poweshiek skipperling	*Oarisma poweshiek*	Endangered
Plants	Western prairie fringed orchid	*Platanthera praeclara*	Threatened

5.5.2 Migratory Bird Treaty Act

Prior to construction the Applicant will work with USFWS to minimize impacts to bird species regulated by the Migratory Bird Treaty Act (MBTA).

5.5.3 Bald and Golden Eagle Protection Act

Bald eagles (*Haliaeetus leucocephalus*) are protected by the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). Bald eagles are found year-round in North Dakota. Bald eagles are generally found near water sources, such as lakes, reservoirs, marshes, or rivers, and their nests are found on large trees near the open water. Nesting and foraging habitat for bald eagles is present in the Project area located on or near large waterbodies including the Missouri River, Apple Creek, and Bois de Sioux River.

Aerial raptor and great blue heron nest surveys were completed in the Project area between April 8 and 11, 2022 prior to tree leaf out in most areas. Two experienced biologists and a pilot used a Bell 206 Jet Ranger helicopter to look for raptor nests within a 2.0-mile-wide survey corridor centered on the Project centerline (1.0-mile either side of the centerline). Altitudes ranged from >100 to <500 feet, depending on terrain or other safety concerns, presence of livestock or occupied buildings. Raptor nest searches located a total of 9 bald eagle nests, 33 other raptor nests, 1 Canada goose nesting in a bald eagle nest, and 34 unoccupied nests within one mile of the Project centerline and associated facilities.

Based on these data, seasonal no-construction buffer zones will be developed around each nest using site-specific information such as visibility from the nest to the project, existing disturbance proximal to each nest, and typical species' tolerance for disturbance. For bald eagles, a seasonal 660-foot no-construction buffer is specified by the National Bald Eagle Management Guidelines for active nests that are visible from a disturbance and in areas where similar disturbance is not present (USFWS 2007).

6 Agency Consultations

Section 6.2 provides a summary of agency correspondence to date. Copies of correspondence are included in Appendix 8.

6.1 Required Permits and Approvals

Table 6.1: provides the permits required for construction of the Project in North Dakota.

AGENCY	PERMIT OR AUTHORIZATION	SUBMITTAL/ ANTICIPATED SUBMITTAL
U.S. Army Corps of Engineers (USACE) Omaha District	Nationwide Permit (NWP) 58 for Utility Line Activities for Water and Other Substances	Oct 2022
	Section 408 Review	Feb 2022
U.S. Fish and Wildlife Service (USFWS) – Mountain Prairie Region	Section 7 Consultation for Threatened and Endangered Species Review and/or Clearance	Oct 2022
North Dakota Public Service Commission (NDPSC)	Certificate of Corridor Compatibility and Route Permit; North Dakota Rules, Article 69-06, Chapter 69-06-02.1	Oct 2022
	Certificate of Public Convenience and Necessity; ND Century Code Chapter49-03.1	Oct 2022
North Dakota Department of Environmental Quality (NDDEQ)	401 Water Quality Certification (WQC)	Oct 2022
	North Dakota Pollutant Discharge Elimination System General Permit for Temporary Discharge Activities	March 2023
	NDPDES General Permit for Stormwater Discharges Associated with Construction Activities	March 2023
North Dakota State Historic Preservation Office (NDSHPO)	Section 106 National Historic Preservation Act Consultation	Oct 2022
	North Dakota Century Code Chapter 55-02-07	Oct 2022
North Dakota Department of Water Resources (NDDWR)	Temporary Water Use Permit	Jan 2023
	Authorization to Construct a Project Within Sovereign Lands of North Dakota	Feb 2023
County Floodplain Administrators	County Floodplain Development Permits	Jan 2023 - Feb 2023
County and Local Authorities	Special or Conditional Use Permits, driveway permits, and road crossing permits where required	Jan 2023 - Feb 2023

6.2 Agency Correspondence

The Applicant initiated consultation and coordination with the designated state agencies and officials listed in NDAC 69-06-01-05, as well as to various federal and county agencies and officials. Consultation and coordination consisted of in person meetings, telephone conferences, mailings, email correspondence, and public meetings to introduce the Project, provide information about construction and operation of the Project, request agency review and comment on the Project, and discuss comments and concerns of affected parties. A summary of these consultations is provided in Table 6.2, and further details on each consultation are included in the following sections.

Table 6.2: Agency Notifications

AGENCY	FORM OF CONTACT	DATE OF CONTACT
Aeronautics Commission	Letter	October 14, 2022
Attorney General	Letter	September 10, 2021
Department of Agriculture	Letter	October 14, 2022
Department of Career and Technical Education	Letter	October 14, 2022
Department of Commerce	Letter	October 14, 2022
Department of Environmental Quality	Letter	October 14, 2022
Department of Human Services	Letter	October 14, 2022
Department of Labor and Human Rights	Letter	October 14, 2022
Department of Transportation	Letter	October 14, 2022
Department of Trust Lands	Letter	October 14, 2022
Energy Infrastructure and Impact Office	Letter	October 14, 2022
Federal Aviation Administration	Letter	October 14, 2022
Federal Bureau of Land Management	Letter	October 14, 2022
North Dakota Game and Fish Department	Letter	October 14, 2022
Governor's Office	Letter	October 14, 2022
Grand Forks Air Force Base	Letter	October 14, 2022
Indian Affairs Commission	Letter	October 14, 2022
Industrial Commission	Letter	August 6, 2021
Job Service North Dakota	Letter	October 14, 2022
Military Aviation and Installation Assurance Siting Clearinghouse	Letter	October 14, 2022
Minot Air Force Base	Letter	October 14, 2022
Natural Resources Conservation Service	Letter	September 14, 2021
North Dakota Forest Service	Letter	October 14, 2022
North Dakota Geological Survey	Letter	October 14, 2022
North Dakota Pipeline Authority	Letter	October 14, 2022
North Dakota Transmission Authority	Letter	October 14, 2022
Parks and Recreation Department	Letter	October 14, 2022
State Department of Health	Letter	October 14, 2022
State Historical Society of North Dakota	Letter	September 14, 2021
Department of Water Resources (formerly State Water Commission)	Letter	September 15, 2021
The county commission of the county or counties where the Project is located	Letter	Various
Twentieth Air Force Ninety-first Missile Wing	Letter	October 14, 2022
U.S. Army Corps of Engineers	Letter	August 17, 2021

Table 6.2: Agency Notifications

AGENCY	FORM OF CONTACT	DATE OF CONTACT
U.S. Department of Defense	Letter	October 14, 2022
U.S. Fish and Wildlife Service	Letter	August 11, 2021

The Applicant has designed and will construct and operate the Project in general accordance with the recommendations and requirements of the consulting agencies. Project specific impact minimization measures are discussed in Sections 7 and 8 of this application. A brief summary of the agency responses received to date are summarized below. Records of consultations with the agencies listed below are provided in Appendix 6. The Applicant will submit all applicable agency correspondence to the NSPSC.

6.2.1 US Fish and Wildlife Service

The USFWS administers several programs designed to identify and protect special status plant and animal species and critical habitats. Contact was initiated with the USFWS National Wildlife Refuge System and Ecological Services on August 17, 2021, and August 19, 2021, respectively. The purpose of contact was to introduce the Project, request input and information on listed species occurrences, areas managed or controlled by USFWS, and any other specific areas of concern or interest where USFWS recommends focusing routing and construction methodologies, and to setup pre-application meetings. Maps and routing information were provided to the USFWS.

Following the meeting with USFWS Ecological Services, they suggested, in correspondence dated September 27, 2021, using the Information for Planning and Consultation (IPaC) database (USFWS, 2021) to gather information on listed species that may be affected by the Project. USFWS also suggested contacting North Dakota Game and Fish and the North Dakota Parks and Recreation Department to develop data sharing agreements with Natural Heritage Programs and to identify specific known species locations. USFWS Ecological Services encouraged the Applicant to continue working with USFWS National Wildlife Refuge System and Wetland Management Districts to identify avoidance areas and areas of concern to minimize impacts to fee lands and easements.

A follow up meeting was held with USFWS on January 25, 2022, to discuss threatened and endangered species within the Project area and survey requirements. Based on the provided information, USFWS identified the following requirements for North Dakota:

- If using water from the Missouri River, the withdrawal pump should have an intake screen with a mesh opening no larger than 0.125 inches. A floating surface intake should be used to avoid the benthic habitat and water velocity at the screen should not exceed 12 centimeters per second to prevent entrainment of larval fish. Additionally, the intake screen will be periodically checked for fish impingement.
- Survey for pallid sturgeon, scaleshell mussel, and piping plover is not required due to the use of HDD at the Missouri River crossing and implementation of the intake screen requirements for water withdrawal from the Missouri River.
- The Applicant will abide by northern long-eared bat (NLEB) 4(d) rule timing restrictions for tree removal (June 1 to July 31) and any large, wooded area will be avoided. Therefore, surveys for NLEB are not required.
- The similar avoidance measures for the piping plover will be implemented for Rufa red knot.
- The Applicant will coordinate with the USFWS to track whooping crane migration, avoid construction during the migration window, or adhere to other mitigation measures, such as stopping work when birds are near.

- Surveys are required for the western prairie fringed orchid to determine areas of suitable habitat. The Applicant will provide a survey plan for USFWS review and concurrence.
- Nests for bald and golden eagles are not to be disturbed.
- The Applicant will work with the four waterfowl production areas that are crossed by the Project to obtain easements that may be required for the pipeline crossings.
- Vegetation clearing should be conducted outside of the nesting season (determined to be April 1 through July 15 in North Dakota) for birds covered under the MBTA.

6.2.2 US Army Corps of Engineers

The USACE administers regulatory programs governing certain activities involving waters of the U.S. The USACE has been delegated authority under the Clean Water Act by the U.S. Environmental Protection Agency (USEPA) to regulate activities that may result in discharges to these waters. The USACE has developed the Nationwide Permit (NWP) program which it uses to regulate various activities including utility line activities, which includes CO_2 pipelines.

Contact was initiated with the USACE Omaha District on August 17, 2021, and a pre-application meeting was held on August 26, 2021. Maps and routing information were provided to the USACE. Discussions in the form of e-mails, telephone conversations, and virtual meetings are ongoing with the USACE regarding Section 404/10, Section 408, Tribal engagement, and coordination with other agencies, including USFWS and SHSND. A Pre-Construction Notice for NWP 58 was submitted the USACE Omaha District on October 4, 2022.

6.2.3 North Dakota Game and Fish Department

Contact was initiated with North Dakota Game and Fish Department (NDGFD) on August 31, 2021, to discuss the environmental review process and sensitive resources that may be located along the route. Maps and routing information was provided the NDGFD to assist in the review process.

6.2.4 North Dakota Department of Water Resources

The North Dakota Department of Water Resources (NDDWR) has the authority to investigate, plan, construct, and develop water-related projects, and serves as a mechanism to financially support those efforts throughout North Dakota. The Applicant provided maps and routing information to NDDWR during initial consultation. Based on NDDWR's review of the provided information, NDDWR identified several water resources in the state that will require Sovereign Land Permits. The NDDWR indicated that construction permits will be required if the Project utilizes temporary water storage vessels and that conditional or temporary permits for water appropriation will be required if surface or ground water is diverted for the Project.

6.2.5 State Historical Society of North Dakota

The SHSND is responsible for managing the historic and archaeological resources of the state; as such, the NDSHPO maintains records of all previously recorded cultural resources within the state and serves as a consulting participant in review process for Section 106 of the NPHA representing the interest of the state in preserving cultural and historic properties. Contact was initiated on August 12, 2021, to introduce the Project, discuss proposed field methods, and a timeline for scope of work and field survey submittals. Concurrence was received from the SHSND for the survey protocols on October 11, 2021 (Appendix 8). The Applicant will submit all future correspondence with the SHSND to the NDPSC.

6.2.6 North Dakota Department of Environmental Quality

The NDDEQ administers air quality, water quality, and waste management regulatory programs in the State of North Dakota. The NDDEQ administers the North Dakota Pollution Discharge Elimination System (NDPDES), a program that regulates and issues permits for water discharges, including construction stormwater, site

dewatering, and hydrostatic test water. The Applicant or its contractor will obtain the following NDPDES permits from the NDDEQ:

- **Construction Stormwater**: The Applicant or its contractor will seek coverage under the NDPDES general permit for construction sites as required when disturbing an area greater than one (1) acre. A project-specific erosion control plan referred to as SWPPP will be prepared and maintained on-site for the duration of the Project.
- **Hydrostatic test water discharges**: The Applicant or its contractor will seek coverage under the NDPDES general permit for various temporary discharges, including both construction site dewatering and hydrostatic test water discharges.
- **401 Water Quality Certification (WQC):** The Project is automatically granted 401 WQC under NWP 58.

6.2.7 North Dakota Industrial Commission

Contact was initiated with the NDIC in September 2021 to introduce the MCE Project and discuss scope of the sequestration facilities. Additional meetings have been had with individual commissioners to both introduce the MCE Project and scope of the sequestration facilities and to follow up with project updates as needed.

6.2.8 County Commissioner's

The Applicant has contacted the commissioners currently sitting on the boards in Burleigh, Cass, Dickey, Emmons, Logan, McIntosh, Morton, Oliver, Richland, and Sargent counties through county commission meetings and updates. No written responses have been provided by the commissioners.

6.2.9 Additional Notifications and Consultations

In addition to the above notifications and consultations. The following agencies have been provided notification of the proposed Project shortly after filing this application.

- Burleigh County Building, Planning, and Zoning
- Burleigh County Water Resource Board
- Burleigh County Weed Control Board
- Cass County Planning Commission
- Cass County Joint Water Resource District
- Cass County Weed Control Board
- Dickey County Water Resource Board
- Dickey County Weed Control Board
- Emmons County Water Resource Board
- Emmons County Weed Control Board
- Logan County Water Resource Board
- Logan County Weed Control Board
- McIntosh County Water Resource Board
- McIntosh County Weed Control Board
- Morton County Planning and Zoning Commission
- Morton County Water Resource Board
- Morton County Weed Control Board
- Oliver County Planning and Zoning Board
- Oliver County Water Management Board
- Oliver County Weed Control Board
- Richland County Water Resource Board
- Richland County Weed Control Board
- Sargent County Water Resource Board
- Sargent County Weed Control Board

Meetings have occurred with the Emergency Management Directors of the counties that the Project is proposed to affect. The meeting discussions addressed the timeline of operations and the Emergency Management Directors agreed that the training, exercises, and response procedures should start once the pipeline construction starts. The Emergency Management Directors agreed to reach out to first responders that would respond to an incident to gather equipment needs and provide to the Applicant. Additional details about emergency response are outlined in the Applicant's Draft Emergency Response Plan (Appendix 9). Table 6.2.8 provides a list of emergency contacts the Applicant has had discussions with.

Table 6.2.8: Emergency Management Contacts		
COUNTY(S)	**EMERGENCY MANAGEMENT DIRECTORS**	**DATE**
Burleigh, Emmons	Mary Senger	June 14, 2022
Morton	Cody Mattson	June 14, 2022
Oliver	Carmen Reed	June 14, 2022
Cass	Jim Prochniak	June 15, 2022
Richland	Brett Lambrecht	June 15, 2022
Sargent	Wendy Willprecht	June 15, 2022
Dickey	Charlie Russell	June 15, 2022
McIntosh	Neil Meidinger	June 15, 2022
Logan	Daniel Schwartz	June 15, 2022

The Applicant will educate the first responders to the pipeline details, hazards of CO_2 releasing from a pipeline, responding to a release, developing the first responders plan of response with the Applicant. Tabletop exercises will be conducted with the first responders and SCS operations before transportation of CO_2 starts.

6.2.10 Tribal Outreach

The Applicant respects and strongly supports the government-to-government consultation process between Native American Tribes and Federal and State departments and agencies. The Applicant's support for the Tribal consultation process includes providing timely and substantive information to all Tribes having historical, cultural, and spiritual connections within the proposed area of the MCE Project. The Applicant is also committed to building mutually beneficial relationships with Tribal- and Native American-owned businesses as its carbon capture, pipeline, and storage project is planned, constructed, and operated.

The 62 Tribes invited to participate in archaeological surveys in August 2021 included the four Tribes with reservations within North Dakota's state borders: the Mandan, Hidatsa, and Arikara Nation - Three Affiliated Tribes, Fort Berthold Reservation; Spirit Lake Tribe, North Dakota; Standing Rock Sioux Tribe of North and South Dakota; and Turtle Mountain Band of Chippewa Indians of North Dakota. Of these four Tribes, the Three Affiliated Tribes and Turtle Mountain participated in cultural surveys in the state of North Dakota. Six additional Tribes with ancestral ties to North Dakota also participated in North Dakota surveys. See Section 5.1 of this application for more information on this effort. The Applicant has worked closely with the Tribal monitors to ensure that Tribal sensitive areas of concern are avoided along the Project route. Additionally, Tribal Historic Preservation Officers (THPOs) from these 62 Tribes are notified once the cultural reports have gone through SHPO review and are provided access to the archaeological reports via a confidential and secure server for their review and comment.

In addition, the Applicant has had phone conversations or virtual meetings with Tribal Leaders, THPOs, and/or cultural resources staff.

In December 2021, each Tribe was invited to conduct TCP studies in the Project area. The Project will compensate Tribes for conducting studies that seek to identify possible TCP or historic properties that can be located within the Project corridor.

In February 2022, the Applicant hosted a series of three introductory Project webinar meetings for Tribal leaders, THPOs, USACE, USFWS, and SHPOs. The webinars provided a project overview focusing on cultural surveys and project permitting with a roundtable discussion following the presentations.

The Applicant has 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 May 2022, the Project was presented at both the Northern Plains TERO meeting and at Coalition of Large Tribes' (COLT) quarterly meeting. A project update to the COLT membership at their quarterly meeting in August 2022 was also provided.

In addition, all Tribes located in North Dakota or believed to have historical, cultural, and spiritual connections to North Dakota lands have been provided notification of the proposed Project.

7 Policy Criteria

NDAC Section 69-06-08-02(4) states that the NDPSC may give preference to an applicant that will maximize benefits that result from the adoption of the policies and practices provided in 6906-08-02-(4). Additionally, the NDPSC may give preference to an applicant that will maximize interstate benefits. Sections 7.1 through 7.10 provide policies and practices that will be implemented for the Project.

7.1 Location and Design

The Project underwent a rigorous corridor route selection process as described in Section 4.4. The Project route corridors and facility locations have and continue to be sited in accordance with the North Dakota Energy Conversion and Transmission Facility Siting Act (NDCC Chapter 49-22.1).

Surveys and reviews for constructability, environmentally sensitive areas, and cultural resources have been performed and additional surveys will continue as needed or determined through consultation with landowners and state and federal resource agencies. Route modifications will continue through permitting and land acquisition processes to further reduce environmental impacts. The Applicant has and will continue discussions with landowners regarding placement of the pipeline on respective tracts. The Applicant is committed to working with individual landowners along the route to maximize benefits to both parties.

Project pipeline and facilities will meet or exceed state and federal safety requirements and, at a minimum, will be designed in accordance with Title 49 CFR Part 195: Transportation of Hazardous Liquids by Pipeline.

7.2 Training and Utilization of In State Labor

The Applicant is committed to using local union and non-union contractors, local suppliers, and local and businesses to provide ongoing economic benefits to local communities in North Dakota and the Midwest. The estimated workforce for Project construction and operations is provided in Table 7.2. The Project will employ welders, mechanics, electricians, pipefitters, heavy equipment operators, and others within the heavy construction industry.

Table 7.2: Project Workforce

WORKFORCE	WORKER YEARS [1,3]	ANNUAL EMPLOYEES[2,3]
Project Construction Jobs	5,803	1,934
Operation Jobs	~	150

Source: E&Y 2022.

[1] Sum of full-time workers required over the course of the three-year construction period (2022- 2024) to complete the construction of the Applicant's pipeline project.

[2] Per year on average.

[3] Total Applicant employees (direct), suppliers/contractors (indirect), and induced jobs.

During construction, the Applicant and its contractors will use local labor to the extent possible. The Applicant will aim to recruit local candidates to fill permanent positions to operate and maintain the project. The Applicant will establish a comprehensive orientation, technical, safety, emergency, and on-the-job training program that is in compliance with the Operator Qualification rules issued by PHMSA under Title 49 CFR Part 195. Demonstrations of competence are shown through reviews of job performance, periodic pipeline control system simulations, emergency exercises, welding certification tests, and other functions required to continue safe pipeline operation and maintenance.

7.3 Economies of Construction and Operation

The Project pipeline routes were selected to minimize impacts on the social, economic, and environmental resources to the greatest extent practicable. The Project route was designed to be as straight as possible while considering landowner concerns, constructability, exclusion areas, avoidance areas, and selection and policy criteria.

To the extent possible, the pipe will be manufactured in the U.S. and pump stations will be assembled and packaged in the U.S. The Project estimated capital investment for construction of the pipelines and pump stations (pipeline facilities) in North Dakota is approximately $898 million (E&Y 2022). The continued costs of maintenance and operation of the pipeline facilities (includes insurance, ROW maintenance expenses, SCADA, engineering maintenance, and regulatory compliance, among other smaller items) is approximately $18 million per annum.

7.4 Use of Citizen Coordinating Committees

The Applicant does not anticipate the use of a citizen coordinating committee.

7.5 Commitment of Portion of Transmitted Product for Use in State

The CO_2 emissions captured and transmitted through North Dakota will be sequestered and permanently stored underground in Oliver and Mercer counties to prevent release to the atmosphere thereby reducing greenhouse gas emissions for North Dakota and surrounding states. The Project will be capable of capturing and safely transporting approximately 0.54 MMTPA CO_2 from the Tharaldson Ethanol Plant in Cass County, North Dakota.

7.6 Labor Relations

The Applicant maintains positive labor relations with its staff and contract workforce. Installation of the pipeline facilities will be performed by companies contracted for the Project that will comply with all appropriate federal, state, and local laws. The Applicant does not anticipate encountering any adverse labor relations on this Project.

7.7 Coordination of Facilities

The Applicant does not currently own or operate any facilities within North Dakota. However, the Project has been designed to site new facilities to avoid and minimize human and environmental impacts to the greatest extent possible. All Project components (pipelines, pump stations, MLVs, etc.) in North Dakota and the other states associated with the MCE Project (Minnesota, Iowa, South Dakota, and Nebraska) are used in conjunction and coordination with each other. This coordination of in- and out- of-state operations allows for the cost effective and safe transportation of CO_2 to a planned sequestration site. Additionally, ongoing commercial discussions are being had between the Applicant and various industrial facilities may lead to future system expansion as appropriate (any expansion would be done in coordination with the NDPSC as appropriate).

7.8 Monitoring Impacts

Project construction impacts will be controlled and mitigated through the use of BMPs such as those identified in the ECP (see Appendix 3). The ECP provides the Project with procedures to reduce the occurrence of off-site sedimentation and erosion and to increase the success and efficiency of revegetation and restoration methods. The ECP implements recognized BMPs to minimize and mitigate impacts to wetlands, waterbodies, and agricultural areas. Additionally, the Applicant will use appropriate construction techniques, and environmental inspection during construction to ensure compliance with the requirements of federal and state agencies and commitments made by the Project. Following construction, periodic inspection will be performed to ensure restoration efforts are successful as required by permitting authorities.

During operations, the Applicant will utilize a supervisory control and data acquisition system that provides for continuous, remote monitoring and control of pipeline operations. Additionally, visual surveillance will be conducted in accordance with Title 49 CFR Part 195.412.

7.9 Utilization of Existing and Proposed Rights-of-Way and Corridors

Proposed Project collocation is where Lateral Lines, the Trunkline and Mainline abut or are within 500-feet from existing pipeline corridors, powerline corridors, road corridors and railroad corridors are shown in Table 7.9.

Table 7.9: Pipeline Collocation North Dakota

ROUTE	TOTAL PIPELINE LENGTH (MILES)	TOTAL PIPELINELINE CONSTRUCTED IN GREENFIELD (MILES)	PERCENT CONSTRUCTED IN GREENFIELD	COLLOCATION WITH OTHER LINEAR CORRIDORS (MILES)	PERCENT OF PROJECT COLLOCATED
Lateral Lines					
MNL-321	3.43	3.43	100.00%	0.00	0%
NDL-323	16.97	15.96	94.07%	1.01	5.93%
NDL-324	54.66	46.11	84.37%	8.54	15.63%
NDL-328	6.55	6.43	98.23%	0.12	1.77%
Trunkline					
NDT-211	88.48	77.84	87.98%	10.63	12.02%

Table 7.9: Pipeline Collocation North Dakota					
ROUTE	**TOTAL PIPELINE LENGTH (MILES)**	**TOTAL PIPELINELINE CONSTRUCTED IN GREENFIELD (MILES)**	**PERCENT CONSTRUCTED IN GREENFIELD**	**COLLOCATION WITH OTHER LINEAR CORRIDORS (MILES)**	**PERCENT OF PROJECT COLLOCATED**
Mainline					
NDM-106	149.91	130.84	87.28%	19.06	12.72%
Pipeline Routes Combined					
Total	**319.98**	**280.62**	**87.70% (Average)**	**39.37**	**12.30% (Average)**
Note: Length mileage and percentage are based on collocation within 200 feet of the Project's centerline.					

7.10 Other Existing or Proposed Transmission Facilities

The Applicant is aware that Dakota Gasification Company is proposing to construct an approximately 6.8-mile-long CO_2 gas pipeline from their Great Plains Synfuels Plant to certain CCS locations in central Mercer County, North Dakota. This is a dedicated facility for those CO_2 sources and does affect the proposed Project.

Additionally, Souris Valley Pipeline Ltd. – a Dakota Gasification Company subsidiary – has owned and operated a 14-inch 205-mile CO_2 pipeline since 2000. The pipeline transports 0.15 MMCFD of CO_2 from Dakota Gas to the Weyburn field in Saskatchewan, Canada where the CO_2 is utilized for enhanced oil recovery (Dakota Gasification Company, n.d.).

8 Siting Criteria

The exclusion and avoidance area criteria set forth in NDAC 69-06-08-02(1) and (2) were taken into consideration when establishing the location of the proposed Route. Any exclusion and avoidance areas located within the proposed 300-foot Project Corridor and Route are depicted on the map books provided in Appendix 1. Further discussion of these areas, the selection criteria, the policy criteria, and other criteria considered is provided in the following Sections. The criteria set forth in NDCC 49-22.1-09 were also evaluated, as discussed in the following sections.

8.1 Exclusion Areas

In accordance with NDAC 69-06-08-02(1), certain geographical areas shall be excluded from consideration for a transmission facility route. A buffer zone of a reasonable width to protect the integrity of the area must be included. Exclusion areas may be located within a corridor, but at no given point may such an area or areas encompass more than 50 percent of the corridor unless there is no reasonable alternative. A summary of exclusion areas in relation to the Corridor and Route is provided in Table 8.1.

Table 8.1: Exclusion Areas Summary

EXCLUSION AREA	PRESENT WITHIN 1-MILE OF ROUTE CENTERLINE	PRESENT WITHIN 300-FOOT SURVEY CORRIDOR	CROSSED BY ROUTE
Designated or Registered National: Parks, Memorial Parks, Historic Sites and Landmarks, Natural Landmarks, Historic Districts, Monuments and, Wilderness Areas, Wild, Scenic, or Recreational Rivers, Wildlife Refuges, and Grasslands	No	No	No
Designated or Registered State: Parks, Forests, Forest Management Lands, Historic Sites, Monuments, Historical Markers Archaeological Sites, Grasslands Wild, Scenic, or Recreational Rivers, Game Refuges, Game Management Areas, Management Areas, and Nature Preserves.	No	No	No
County Parks and Recreational Areas, Municipal Parks, Parks Owned or Administered by Other Governmental Subdivisions, Hardwood Draws, and Enrolled Woodlands	No	No	No
Areas of Critical Habitat[1]	Yes	Yes	Yes[1]
Areas Where Unique or Rare Species will be Irreversibly Damaged	No	No	No
Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility	No	No	No
Areas within 30 Feet on Either Side of a Direct Line between an Intercontinental Ballistic Missile Launch or Launch Control Facility	No	No	No

[1] Areas of USFWS designated critical habitat will be avoided by HDD, therefore there is no impact to the critical habitat

Areas of piping plover USFWS designated critical habitat along the Missouri river corridor cannot be avoided through traditional construction methods since it is a large continuous swathe that runs from central South Dakota, north through North Dakota turning west and into Montana. The critical habitat will be avoided through the use of HDD.

8.1.1 Designated or Registered National: Parks, Memorial Parks, Historic Sites and Landmarks, Natural Landmarks, Monuments and Wilderness Areas

Utilizing digital data from multiple sources including the (2022) USGS, Protected Areas Database of the United States (PAD-US), U.S. Census TIGER (2021), and ND GIS Hub (2021), the Applicant reviewed an area within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline. Based on this review there are no National Parks, Memorial Parks, Historic Sites and Landmarks, Natural Landmarks, Monuments and Wilderness Areas.

8.1.2 Designated or Registered State: Parks, Historic Sites, Monuments, Historical Markers, Archeological Sites, and Nature Preserves

Utilizing digital data from multiple sources including USGS PAD-US, TIGER, and ND GIS Hub, the Applicant reviewed an area within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey

corridor, and the pipeline route centerline. Based on this review there are no there are no designated or registered state parks, historic sites, monuments, historical markers, archaeological sites, or nature preserves along the project route.

8.1.3 County Parks and Recreational Areas, Municipal Parks, and Parks Owned or Administered by Other Governmental Subdivisions

Utilizing digital data from multiple sources including USGS PAD-US, TIGER, and ND GIS Hub the Applicant reviewed an area within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline. Based on this review there are no County Parks and Recreational Areas, Municipal Parks, and Parks Owned or Administered by Other Governmental Subdivisions located within the identified evaluation areas.

8.1.4 Areas of Critical Habitat

USFWS defines critical habitat as: “specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation.”

Of the seven federally listed endangered or threatened species which have the potential to occur within the Project area, only the piping plover has mapped critical habitat which occurs within the Project footprint. Based on available data from the USFWS, critical habitat for the piping plover, occurs in Oliver, Morton, and Burleigh counties. Mainline NDM-106 crosses piping plover critical habitat at the Missouri River crossing. The pipeline will cross the Missouri River using HDD methodology, thereby avoiding direct impacts to the piping plover's critical habitat. Any additional mitigative measures to ensure no adverse effects to the species will be coordinated with the USFWS.

8.1.5 Areas Where Unique or Rare Species will be Irreversibly Damaged

The Project does not cross any areas that have been identified as unique or areas where rare species are present except for those identified in Section 8.1.4.

A total of seven federally listed species and one federally designated critical habitat were identified as potentially occurring within the Project area. Based on field surveys and review of available sources, it has been determined that the Project will either have No Effect or is Not Likely to Adversely Affect seven of the federally listed species: the piping plover, red knot, whooping crane, Poweshiek skipperling, western prairie fringed orchid, Dakota skipper and NLEB. Additionally, the Project will result in No Adverse Modifications to piping plover designated critical habitat. The species effect determination is not applicable for the monarch butterfly, which is currently listed as a candidate species. Nor is the species effect determination applicable for the bald eagle, which is protected under the MBTA and BGEPA.

8.1.6 Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility

The closest Intercontinental Ballistic Missile Launch (ICBM) facility is the 91st Missile Wing at Minot Air Force Base located approximately 93 miles north of mainline NDM-106. The Project is not located within 1,200 feet of the geographic center of an ICBM launch or launch control facility.

8.1.7 Areas within 30 Feet on Either Side of a Direct Line between an Intercontinental Ballistic Missile Launch or Launch Control Facility

As indicated in Section 8.1.6, the closest ICBM facility is located approximately 93 miles north of the terminus of NDM-106. Therefore, the Project is not located within 30 feet on either side of a direct line between an ICBM launch or launch control facility.

8.2 Avoidance Areas

In accordance with NDAC § 69-06-08-02(2), certain geographical areas may not be considered in the routing of a transmission facility unless the Applicant shows that, under the circumstances, there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the NDPSC may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative routes. In addition, a buffer zone of a reasonable width to protect the integrity of the area must be included, unless a distance is specified in the criteria. Avoidance areas may be located within a corridor, but at no given point may such an area or areas encompass more than 50 percent of the corridor unless there is no reasonable alternative. A summary of avoidance areas in relation to the Corridor and Route is provided in Table 8.2.

Table 8.2: Avoidance Area Summary

AVOIDANCE AREA	PRESENT WITHIN 1-MILE OF ROUTE CENTERLINE	PRESENT WITHIN 300-FOOT SURVEY CORRIDOR	CROSSED BY ROUTE	>50% OF STUDY CORRIDOR
Designated or Registered National Avoidance Areas (Historic Districts; Wildlife Areas; Wild, Scenic, or Recreational Rivers; Wildlife Refuges; and Grasslands)	Yes	Yes	Yes	No
Designated or Registered State Avoidance Areas (Wild, Scenic, or Recreational Rivers; Game Refuges; Game Management Areas; Management Areas; Forests; Forest Management Lands; and Grasslands)	Yes	No	No	No
Historical Resources Not Specifically Designated as Exclusion or Avoidance Areas	Yes	Yes	No	No
Within 500 Feet of a Residence, School, or Place of Business	Yes[1]	Yes	No	No
Reservoirs and Municipal Water Supplies	Yes	No	No	No
Water Resources for Organized Rural Water Districts	Yes	Yes	Yes	No
Irrigated Land[2]	N/A	N/A	N/A	N/A
Areas of Recreational Significance that are not Designated as Exclusion Areas	No	No	No	No
Areas which are geologically unstable	Yes	Yes	Yes	No

[1] Within 500 feet of the centerline (see Section 8.2.5 for discussion)

[2] While identified as an Avoidance Criteria in Chapter 69-06-08-02(2) irrigated land is not considered as an Avoidance Criteria for underground transmission facilities under Chapter 69-06-08-02(2).

8.2.1 Designated or Registered National Avoidance Areas

Utilizing digital data from multiple sources the Project was reviewed for designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline.

No federal wildlife refuges will be crossed the Project route centerline, but a portion of the Dakota Lake National Wildlife Refuge is within one mile of the Project route centerline in Dickey County.

Six waterfowl production areas as shown in Table 8.2.1 are within one-mile of the Project route centerline, all six are within the 300-foot survey corridor, and four are crossed by the pipeline route centerline. None of the waterfowl production areas encompass more than 50 percent of the Project Corridor. Wetlands within these waterfowl production areas have been avoided to the extent feasible, considering landowner routing requirements and constructability requirements (e.g., angles of pipe turn) (see Appendix 1).

Table 8.2.1: Waterfowl Production Areas

NAME	WITHIN 1-MILE OF ROUTE CENTERLINE	WITHIN 300 -FOOT SURVEY CORRIDOR	CROSSED BY ROUTE CENTERLINE	>50% OF STUDY CORRIDOR
Richland County Waterfowl Production Area	Yes	Yes	Yes	No
Sargent County Waterfowl Production Area	Yes	Yes	Yes	No
Dickey County Waterfowl Production Area	Yes	Yes	Yes	No
Mcintosh County Waterfowl Production Area	Yes	Yes	No	No
Emmons County Waterfowl Production Area	Yes	Yes	Yes	No
Burleigh County Waterfowl Production Area	Yes	Yes	No	No

While the Project crosses multiple waterfowl production areas, the Project will only have temporary impacts during construction and will not affect the overall purpose of the resources.

8.2.2 Designated or Registered State Avoidance Areas

The Applicant reviewed digital data from multiple sources for designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline. Based on this review, no designated or registered state field, scenic, or recreational rivers, game refuges, game management areas, management areas, forests, forest management lands were identified.

8.2.3 Historical Resources Not Specifically Designated as Exclusion or Avoidance Areas

The Applicant reviewed digital data from multiple sources for historical resources not specifically designated as exclusion or avoidance areas within one-mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline.

Twelve cemeteries are located within one mile of the Project route centerline. Two in Richland County, five in Sargent County, two in McIntosh County, one in Emmons County, and one in Oliver County. The Project will not directly cross or impact any of the cemeteries.

Historical resources and archaeological sites exist within the Project Corridor. See Section 5.1 of this Application for a more detailed discussion on previously identified cultural resources, the project specific field investigations, and agency correspondence. However, the Applicant has avoided potentially eligible sites and will continue to work toward avoiding all cultural resource sites as the Applicant is committed to avoiding all impacts to eligible cultural resources.

8.2.4 Areas that are Geologically Unstable

USGS databases, National Resources Conservation Service (NRCS) soil data (2019), and topographic information were reviewed to identify areas of potential geologic instability within the Project area including floodplains, seismic hazards, landslides, and slope instability. Overall, the Project route in North Dakota will traverse terrain that is geologically stable.

In North Dakota, most flooding occurs in the spring, when the winter snow cover melts. While flooding is generally considered a geologic hazard, the potential for a flood to negatively impact the Project is minimal. Approximately 64 acres of the Project's North Dakota footprint is located within the Federal Emergency Management Agency (FEMA) identified 100-Year floodplain (FEMA 2022). Impacts within the 100-year floodplain will be temporary. Following construction, contours will be restored to as close to previously existing contours as practical, preserving local flood elevations.

Seismic hazards include ground motion, surface faulting, and soil liquefaction. Soil liquefaction is a condition that typically occurs when loose, saturated soil is subjected to vibration or shockwaves, typically from a seismic event. The USGS ground motion hazard mapping (2017) indicates that the potential ground motion hazard in the Project area is low. Based on historical seismic activity in the area, the USGS estimates that an earthquake with a 10 percent probability of occurring within any 50-year interval will result in a maximum peak ground acceleration of 1-2 percent of the acceleration of gravity. Ground movement from an earthquake of this magnitude may cause a light perceived shaking but is not expected to cause any structural damage. In general, North Dakota historically has little earthquake activity that will be considered threatening or cause damage to property. There are no identified active faults within 100 miles of the Project footprint. The low probability of a seismic event occurring within the Project area makes the occurrence of soil liquefaction unlikely.

Karst terrain results from the dissolution of highly soluble bedrock such as limestone and dolomite. Land subsidence is the sinking of the Earth's surface, either gradually or sudden, due to the subsurface movements of materials such as water or soil. Areas with karst terrain are more susceptible to subsidence events (Galloway et al., 2005). Karst in the area is described as having fissures, tubes, and cave less than 1,000 feet long and 50 ft or less vertical extent in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft to 200 ft thick (Weary and Doctor, 2014). Approximately 392 acres crossed by the Project route are identified as having potential karst hazards. These hazards exist in the carbonate Niobrara and Carlile Formations and are overburdened by greater than 50 feet of glacially deposited insoluble sediments.

Slope instability occurs when unconsolidated soils and sediments located on steep slopes become saturated, usually from a flooding event. According to the USGS Landslide Hazard Inventory (Jones et al., 2019), the majority of the Project route in North Dakota is in an area designated as having low susceptibility to landslides (less than 1.5

percent of the area is involved in landslides). Approximately 1,571 acres along the pipeline routes are in areas identified as having a moderate susceptibility and low incidence to landslides (between 1.5 percent and 15 percent of the area is involved in landslides). Most of these are associated with stream cut banks and will be stabilized after construction to avoid erosion. There are no known areas along the Project route in North Dakota identified with high susceptibility to landslides.

8.2.5 Within 500 Feet of a Residence, School, or Place of Business

Utilizing digital data and aerial photography, eight domestic (residential) structures and one business were identified within 500 feet of the Project pipelines route centerlines. The Applicant has secured a waiver for one of the domestic structures from the landowner.

The Applicant is currently working with landowners of these locations to obtain waivers in writing in accordance with NDCC 49-22.1-03*., Exclusion and Avoidance Areas – Criteria* or revise the route to increase the set back.

8.2.6 Reservoirs and Municipal Water Supplies

The Project crosses the City of Bismarck and City of Mandan Community Source Water Protection Area in the vicinity of the Missouri River. The two Community Source Water Protection Areas extend outside of the HDD planned for the Missouri River crossing. The Project is anticipated to have little or no impact on the Community Source Water Protection Area's crossed and the resource is less than 50 percent of the Project Corridor.

The Project is within one mile of the following community source water protection areas:

- Four additional units of the City of Bismarck Community Source Water Protection Area.
- Apple Valley Coop Community Source Water Protection Area; and
- Two additional units of the City of Mandan Community Source Water Protection Area.

The Project will not directly impact any of these community source water protection areas.

There are four municipal water wells within one mile of the proposed Project route centerline and facilities locations. There are no municipal wells within the 300-foot survey corridor or crossed by the Project pipeline route. The Project will not directly impact any of the municipal water wells. In addition, the pipelines carry CO_2 which would vent to atmosphere in the unlikely event of a leak, having no impacts to groundwater sources for these municipal water supplies.

8.2.7 Water Resources for Organized Rural Water Districts

The Project crosses four Rural Water Districts:

- Southeast Water Users District – Richland County, Sargent County, Dickey County
- Cass Rural Water Users District – Cass County, Richland County
- South Central Regional Water District – Burleigh County
- Service by South Central – Emmons County, McIntosh County

The Southeast Water Users District uses water from the Hankinson Aquifer, the Spiritwood Aquifer, and the Middle LaMoure Aquifer. The Cass Rural Water Users District uses water from the West Fargo Aquifer, Sheyenne Delta Aquifer, and the Page Aquifer. The Sheyenne Delta Aquifer is crossed by the Project. The South-Central Regional Water District uses surface water from the Missouri River. The Missouri River is crossed by the Project as discussed in Section 8.2.6.

The Southwest Water Authority/Southwest Water Pipeline Project transports raw water from Lake Sakakawea. Lake Sakakawea is not within one mile of the proposed Project. In addition, the pipelines carry CO_2 which would vent to atmosphere in the unlikely event of a leak, having no impacts to surface water sources for these rural water districts.

8.2.8 Irrigated Land

While identified as an Avoidance Criteria in Chapter 69-06-08-02(2) irrigated land is not considered as an Avoidance Criteria for underground transmission facilities under Chapter 69-06-08-02(2).

8.2.9 Areas of Recreational Significance that are not Designated as Exclusion Areas

No areas of recreational significance not designated as exclusion areas have been identified within one mile of the proposed Project route centerline and facilities locations, within the 300-foot survey corridor, and the pipeline route centerline (See Section 8.1.3).

8.3 Selection Criteria

Pursuant to NDAC 69-06-08-02(3), a corridor or route shall be approved only when it has been demonstrated that any significant adverse effects resulting from the location, construction, and maintenance of the facility as they relate to the criteria shown below, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum.

8.3.1 Agricultural Production

Cultivated crops and hay/pasture are the predominant land uses crossed by the Project Corridor (See Table 5.4.1). Crop and forage (hay/pasture and herbaceous) production will be temporarily disrupted in cases where the construction period overlaps with the growing season. Landowners will be compensated for crop loss and reduced yields caused by construction of the Project.

Pipelines will be installed at depths that exceed the typical tillage depth (and greater than required by PHMSA). Project construction effects on agriculture and grazing (both tame and native pasture) will be minor and short-term. The primary impact will be the loss of standing crops or unavailability of native range or hay within the construction work area for the growing seasons during which Project-related activities occur.

In some cases, construction can result in soil compaction; mixing of topsoil and subsoil, including introduction of rocks into the topsoil from the subsoil; erosion; the introduction of weeds; and damage to irrigation and drainage systems. These impacts may lower soil productivity and reduce crop and hay yields as well as range productivity following construction. BMPs outlined in the ECP (Appendix 3) will be utilized to reduce and minimize the potential for these impacts.

Following construction, the Applicant will restore the construction ROW to its pre-construction contours to the extent reasonably practicable and stabilize the ground until the next growing season. Planting and harvesting will be allowed to continue over the operational ROW.

Permanent impacts on agricultural production will be limited to the areas where the aboveground facilities (e.g., pump stations and MLVs) and permanent access roads, will be constructed. These facilities will encompass a total of approximately 21.6 acres of land and the landowner will be compensated for the transfer of that property to the Applicant.

8.3.2 Family Farms and Ranches

Project construction activity will not substantially alter the patterns of landownership or create long-term disruptions of family farming operations.

Following construction, the construction ROW will be restored, and farming and ranching will be allowed to continue over the operational ROW (see ECP, Appendix 3). If crop damage were to occur during construction landowners will be compensated. Crop damage resulting from pipeline maintenance and repairs will be localized and the procedures outlined here for construction will be used in those focused locations. Landowners will be compensated for temporary loss of land use. Agricultural activity and livestock grazing activities will return to normal after replanting of crops and natural revegetation of pastureland.

8.3.3 Land which the owner can demonstrate has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation

The Project will cross lands with center pivot irrigation systems, however no permanent impacts to these lands will occur. The Applicant will work with landowners to identify any lands that may be economically suitable for irrigation.

8.3.4 Surface Drainage Patterns and Ground Water Flow Patterns

8.3.4.1 Surface Drainage

The construction of the pipeline will not alter surface drainage patterns. Streams, swales, ditches, and other natural drains will be restored to pre-construction contours after construction is complete (see ECP, Appendix 3). The pipe will be installed to depths that will not interfere with flow or maintenance efforts by landowners, or the natural course of the waterbody. As discussed in Section 2.2.12, drain tiles disturbed or damaged by pipeline construction will be repaired to its original or better condition.

8.3.4.2 Groundwater Flow

The depth of the pipeline trenches is anticipated to be shallower than groundwater elevations. Construction impacts that may occur to groundwater flow will be in surficial aquifers and will be highly localized and temporary in nature. HDD installations will enter surface groundwater sources, however, the use of naturally occurring bentonite clays will seal the space around the pipeline and not interfere with groundwater flow throughout the surficial aquifer. No permanent impacts to groundwater flow are expected as a result of the Project.

8.3.5 Sound Sensitive Land Uses

During Project construction residences or other sound sensitive receptors in proximity may experience short-term increases in construction related noise due to heavy equipment operation. Operation-related noise will be limited to the pump station sites which are more than 1,000 feet from the nearest potential receptor. Construction and operation of the Project is expected to comply with applicable noise requirements.

8.3.6 The Visual Effect on the Adjacent Area

The Project Corridor and facilities have a visual landscape comprised primarily of agricultural fields and open grasslands with widely spaced structures, roadways, and power lines typical of a rural setting. Taller vegetation and trees infrequently occur as riparian vegetation near streams and waterbodies or shelter belts. The landscape is very open with long sightlines and few vertical features to break the horizon.

Aboveground construction for the Project includes the four planned pump stations sites, two standalone launcher-receiver sites, and MLVs. The four pump stations, each found in a footprint that typically encompasses an area approximately 340 feet by 450 feet, are situated in rural areas near roads. The footprint for the PLRs will be approximately 150 feet by 150 feet and will be situated over the pipeline. The facilities will be fenced but because of their low topographic relief, will typically be visible only to those who directly pass near them. MLVs are small with a footprint approximately 50 feet by 50 feet along the pipeline ROW and within the permanent ROW. Apart from the aboveground facilities the Project will result in only short-term visual effects related to the presence of heavy equipment, staging areas, and removal of vegetation within the temporary construction workspace. Disturbed areas will be reclaimed but may continue to show short-term visual disturbance until vegetation is fully reestablished.

8.3.7 Extractive and Storage Resources

Three types of actively extractive resources were identified at various locations within the Project Corridor or pipeline routes: sand, gravel, and lignite. Impacts on future extractive development will not constitute a substantial loss of resource availability because of the narrow, linear nature of the pipeline ROW relative to the expanse of

areas with resource potential. In general, active mine sites were avoided and any future development will be coordinated between the Applicant and the landowner to minimize impacts to the mining operation as well as the operating pipeline.

The Project may require construction sand and gravel from local, existing commercial sources for use as pipe padding, road base, or surface facility pads. The demands for sand and gravel will aid in short term economics of the local gravel pits but will not affect the long-term availability of construction materials in the area.

8.3.8 Wetlands, Woodlands, and Wooded areas

The Applicant conducted both field and desktop survey of wetlands and waterbodies in survey corridor. The results of the survey are presented in Section 5.3.

The Project will result in the permanent drainage or filling of approximately 0.09 acres of wetlands and the permanent conversion of approximately 2.58 acres of PFO and PSS wetlands to PEM wetlands. The Applicant will restore the area as close to its previous state and naturally functioning condition as possible. Mulch, lime, herbicides, and fertilizers will not be utilized in wetlands unless approved by the appropriate land management and state agency.

Operational impacts will be limited to occasional mowing/vegetation maintenance along the ROW and no long-term adverse effects on wetland function or value are anticipated.

Impacts to trees will be avoided to the extent practicable. In areas where woodlands are present, the permanent ROW will be maintained in an herbaceous state free of trees to comply with federal regulations and to facilitate the safe operation, maintenance, and inspection of the pipeline.

Tree and shrub inventories will determine the number of trees and shrubs that will be removed during construction and the wooded acres that will be converted to open land. The Applicant will follow the NDPSC rules, orders, and specifications on tree mitigation and replacement.

8.3.9 Radio and Television Reception, and Other Communication or Electronic Control Facilities

No impacts to television or radio reception or other communication or electronic control facilities are anticipated because of the Project.

8.3.10 Human Health and Safety

The Applicant does not anticipate impacts to human health and safety resulting from construction or operation of the Project. Proper signage and warnings at road and highway crossings, railroad crossings, navigable rivers, and other locations to alert the public to the presence of underground lines and will provide information, contact numbers, and emergency data. The Project will be maintained and operated in accordance with applicable safety rules and laws.

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

Construction contractors for the Project 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, schedules, contact numbers, training, and other requested information to local and county emergency management.

Construction contractors for the Project will also 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.

8.3.11 Animal Health and Safety

The clearing of vegetation on the pipeline ROW will temporarily reduce cover, nesting, and foraging habitat for some species, temporarily displacing individuals that used these areas. After reclamation, it is likely that wildlife will be reestablished within the pipeline corridors to preconstruction levels.

The pump station sites, launcher-receiver sites, permanent access roads, and MLVs will permanently remove those locations from use by wildlife. Vegetation clearing and facility construction will reduce cover, nesting, and foraging habitat for some species, displacing individuals that used these areas. However, that loss is minimal, and it is anticipated that the adjacent habitat will support those wildlife species displaced.

Pipeline trenching activities and associated spoil piles may result in a short-term barrier restricting the movement of some wildlife species (typically two to four weeks at any one area). Except for short-term interruptions during construction, existing public roads, farm lanes, and livestock crossings will be kept open, providing crossing access for wildlife. During construction, temporary fencing, as necessary will be used to keep livestock and wildlife away from the pipeline trench and the length of time the trench will be left open will be minimized.

8.3.12 Plant Life

Clearing of vegetation for the pipeline is anticipated to have a short-term impact to plant life during construction. Vegetation will be removed from the construction ROW and temporary workspace areas. Vegetation will be cleared only to the extent necessary to facilitate access for construction, operation, and maintenance of the pipeline. Permanent revegetation will be needed in many areas and the Applicant will use and specify appropriate native seed mixes and application in accordance with applicable standards and landowner discussions. Additional information on revegetation is provided in the ECP in Appendix 3.

Operational impacts to vegetation will be limited to maintenance of the permanent easement where necessary to comply with federally mandated safety requirements. Management of the pipeline ROW for invasive species and noxious weeds is provided in the ECP in Appendix 3 as well as the Noxious Weed Management Plan in Appendix 10.

The pump station sites, launcher-receiver sites, permanent access roads, and MLVs will require a permanent change to vegetation within the facilities footprint. However, the total area removed from vegetative cover is not anticipated to have a significant impact to overall vegetation or plant life.

9 Other Factors Considered

9.1 Public Health and Welfare, Natural Resources, and the Environment

A discussion of the anticipated effects of the location, construction, and operation of the pipeline on public health and welfare, natural resources, and the environment is included in Sections 5, 7.3, 7.7, 7.9, 8.1, 8.2 and 8.3.

9.2 Transmission Technology and Design to Minimize Adverse Environmental Effects

The Project pipeline design is consistent with current pipeline technology. Various measures will be used to avoid, minimize, or mitigate impacts to sensitive resources, including implementing trenchless construction (HDD, bores), narrowing ROW widths, rerouting, and route deviations, and timing/scheduling considerations. Best management practices as identified in the ECP (Appendix 3) will be implemented to minimize impacts from clearing, trenching, and reclamation of the construction ROW. Potential impacts to environmentally sensitive areas and cultural resources will be avoided by rerouting or HDD/bore or by delineating and protecting sites during construction.

9.3 Potential for Beneficial Uses of Waste Energy

The Project does not include energy conversion facilities and as such this factor is not applicable.

9.4 Unavoidable Adverse Direct and Indirect Environmental Effects

Unavoidable adverse direct and indirect environmental effects for construction of the Project are minimal and have been described throughout the Application. Impacts to agricultural operations are anticipated to be minimal and impacts to transportation are anticipated to be short-term. Impacts on vegetation and wildlife will also be minimal. Vegetation will be removed from the ROW prior to construction, and the area will be restored and re-seeded following construction. Wildlife may temporarily avoid the ROW during construction, but no long-term impacts are anticipated. Noise level increases are associated only with construction.

9.5 Alternatives to Corridor/Route Identified During the Hearing Process

To date, all alternatives identifying environmentally superior routing alternatives have been incorporated into the current routing of the Project. Additional corridor or route alternatives may be identified during Project development. When identified, they will be reviewed and evaluated as appropriate. The Project is confident the alternatives developed and evaluated to date have identified a corridor and route that minimizes adverse effects as described in the preceding sections.

9.6 Irreversible and Irretrievable Commitments of Natural Resources

There are few commitments of resources associated with this Project that are irreversible and irretrievable, but include those resources related to construction, such as steel, concrete, aggregate, and hydrocarbon fuel. None of these resources, however, are in short supply, and their use for the Project would not have an adverse effect on the availability of these resources.

9.7 Direct and Indirect Economic Impacts of the Proposed Facility

The MCE Project is estimated to have a $4.5 billion capital investment with an estimated $898 million investment in North Dakota (E&Y 2022). The total MCE Project expenditure estimate includes construction of pump stations, the pipeline and other Project facilities, landowner easement payments, final design, and other oversight and support services. Construction outputs in North Dakota resulting from the Project will include employment, labor income, and support services spending. Economic impacts resulting from the Project will commence with initial landowner easement payments starting in 2021, continue through 2022-2024 and throughout operations and maintenance annually starting in 2024.

North Dakota has sales and use tax, gross receipts and lodging tax, and income tax. The Project will contribute directly and indirectly to tax bases at the state and local level. During operations and maintenance, the Project will also pay local property tax.

Ernst & Young's report (E&Y 2022) contains specifics regarding the MCE Project's North Dakota economic contributions, including assumptions and the following approximate estimates based on direct, indirect, and induced impacts[1]:

1) Construction (ending in 2024)
    a) Total Capital Expenditures: $898,000,000
    b) Total Work Years[2]: 5,803 worker years (equivalent to 1,934 average annual jobs)

[1] Direct economic contributions are expressed in employment, worker years, labor income, value added, output, and taxes resulting from Summit employees. Direct effects include Summit employees and wages paid to them. Indirect economic contributions are estimated in terms of employment, worker years, labor income, value added, output, and taxes resulting from intermediate purchases from local suppliers, including real estate, utility service, and insurance companies. The indirect effects also include a second-round contribution from local suppliers who support the businesses contributing to Project construction. Induced economic contributions consist of employment, worker years, labor income, value added, output, and taxes resulting from spending by the Summit workforce, employees of other businesses supporting Project construction, and their suppliers' employees.

[2] Worker years: Sum of work done over the course of the Project, represented as total number of workers.

c) Total Labor Income: $392,000,000
d) Total Value Added[3]: $569,000,000
e) Total Output[4]: $1,157,000,000
f) Total Tax Contributions: $61,000,000 (including $32,000,000 in state and local taxes)

2) Operations (2025 annual estimate)
a) Total Operating Expenditures: $18,000,000
b) Total Jobs: 150 (including 34 direct employees)
c) Total Labor Income: $14,000,000
d) Total Value Added: $22,000,000
e) Total Output: $47,000,000
f) Total State and Local Property Taxes: $32,000,000

9.8 Existing Development Plans of the State, Local Government and Private Entities at or in the Vicinity of the Corridor and Route

There are no known state or local government development plans in the vicinity of the Project.

MPC plans to construct a CCS system at their Milton R. Young Power Plant in Oliver County, North Dakota. This system will include one 16-inch pipeline that will ultimately supply CO_2 for subsequent injection and sequestration. The flowline will be routed to the Southeast corner of the power plant property, approximately 0.25 miles. The project is located approximately 5.9 miles north of pipeline NDM-106 at MP 152. The agreement between the Applicant and MPC provides access to MPC's already permitted 100-million-ton capacity CO_2 storage site near Center, North Dakota, the largest of only three such permitted sites in the United States. The agreement also creates the framework to jointly develop additional CO_2 storage resources nearby, which are estimated to have aggregate CO_2 storage exceeding 200 million tons. The collaboration is beneficial to both MPC's and the Applicant's projects, as it reduces risk, accelerates the timeline for financing and construction, and provides increased operational flexibility when CO_2 storage begins. These benefits importantly provide landowners an enhanced opportunity to maximize the value of the rock formations deep below the surface.

Montana-Dakota Utilities Co. plans to reroute an existing 230 kV transmission line for a new substation and terminating at a new line terminal in the Mandan Transmission Substation north of Mandan, North Dakota. The Montana-Dakota Utilities Co. project is located approximately 6 miles southeast of pipeline NDM-106 at MP 132 on the west side of the Missouri River.

BNI Coal, LTD has commissioned a new dragline at the company's Center Mine. The Center Mine supplies lignite to the Milton R. Young Power Station.

MPC's Project Tundra is being developed at the Milton R. Young Power Plant near Center, ND. The Project Tundra facility is designed to capture CO_2 at a rate of about ninety percent from either unit at the Young Power Plant. The CO_2 would then be stored more than a mile underground. If the project moves forward, North Dakota would be a world leader in the development of next-generation energy technologies (Project Tundra 2022).

There are no other known development plans in the vicinity the Project.

[3] Value added: Labor income plus indirect business taxes, consumption of fixed capital (depreciation), and mixed income.

[4] Output or gross economic output is the sum of value-added and intermediate input (supplier) purchases. This is equivalent to an industry's revenue and is considered the broadest measure of economic activity.

9.9 Effects of the Route on Cultural and Paleontological Resources

See Section 5.1 and Section 5.2 for a discussion of the potential Project impact on cultural and paleontological resources and associated minimization and mitigation measures.

9.10 Effects of Route on Areas of Biological Wealth or Rare and Endangered Species Habitat

Section 5, 8.1.4 and 8.1.5 discuss the potential Project impacts to biological resources including wetlands, waterbodies, vegetation, wildlife, and federally listed threatened and endangered species.

Species-specific surveys have been conducted, no effects on rare or endangered species and their habitats are expected. Any additional surveys required for condemnation tracts or for follow-up surveys will be conducted in 2023 and consultations with the USFWS and NDGFD will continue through 2022 and 2023 on any conservation measures required for construction.

9.11 Concerns Raised by Agencies

The Applicant initiated consultation and coordination with various federal, state and county agencies and officials. Section 6 provides a summary of agency consultations that have taken place. Agency comments varied according to agency function and jurisdiction, but agency comments generally emphasized a desire to minimize impacts to environmental resources such as wetlands, wildlife, and cultural resources. Agency comment letters regarding the Project are included in Appendix 8. The Project has and will continue to work with federal, state, and local agencies and address issues that are raised.

10 Mitigative Measures

The Applicant will use Environmental Inspectors to ensure compliance with permits, plans, regulations, construction commitments, and landowner agreements.

10.1 Special Construction Procedures

The Applicant will use special construction procedures as detailed in the ECP (Appendix 3) for irrigation systems (Section 3.5), drain tiles (Section 3.6), terraces (Section 3.7), waterbodies (Section 4), and wetlands (Section 5).

10.2 Horizontal Directional Drill and Bore Crossing Method

The Applicant will use, where required, the HDD or bore crossing methods for designated major and sensitive waterbodies, highway crossings, select railroad crossings, and select historic resources. Twenty-one HDDs are anticipated for the Project in North Dakota. The ECP Section 4.3.5 (Appendix 3) provides additional detail on HDDs. Additional mitigation measures are provided in the HDD Inadvertent Return Plan in Appendix 11.

10.3 Road and Railroad Crossings

The Applicant will bore paved/improved roads and railroads, other than those designated for HDD as described above, to minimize interference with traffic flow during construction activities. The Applicant will open cut or bore gravel roads. Open cutting a road will temporarily close it to traffic; however, it appears the road network throughout the Project area has suitable alternative routes available to prevent significant delays in traffic. Additionally, the open-cut trench can be plated to allow for traffic crossing when construction is not active (i.e., after the end of the workday).

The Applicant will acquire all applicable permits prior to conducting road crossings. The Applicant will obtain permission from all owners of private roads, to cross said roads. Temporary signs will be posted at each crossing as appropriate to alert motorists of construction activity and flagmen will be present during active construction activity.

10.4 Human Environment

The Applicant will require that all contractors be responsible for ensuring all trash is removed from the ROW daily. Extraneous vegetative, rock, and other natural debris will be removed before the completion of cleanup.

Construction debris will be removed from the construction ROW and disposed at regulated facilities that abide by state and federal regulations. Waste will be disposed of at a licensed waste disposal facility. Waste that contains or has previously contained oil, grease, solvents, or other petroleum products will be segregated for handling and disposal of hazardous wastes.

Once cleanup is complete, additional seeding and erosion control methods may be utilized to ensure restoration is accomplished. See Appendix 3 ECP Section 7.

The Applicant and its contractors will, to the extent practicable, minimize dust (see Appendix 3 ECP Section 2.10 and Appendix 12 Dust Control Plan) and noise (see Appendix 3 ECP Section 2.11) resulting from construction near residential areas.

10.5 Biological Resources

10.5.1 Waterbodies and Wetlands

The Applicant will implement special construction procedures for waterbodies and wetlands as discussed above and as identified in ECP Section 4 and Section 5.

10.5.2 Vegetation

Other than mitigation for tree and shrub loss, mitigation measures outlined in the ECP (Appendix 3) will be followed before and after construction. Tree and shrub surveys will take place prior to construction and a final mitigation plan developed for NDPSC approval before implementation. The Applicant and its contractors will protect shelter belts and trees to the extent possible in a manner compatible with the safe operation, maintenance, and inspection of the pipeline. Noxious weeds and invasive species will be managed in accordance with ECP Sections 2.7, 2.9.2, and 2.10.2 and the Noxious Weed Management Plan (Appendix 10).

10.5.3 Wildlife and Threatened and Endangered Species

The Project is anticipated to have *No Effect* or is *Not Likely to Adversely Affect* federally listed threatened and endangered species. Construction trenching will follow specific procedures to allow wildlife, and livestock, passage during pipeline construction (ECP Section 3.2). Consultation with the USFWS and NDGFD is ongoing and will provide guidance, if required, in the identification and development of mitigation measures for wildlife and threatened and endangered species.

10.6 Soil Resources

The Applicant and its contractors will minimize or avoid impacts to soils by implementing the measures identified in the ECP. Temporary erosion and sedimentation control measures may include installation of silt fence, straw bales, slope breakers, trench breakers, erosion control fabric and mulch.

The Applicant and its contractors will use topsoil segregation when stripping the topsoil for construction in certain areas. When separated, topsoil piles will be stabilized to reduce loss from erosion by utilizing measures such as sediment barriers, mulch, temporary seeding, or tackifiers, where necessary. Topsoil will be segregated where required by state regulation or as required by a landowner. Topsoil will be segregated in wetlands as required by conditions of the USACE 404 authorization.

Topsoil and subsoil piles will be placed so that at least a 1-foot of separation will be maintained between the piles to prevent mixing. If a 1-foot separation gap cannot be maintained, approval from the EI may be given to utilize a physical barrier such as a silt fence or thick layer of mulch. Topsoil may be tackified in excessive wind conditions.

10.7 Cultural Resources

The Project has conducted pre-construction cultural surveys to identify culturally significant sites and properties listed or eligible for listing in the NRHP. Areas identified as culturally or historically important were avoided to the extent practical by rerouting the pipeline corridor, reducing ROW workspace by HDD or other means. The SHSND will review the results of the 2021/2022 cultural field surveys and concur or comment on site eligibility for features found during surveys. The Applicant has also reached out to Tribes in the Project area and involved interested Tribes in the cultural resource surveys in 2021 and 2022. Tribes were also invited to conduct their own traditional cultural properties surveys in the Spring and Summer of 2022. While no Tribes agreed to partake in a TCP study, the Applicant financed a week-long cultural resources training course for the Mille Lacs Ojibwe tribe in Minnesota in April 2022.

If an unanticipated cultural resource is discovered during construction, the procedures identified in the Unanticipated Discovery Plan (UDP, see Appendix 13) will be implemented.

10.7.1 Unanticipated Discovery Plan

The Project has prepared an UDP (Appendix 13) that will be implemented to minimize disturbance to cultural sites and provide actions the contractor will take if any unanticipated cultural discovery is encountered during construction. Training will be provided to all construction personnel on unanticipated discovery procedures. In the event an unanticipated discovery is encountered, the Contractor will immediately halt all construction activities within a 100-foot radius; notify the EIs; and implement the procedures listed in the UDP.

10.8 Paleontological Resources

The Applicant and its contractors will implement processes, as identified in Section 5.2, to prevent impacts to paleontological resources during construction activities.

10.9 Land Use

The Applicant will obtain and comply with applicable county permits and zoning and land use regulations. Permits for the Project may include, but are not limited to, building permits, grade and fill permits, ditch crossing permits, road and utility permits, and conditional use permits.

In addition to the county and local permits the Applicant will acquire applicable state and federal permits which may include but not limited to the following:

- Pollution Discharge Elimination System General Permit for Temporary Dewatering, Hydrotest Water Discharge
- Pollution Discharge Elimination System General Permit for Temporary Dewatering, Trench, and Well Point Dewatering Discharge
- General Permit for Construction Stormwater Discharge
- Temporary Water Permit/Temporary Water Permit for Industrial Use
- Authorization to Construct a Project Within Islands and Beds of Navigable Streams and Waters (Sovereign Lands Permit)
- USACE, Section 404, Section 10, and Section 408

Procedures to be implemented by the Applicant and its contractors during construction, reclamation and revegetation are provided in detail in the ECP (See Appendix 3).

10.10 Environmental Compliance Inspection and Monitoring

The Applicant will use Environmental Inspectors to comply with construction activities and procedures as identified in the ECP Section 1.1 (Appendix 3).

Additionally, the Applicant will require inspections of erosion control devices (ECP, Section 2.9), clearing and grading limits of disturbance (ECP, Section 3.1), terraces post construction (ECP, Section 3.7), and contractor equipment for leaks for spill prevention (ECP, Section 8.2).

10.11 Policies and Commitments to Limit Environmental Impacts

The Applicant has identified its basic procedures and commitments to limit environmental impacts in the ECP (Appendix 3). In addition, the Applicant will continue working with landowners and resource agencies through the NDPSC application process and Project permitting to further refine and limit potential environmental impacts through reasonable and feasible facility and/or route variations and modifications.

11 List of Preparers

List of preparers along with their qualifications.

Table 11.1: Personnel Qualifications

NAME	DEGREE	QUALIFICATIONS AND EXPERIENCE
James Powel	B.S., Engineering	Currently serves as the Chief Operating Officer for the Applicant. Prior to joining SCS, James served in various senior leadership roles for both private and publicly traded midstream and upstream operating companies. James has more than 30-years of experience leading large energy infrastructure projects in the U.S. and internationally. In addition to his extensive project experience, James led the operating organizations for Hiland Partners as EVP & COO and Kinder Morgan as VP of Operations. As VP of Operations for Kinder Morgan, James was accountable for U.S. assets that included ~10,000 miles of pipeline and related facilities.
Jason Zoller	M.S., Biological Sciences B.S., Fisheries and Wildlife	Currently serves as the Environmental Program Manager for the Applicant. Before joining SCS, Jason worked as an environmental consultant for 16 years working on large controversial pipeline, LNG, transmission line, and renewable energy projects.
Lynn Meredith	B.S. Civil Engineering	Currently Director of Engineering and Technical Services at SCS. Prior experience includes engineering management leading technical teams and supporting pipeline assets through design, construction, and operation. Experience spans domestic and international projects with both onshore and offshore locations. Over 40 years of broad-based professional employment with E&P, Midstream, Interstate Gas Pipeline and EPC companies.

Table 11.1: Personnel Qualifications		
NAME	**DEGREE**	**QUALIFICATIONS AND EXPERIENCE**
Micah Rorie	B.A. Economics	Currently serves as Sr. Director of Land Services with 15 years experience covering all facets of both capex right of way and operations right of way leadership. Combined land management experience spans 13 states, 12,000 miles of pipeline right of way and 8,000 acres of fee simple transactions.
Jon Schmidt	Ph.D., Biological Sciences M.S., Biology B.S., Marine Biology	With over 30-years of experience, Jon Schmidt is currently the Vice President, Environmental & Regulatory Services of EXP Energy Services Inc. Jon has extensive experience in environmental management, particularly with respect to the pipeline industry including: environmental regulatory strategy development and project planning, project management, environmental baseline surveys, permitting, and environmental inspection and monitoring. In over 30 years, he has permitted over 30,000 miles of pipeline projects in most states in the US for mid-stream pipeline companies, gas distributors, and producers.
Grant Young	B.S. Biology	15 years of experience with environmental planning, impact assessment, and management of large capital projects including pipelines, transmission lines, and renewable energy.
Nathan Sessions	B.S. Geography	Mr. Sessions has more than 6 years of professional experience in environmental permitting, compliance, mitigation strategy development, waste management strategy development, sampling and analysis planning, stakeholder engagement, and technical writing. He specializes in water resource and geologic assessments and has experience working in both the private and public sectors.
Erin Salisbury	M.A. Anthropology B.A. Anthropology	More than 10 years of experience in cultural resources management. Erin has extensive archaeological experience in archaeological survey, data recovery, monitoring, report writing, tribal consultation, and project management/oversight for well pads, access roads, water lines, pipelines, seismic projects, transmission lines, and railroads across the Great Plains and southeast.
Michelle Erickson	B.S. Geography	With more than 8 years of experience specializing in environmental assessments, regulatory compliance, and permitting. Her experience has encompassed all sectors of oil and gas projects including development of transportation pipelines and facilities for both onshore

Table 11.1: Personnel Qualifications		
NAME	**DEGREE**	**QUALIFICATIONS AND EXPERIENCE**
		and offshore projects. Technical expertise in impact assessments, restoration and mitigation planning, environmental data analysis, field investigation, and technical writing.

12 References

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Appendix 1 – Map Book

Appendix 2 –
Aboveground Facility Typicals

Appendix 3 –
Environmental Construction Plan

Appendix 4 –
Damage Prevention Plan

Appendix 5 –
Cultural Resource Report

Contents include only title page and abstract.

Appendix 6 – Paleontological Report

Appendix 7 – Biological Reports

Appendix 8 –
Agency Correspondence

Appendix 9 –
Emergency Response Plan

Appendix 10 –
Noxious Weed Management Plan

Appendix 11 –
HDD Inadvertent Return Plan

Appendix 12 –
Dust Control Plan

Appendix 13 –
Unanticipated Discovery Plan