BakkenLink Dry Creek to Beaver Lodge Pipeline Project Environmental Assessment

January 2015

BLM

Bureau of Land Management, North Dakota Field Office, Dickinson, North Dakota

Abbreviations and Acronyms

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AADT	Annual Average Daily Traffic
AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act of 1978
amsl	above mean sea level
APE	area of potential effects
API	American Petroleum Institute
AQRV	air quality related value
ARPA	Archaeological Resources Protection Act
ATWS	additional temporary work space
BakkenLink	BakkenLink Pipeline LLC
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
bpd	barrels per day
CAA	Clean Air Act
CCSIR	Climate Change Supplementary Information Report
CEQ	Council on Environmental Quality
CESA	cumulative effects study area
CFR	Code of Federal Regulations
CH_4	methane

CMRP	Construction, Mitigation, and Reclamation Plan
CMS	Cultural Material Scatter
CO	carbon monoxide
CO_2	carbon dioxide
CO2e	carbon dioxide equivalent
CPM	Computational Pipeline Monitoring
CWA	Clean Water Act
dB	decibel
dBA	decibels on the A-weighted scale
DR	Decision Record
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
ERP	Emergency Response Plan
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FLM	Federal Land Manager
FONSI	Finding of No Significant Impact
GAP	Gap Analysis Program
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HCA	high consequence area
HDD	horizontal directional drill
IMP	Integrity Management Plan
IPCC	Intergovernmental Panel on Climate Change
LMNG	Little Missouri National Grassland
LNG	liquefied natural gas

MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act
Metcalf	Metcalf Archaeological Consultants, Inc.
mg/L	milligrams per liter
MHAN	Mandan, Hidatsa, and Arikara Nation
MIS	Management Indicator Species
MLA	Mineral Leasing Act of 1920
MLRA	Major Land Resource Area
MLV	mainline valve
MMcf	million cubic feet
MOU	Memorandum of Understanding
MP	milepost
n-hexane	normal hexane
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Grave Protection and Repatriation Act of 1990
NDAREC	North Dakota Association of Rural Electric Cooperatives
NDCC	North Dakota Century Code
NDDH	North Dakota Department of Health
NDDH-AQD	North Dakota Department of Health – Air Quality Division
NDIC	North Dakota Industrial Commission
NDGFD	North Dakota Game and Fish Department
NDGS	North Dakota Geological Survey
NDSL	North Dakota State Land
NDSU	North Dakota State University
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants

NETL	National Energy Technology Laboratory
NGL	natural gas liquids
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NWI	National Wetland Inventory
NWP	Nationwide Permit
O_3	ozone
OCC	Operations Control Center
OD	outside diameter
OSHA	Occupational Safety and Health Administration
PAB	Palustrine Aquatic Bed
PALs	plantwide applicability limitations
PEM	Palustrine Emergent Wetland
PFYC	Potential Fossil Yield Classification
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLOTS	Private Land Open to Sportsman
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less

POD	Plan of Development
ppm	parts per million
Project	BakkenLink Dry Creek to Beaver Lodge Project
PRPA	Paleontological Resources Preservation Act
PSC	Public Service Commission
PSD	Prevention of Significant Deterioration
psig	pounds-force per square inch gauge
RCRA	Resource Conservation and Recovery Act
RFFAs	reasonably foreseeable future actions
ROW	right-of-way
SASR	Sakakawea Area Spill Response
SCADA	supervisory control and data acquisition
SF	Standard Form
SH	State Highway
SHPO	State Historic Preservation Office
SIO	scenic integrity objectives
SIP	State Implementation Plan
SMS	Scenery Management System
SO_2	sulfur dioxide
SPCC Plan	Spill Prevention, Control, and Countermeasures Plan
SPRT	Sequential Probability Ratio Test
SSURGO	Soil Survey Geographic Database
SWPPP	Storm Water Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
tpy	tons per year
TSS	total suspended sediment
U.S.	United States

USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound
VQO	Visual Quality Objective
WMA	Wildlife Management Area
WT	wall thickness
WUS	waters of the U.S.

Contents

List of Appendices

List of Tables

List of Figures

1.0 Introduction

1.1 Introduction

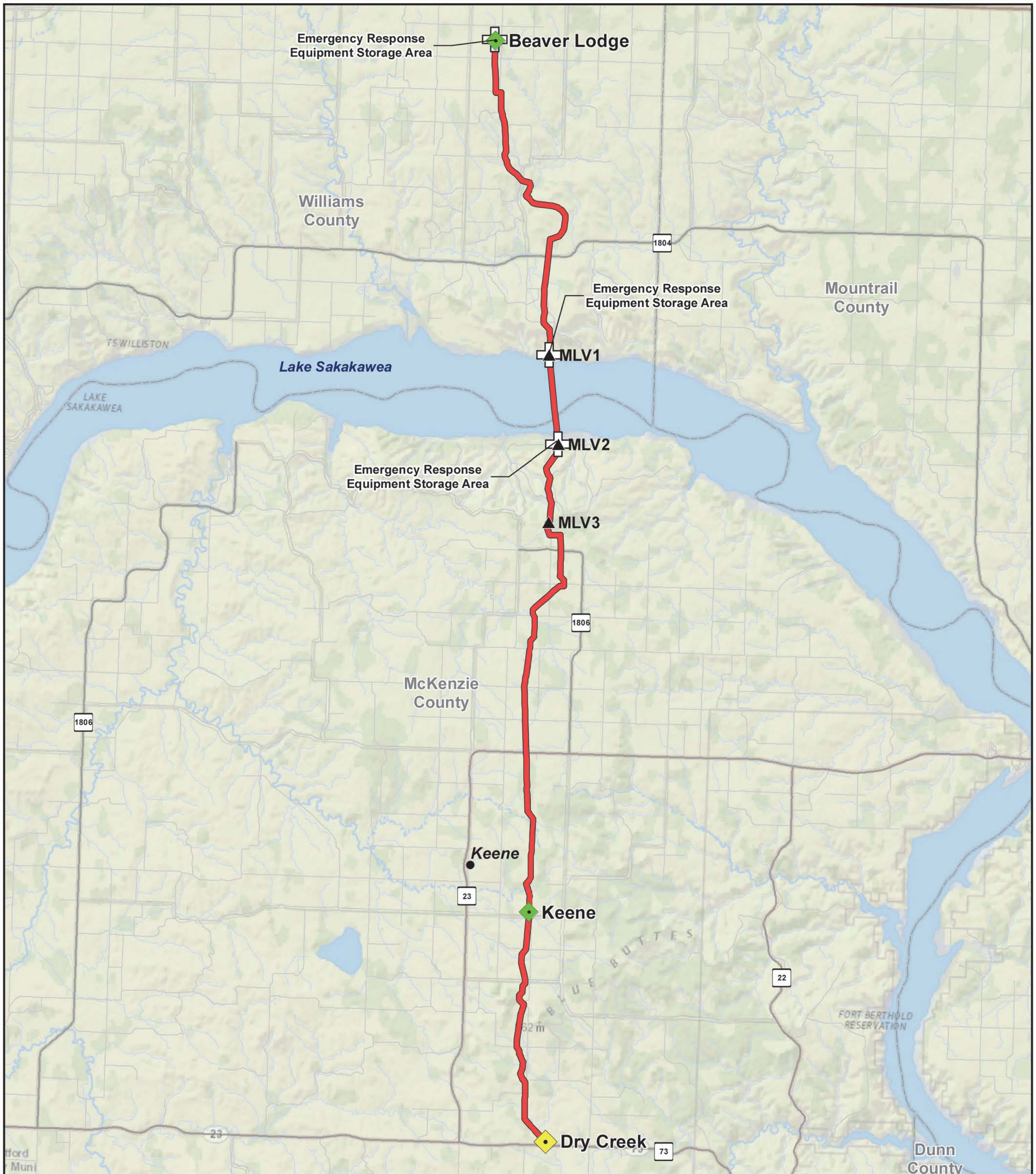
BakkenLink Pipeline LLC (BakkenLink), a wholly owned subsidiary of Great Northern Midstream LLC, has filed a right-of-way (ROW) application proposing to amend their existing authorization (No. NDM 102507) to construct, operate, and maintain the proposed BakkenLink Dry Creek to Beaver Lodge Project (Project) on federal lands in McKenzie and Williams counties, North Dakota, as shown in **Figure 1-1**. The Plan of Development (POD) and appendices were submitted to the BLM North Dakota Field Office on March 3, 2014, and amended October 29, 2014. The information provided in the POD was used to support the development of the EA and is available for review as a supporting document to the EA.

The Project would consist of approximately 37 miles of 16-inch-diameter steel crude oil pipeline extending from the existing Dry Creek Terminal in McKenzie County, North Dakota, to the proposed Beaver Lodge Receipt Facility in Williams County, North Dakota. The connection to the Dry Creek Terminal would establish a connection with the existing BakkenLink Pipeline that is transporting crude oil to a rail facility operated by ND Land Holdings LLC (dba Dory Land), a wholly owned subsidiary of Great Northern Midstream LLC at Fryburg, North Dakota. The Project also would include an oil receipt facility near Keene, North Dakota.

The Project is a continuation of an ongoing crude oil pipeline system that BakkenLink originally proposed to construct between Fryburg, North Dakota, and the Beaver Lodge Receipt Facility near Tioga, North Dakota (original BakkenLink Pipeline Project). That project was evaluated in an environmental assessment (EA) by the jurisdictional agencies in 2012. Because the jurisdictional agencies were interested in evaluating a horizontal directional drill (HDD) alternative crossing method of Lake Sakakawea and inadequate geotechnical data existed at the time to determine the feasibility of an HDD at the proposed crossing location, the Bureau of Land Management (BLM) Decision Record (DR) indicated that it analyzed most, but not all, of the Project and possible alternatives. Because BakkenLink indicated a willingness to construct part of the project that did not include the Lake Sakakawea crossing, and because that part of the project had independent utility, a Mitigated Finding of No Significant Impact (FONSI) was issued for the segment of the project extending from Arrow Midstream to Fryburg (the mitigation being to not make a decision on the lake crossing until the necessary geotechnical data could be obtained and evaluated). From September 2012 to February 2013, BakkenLink obtained and evaluated the necessary geotechnical data at the Lake Sakakawea crossing. The feasibility report completed by a third-party HDD expert determined that an HDD is not feasible due to multiple factors, and indicated a very high likelihood of failure.

Given the new information, BakkenLink filed an application to amend its existing ROW to complete the project as originally proposed, crossing Lake Sakakawea using a jetting technique to install the pipe in the lake bottom in a shallow trench with a minimum of 4 feet depth of cover, and terminating at the Beaver Lodge Receipt Facility near Tioga, North Dakota. The Project would continue to allow transport of Bakken crude oil southward to the Fryburg rail loading facility, but also would allow bidirectional flow northward to the Beaver Lodge Receipt Facility.

In total, approximately 5.2 miles of the Project alignment occurs on federal land (i.e., United States [U.S.] Forest Service [USFS] and U.S. Army Corps of Engineers [USACE]). The remaining alignment is proposed on private land (28.9 miles) and State of North Dakota-owned lands (3.1 miles). The proposed pipeline would be buried and would follow existing pipeline and utility easements to the extent practicable. BakkenLink maintains that the Project combined with the existing Fryburg to Arrow Midstream pipeline section would provide much needed pipeline capacity to transport the increasing



Project Features

- Proposed Route
- Existing Receipt Facility
- Proposed Receipt Facility
- Other Facility
- Mainline Valve (MLV)

Source: BakkenLink 2014.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 1-1

Project Overview

0 1.25 2.5 5
Miles

supplies of crude oil produced in portions of Billings, McKenzie, Stark, and Williams counties, North Dakota, and that the location of the Project would encourage the development of pipeline gathering laterals and receipt facilities and outlet connections with other proposed pipelines.

This EA for the Project is being prepared under the direction of the BLM, serving as the lead agency in compliance with the National Environmental Policy Act of 1969 (NEPA) per the Mineral Leasing Act of 1920 (MLA), as amended. The USFS, USACE, and U.S. Fish and Wildlife Service (USFWS) are serving as cooperating agencies on the Project. This document follows the guidelines promulgated by the Council on Environmental Quality (CEQ) for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508, BLM's NEPA Handbook [H-1790-1], and the USACE regulation ER 200-2-2 [33 CFR 230]). Additionally, CFR 1506.3(a) allows the cooperating agencies (USACE, USFS, and USFWS) to adopt a NEPA document prepared by the lead federal agency (BLM). The USACE and USFS would independently evaluate and verify the information and analysis undertaken in the EA and would take full responsibility for the scope and content contained herein, even though per the MLA, the BLM would issue the ROW Grant for all federal lands crossed.

The Project would be designed, constructed, and operated in accordance with 49 CFR 195, Transportation of Hazardous Liquids by Pipeline. These regulations are administered by the U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA).

This chapter presents BakkenLink's interests and objectives for the Project as well as the BLM's purpose and need for action. In addition, it also describes the Project location and identifies other authorizing actions necessary for the Project to be constructed. A complete description of the applicant's Project is provided in Chapter 2.0.

The sources of the crude oil that would be transported by the Project are the middle Bakken and upper Three Forks formations (Bakken) of the Williston Basin. The Project would consist of the following assets:

- Approximately 37 miles of 16-inch-diameter steel mainline for the transportation of crude oil from 3 receipt facilities, including 1 existing (Dry Creek Terminal) and 2 proposed (Keene and Beaver Lodge) crude oil receipt facilities. This mainline would have bi-directional capability and would transport crude oil between the Beaver Lodge Receipt Facility on the north end of the Project and the existing Dry Creek Terminal on the south end of the Project.

The Project is designed to initially carry up to 100,000 barrels per day (bpd) and would have expansion capabilities of up to 135,000 bpd. The pipeline would be buried with a minimum of 3 feet of cover except for locations/conditions that would warrant deeper burial depths. Other surface facilities would be limited to pipeline markers, communications equipment, emergency response equipment storage areas, and mainline valves (MLVs).

1.2 BakkenLink's Interests and Objectives

BakkenLink initially submitted a Standard Form (SF) 299 application to the BLM North Dakota Field Office on May 17, 2011, and submitted an amended application on August 8, 2011, requesting a crude oil pipeline ROW Grant across 2.43 miles of USACE land and 6.8 miles of USFS lands in North Dakota for the originally proposed route (approximately 132 miles). BakkenLink originally proposed to construct and operate a pipeline system that would collect crude oil from existing or new crude oil receipt facilities and would transport the collected crude oil to either a rail facility located near Fryburg, North Dakota, and/or to facilities near Beaver Lodge, North Dakota. BakkenLink maintained that the Project would help to address anticipated regional pipeline and outlet constraints as development of the Bakken Formation increases and that the pipeline was needed to relieve the large truck traffic congestion on the western North Dakota road system. The BLM provided authorization (No. NDM 102507) to construct a segment of the originally proposed route from the Fryburg rail loading facility to the Arrow Midstream Receipt Facility.

On March 14, 2013, BakkenLink filed a SF299 application proposing to amend their existing authorization (No. NDM 102507) to construct, operate, and maintain the Project (approximately 37 miles) on federal lands in McKenzie and Williams counties, North Dakota.

1.3 BLM's Proposed Action

The Proposed Action under consideration in this analysis is the BLM's authorization of a 50-foot-wide to 100-foot-wide construction ROW across 2.4 miles of USFS land and 2.8 miles of USACE land for the construction and operation of the crude oil pipeline. During operation of the pipeline, the ROW would permanently accommodate a 16-inch-diameter steel pipeline within a 20-foot-wide (USFS) to 50-foot-wide (USACE) permanent easement across federal lands.

1.4 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to consider providing BakkenLink with a ROW across federal lands to meet their interests and objectives for the Project. The need for the Proposed Action is the requirement to consider granting approval for the construction, operation, maintenance, and termination of a pipeline system for the purpose of transporting crude oil on public lands administered by the USFS (McKenzie Ranger District) and the USACE (Omaha District) under the authority of the MLA, as amended and supplemented, (30 United States Code [U.S.C.] 181 *et seq.*) and prescribed in 43 CFR 2880 and 3160. The U.S. Department of Interior's (USDOI's) Energy Policy Act of 2005 encourages the development of energy related facilities upon review and analysis.

1.5 Decisions to be Made

The BLM is the lead agency for this EA and would decide whether or not to approve BakkenLink's application for a ROW, and if so, under what terms and conditions. The cooperating agencies would have their own terms and conditions for portions of the pipeline and/or any facilities that would be installed on their property. The BLM would make a decision regarding whether or not to issue a ROW Grant, and under what conditions, after consultation with and agreement from the cooperating agencies.

1.6 Location of Project

The Project proposed by BakkenLink would be located in two North Dakota counties (McKenzie and Williams) and traverse private and state lands, as well as USFS- and USACE-administered lands. The proposed route would not traverse BLM-administered lands. A map showing the location of the proposed pipeline route and associated facilities is provided on **Figure 1-1**.

1.7 Authorizing Actions

The Project would require federal, state, and local authorizations for many aspects of construction, operation, maintenance, and abandonment. It is the Applicant's responsibility to fulfill all requirements of any applicable statutes, regulations, and policies. **Table 1-1** lists permits, approvals, and reviews necessary for implementation of the Project.

Table 1-1 Federal, State, and Local Permits, Approvals, and Reviews Required for Construction and Operation of the Project

Agency	Nature of Action	Authority
Federal Permits, Approvals, and Reviews		
USDOI, BLM	Grant ROWs and issue temporary use permits for federal lands after NEPA review	Section 28 of the MLA, as amended

Table 1-1 Federal, State, and Local Permits, Approvals, and Reviews Required for Construction and Operation of the Project

Agency	Nature of Action	Authority
USFS	Review proposal for consistency with Land and Resource Management Plan. Provide BLM with reasonable and necessary measures to minimize impacts to grassland resources	Section 28 of the MLA, as amended
	Issue cultural resource permit to excavate or remove cultural resources on federal lands	Archaeological Resources Protection Act of 1979 (ARPA), 16 U.S.C. Section 470aa-47011; 43 CFR 3
USACE	Review, provide stipulations, approve, and adopt BLM's decision for issuance of a ROW and Special Use Permits across USACE lands	40 CFR 1506.3(a)
	Outgrant Application Permit to Construct	Section 404 of the Clean Water Act (CWA) of 1972 (40 CFR 122-123); 33 U.S.C. Section 1344; 33 CFR 323, 325; Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 401-413
	Issue Section 404 permit for placement of dredged or filled material in Waters of the U.S. (WUS) – Nationwide Permit (NWP) 12	Section 404 of the Clean Water Act (CWA) of 1972 (40 CFR 122-123); 33 U.S.C. Section 1344; 33 CFR 323, 325
	Issue Section 10 permit for crossing navigable water in the U.S.	Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 401-413
	Engineering Circular – proposed alterations to U.S. Army Corp of Engineers Civil Works Projects	Section 14 of the Rivers and Harbors Act of 1899; Pursuant to 33 U.S.C. 408 (CECW-CP Circular No. 1165-2-216) 31 July 2014
	Issue cultural resource permit to excavate or remove cultural resources on federal lands	ARPA, 16 U.S.C. Section 470aa-47011; 43 CFR 3
USFWS	Section 7 Consultation process for endangered or threatened species	Endangered Species Act (ESA) of 1973; 16 USC 1531 et seq. Migratory Bird Treaty Act (MBTA) of 1918, as amended; Executive Order (EO) 13186; EO 11990; Bald and Golden Eagle Protection Act (BGEPA) of 1940; NEPA
USDOT – Federal Highway Administration	Issue permits to cross federal-aid highways	23 U.S.C. Sections 116, 123; 23 CFR 645 Subpart B
USDOT – PHMSA	Review and approve Integrity Management Plan for High Consequence Areas (HCAs)	49 CFR 195
	Review and approve Emergency Response Plan (ERP)	49 CFR 194
Advisory Council on Historic Preservation (ACHP)	Review and compliance activities related to cultural resources	Section 106 National Historic Preservation Act (NHPA) (16 U.S.C. 470) (36 CFR 80)
State of North Dakota		
North Dakota State Historical Society	Review and comment on activities potentially affecting cultural resources	Consultation under Section 106, NHPA
	Issue cultural resource permit to excavate or remove cultural resources on state or private land.	North Dakota Century Code (NDCC) 55-03-01.1

Table 1-1 Federal, State, and Local Permits, Approvals, and Reviews Required for Construction and Operation of the Project

Agency	Nature of Action	Authority
Department of Health, Division of Water Quality	Permit for stream and wetland crossings/consultation for USACE Section 404 process	Section 401 CWA, Water Quality Certification
	Permit regulating hydrostatic test water discharge and construction dewatering and storm water to waters of the state	National Pollutant Discharge Elimination System (NPDES) Temporary Dewatering/ Hydrostatic Testing Permit (NDG07000), Storm Water Discharge Permit NDR10-0000
Department of Health, Division of Air Quality	Permit to construct	Clean Air Act (CAA)
Public Service Commission (PSC)	Permit for construction of a pipeline within an approved corridor and along an approved route	Energy Conversion and Transmission Facility Siting Act Corridor Certificate and Route Permit
North Dakota Game and Fish Department (NDGFD)	Consultation and review	Assess potential effects to fish and wildlife
North Dakota State Water Commission	Section 401 CWA Certification	CWA
	State Sovereign Lands Permit	NDCC 28-32-02, 61-03-13
	Water Use	Temporary Water Use Permit SWC Form 247
North Dakota State Land Department	Easement	
Department of Transportation	Utility Occupancy Permit	ROW occupancy permit for state roadway crossings.
Counties	Conditional Use/Pipeline Permit/Road Crossing Permits	Required for pipeline construction

1.7.1 Easement Acquisition Process on Public Lands

In order to obtain a ROW grant from federal land management agencies or easements across private land, several steps must be taken. For federally administered lands, an applicant must submit a ROW application to the appropriate federal agency along with a fee to cover the costs of processing the application and granting and administering the ROW. The agency then prepares an environmental document (such as this EA) as required under NEPA to determine potential impacts on all lands (regardless of ownership) that may occur as a result of implementing the Proposed Action. CFR 1506.3(a) allows the cooperating agencies (USACE,USFS, and USFWS) to adopt a NEPA document prepared by the lead federal agency (BLM) if needed for any independent decisions those agencies may require.

Protective measures to avoid and minimize adverse impacts are proposed by the Applicant and referenced throughout this document as design features. In addition to these commitments, the agencies require standard protective measures on federal lands.

After the EA is prepared with input and participation from the cooperating agencies, reviewing agencies, tribal governments, and the public, the BLM prepares a DR. The DR documents and provides the legal record for BLM decisions made regarding the requested ROW on federal lands. If it is determined that no significant impacts would be incurred after application of mitigation measures, the BLM would issue a FONSI along with its DR. If it is determined that significant impacts would be incurred as a result of construction and/or operation of the Project, an environmental impact statement (EIS) would have to be prepared to further evaluate the Project under NEPA.

Before the ROW can be granted, BakkenLink must prepare a Plan of Development (POD) detailing construction of all Project facilities. The POD must be submitted to the authorizing agencies for approval. The POD would be amended to include reasonable and necessary mitigation as described in the EA. POD approval is concurrent with the ROW approval. The POD contains Project information and site-specific procedures for the following:

- Fire protection;
- Erosion control, revegetation, and reclamation;
- Water resources protection;
- Transportation;
- Communications;
- Cultural resources protection;
- Paleontological resources protection;
- Threatened or endangered species protection;
- Wildlife protection;
- Dust control;
- Weed control;
- Health and safety;
- Construction schedule;
- Construction facilities and housing;
- Pipeline testing;
- Construction monitoring;
- Operations and maintenance plans; and
- Abandonment.

For the NEPA analysis, the Applicant has been required to conduct site-specific surveys along the proposed ROW, additional temporary work space (ATWS), access roads, pipe storage yards, emergency response equipment storage areas, and ancillary facility locations for sensitive habitats, plants, animals, and other resources, including federally listed, proposed, and candidate species; raptor species protected under the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BAGEPA); USFS sensitive species; jurisdictional WUS; cultural, historical, and paleontological resources; and noxious weeds. Data obtained from these surveys have been used in this document to apply stipulations and mitigation measures, where necessary, to protect site-specific resources. All reasonable and necessary stipulations and mitigation measures must be incorporated into the POD prior to issuance of a DR or FONSI.

1.7.2 Easement Acquisition Process on Private Lands

The process used by pipeline companies to obtain easements across private lands is different from that used for state or federal lands. The company's ROW agent first contacts the landowner for permission to determine the proposed pipeline's centerline across the owner's property. At the same time, the ROW agent seeks the landowner's permission to conduct the cultural and biological surveys required by the PSC to obtain permits to cross private lands as a common carrier.

A plat is prepared after the surveyor obtains the necessary data for locating the pipeline. This plat shows the relationship of the planned pipeline to the property boundaries. The ROW agent meets with the landowner to initiate negotiations for an easement across the property.

Across federal, state, and private lands, BakkenLink has requested a temporary construction ROW of 100 feet (USFS would allow only a 50-foot-wide construction ROW on their lands). ATWS would be required at certain locations (e.g., road and river crossings and in rugged terrain). The temporary construction ROW may be reduced in some areas as necessary to avoid impacts to environmentally sensitive areas. BakkenLink requests a permanent easement of 50 feet (USFS would allow only a 20-foot-wide easement on their lands). The location of the pipeline within the permanent easement may vary, however, depending on terrain, the presence of other existing facilities, and landowner concerns. Construction techniques and reclamation procedures would be the same on private and public lands, or as specified by the landowner.

1.8 Conformance with Land Use Plans

This Project would traverse private, state, USFS- and USACE-administered lands; BLM-administered lands are not crossed by the Project. However, the BLM is responsible for issuing the ROW grant across federal lands under the authority of the MLA. The USFS and USACE, as cooperating agencies, are reviewing the Project to assure conformance with their land use plans (Land and Resource Management Plan for the Dakota Prairie Grasslands [USFS 2001] and Garrison Dam/Lake Sakakawea Master Plan [USACE 2007], respectively). The State of North Dakota and affected counties also are reviewing the Project to assure conformance with any state- and county-level land use plans. To this point, there has been no indication that the Project would not be consistent with any federal, state, or local land use plans.

1.9 North Dakota Public Service Commission Coordination

In accordance with the laws of North Dakota and prior to undertaking the construction and operation of a crude oil pipeline, BakkenLink is required to apply for, and obtain from the North Dakota PSC, a Certificate of Corridor Compatibility and a Route Permit, confirming the construction and operation of the pipeline: 1) would result in minimal adverse effects to the environment and on the welfare of the citizens of North Dakota; 2) are compatible with environmental protection and the efficient use of resources; 3) would minimize adverse human and environmental impact while ensuring continuing system reliability and integrity, and ensuring that energy needs are met and fulfilled in an orderly and timely fashion; and 4) are of such design and location that it would produce minimal adverse effect.

On June 21, 2011, BakkenLink filed with the PSC a consolidated application for a Certificate of Corridor Compatibility and Route Permit under Chapter 49-22.07 of the NDCC to authorize construction of a 144-mile-long crude oil pipeline project in Billings, Dunn, McKenzie, Stark, and Williams counties, North Dakota. As part of the review and approval process, a public hearing on the consolidated application was announced and held in Watford City, North Dakota.

On February 29, 2012, the PSC issued its Findings of Fact, Conclusions of Law, and Order, granting BakkenLink Certificate of Corridor Compatibility No. 128 and Route Permit No. 137 to authorize construction of the 144-mile-long crude oil pipeline project. Subsequently, due to minor reroutes, BakkenLink requested, and the PSC issued, several amendments to the Certificate of Corridor Compatibility No. 128 and Route Permit No. 137.

On December 16, 2013, BakkenLink filed an application for a Certification of Public Convenience and Necessity under Chapter 49-03.1 of the NDCC.

On September 17, 2014, the PSC issued its Findings of Fact, Conclusions of Law, and Order, granting BakkenLink a Certificate of Public Convenience and Necessity for the south segment of the pipeline (the part of the project that is in operation and does not include the Lake Sakakawea crossing). The

Certificate of Public Convenience and Necessity for the north segment of the pipeline (Project) also was granted and will be issued upon receipt of written notification from BakkenLink that it has received federal approval of the Project.

1.10 Agency and Public Scoping and Issues

Informal agency scoping regarding the Project has been ongoing for over a year. BakkenLink engineers, lands specialists, and consultants have interacted with the applicable agencies and landowners extensively over the past year to develop a preferred route and construction techniques that would avoid or minimize impacts to the environment. In accordance with NEPA Sections 101 and 102, federal regulations, and BLM policy, through scoping via the Public Notice, the BLM has solicited the public's involvement in the EA process. Public involvement can be achieved through various methods, such as sending direct mail notification of a proposed project and/or conducting scoping meetings where public and other interested parties (federal, state, and local agencies; tribal governments; landowners; and non-governmental organizations [NGOs]) are invited to a public venue to comment on the proposed project via an open house or more formal presentation setting. Scoping provides a mechanism for defining the scope of significant issues (40 CFR 1501.7 and 40 CFR 1508.25) and concerns associated with the development and operation of a proposed project. This information is used to better define the EA analysis so that the focus is on areas of interest and concern to the public and other parties.

Formal public scoping meetings were not conducted as part of the NEPA process for the Project; however, public scoping was conducted via published public notices in local newspapers and through direct mail notification to affected landowners, tribal governments, governmental agencies, and other potentially interested parties.

1.10.1 Agency Involvement

In addition to ongoing informal agency consultation, mail notifications, and news press releases, formal agency scoping meetings were held in the USACE Omaha District Office (Omaha, Nebraska) and the USFWS North Dakota Ecological Service Field Office on November 7, 2013, and January 15, 2014, respectively. Agencies that participated in the meetings or provided written comments during the agency scoping period included the USFWS, USACE, USFS, Bureau of Indian Affairs (BIA), NDGFD, North Dakota State Water Commission, and North Dakota Parks and Recreation.

1.10.1.1 Agency Issues and Concerns

A majority of the comments received from agencies (during meetings and in comment letters) were related to project and alternatives development and potential impacts to biological resources (e.g., special status species, soils, vegetation, wetlands), water quality, cultural resources, and air quality. The following is a general list of issues or concerns noted in the comments:

- Special status species (federal listed, proposed, candidate, and USFS sensitive species);
- Migratory birds;
- Bald and golden eagles;
- Aquatic nuisance species;
- Waterfowl production areas;
- Wetlands, native prairie, and wooded draws;
- Soils and hydrology;
- Noxious weeds;
- Cultural resources;
- Water quality issues – potential disturbance in the substrate of the lake;

- Potential for accidental release of crude oil into waters, primarily Lake Sakakawea (potential impacts to the pallid sturgeon, which is a concern to the USFWS); the USFWS and USACE recommended that a Spill Risk Assessment and Spill Response Plan be completed for the Project;
- The USFS has a maximum construction ROW width of 50 feet and permanent ROW width of 20 feet across the Little Missouri National Grassland (LMNG);
- Potential impacts to Management Indicator Species as described in the Grassland Management Plan for USFS land;
- Need to develop additional alternatives;
- Impacts to air quality;
- Degradation of roads and public safety; and
- Permanent impacts from aboveground facilities.

1.10.2 Public Involvement

The BLM initiated public involvement and the scoping comment period with the mailing of newsletters that described the Project on April 22, 2013, to 394 interested parties and landowners in the area of the Project. The newsletter also included BLM contact information for providing comments. The BLM issued press releases containing the same project and contact information during the week of April 22, 2013. The press releases appeared in regional newspapers and Associated Press outlets (Associated Press [BHG Newsgroup and Bloomberg], Beulah Beacon, Billings County Pioneer, Bismarck Tribune, Bowman County Pioneer, Dickinson Press, Dunn County Herald, Golden Valley News, Hazen Star, Kenmare News, Mandan News, McKenzie County Farmer [Watford City newspaper], Mclean County Independent, Minot Daily News, Mountrail County Promoter, Mountrail County Record, New Town News, Tioga Tribune, Turtle Mountain Star, Turtle Mountain Times, Washburn Leader News, and Williston Daily Herald) throughout the Project region. The BLM's public scoping comment period ended on May 22, 2013.

1.10.2.1 Public Issues and Concerns

By the conclusion of the official scoping period, BLM had received a total of seven comment letters/submittals (e.g., formal letters or e-mails) from two federal agencies (USFWS and BIA), three state agencies (North Dakota Water Commission, NDGFD, and North Dakota Parks and Recreation), one Native American Tribe (Standing Rock Sioux Tribe), and one individual. The comments received were compiled and reviewed to identify key issues and concerns to be addressed in the EA.

A majority of the comments received during the scoping period were related to project and alternatives development and potential impacts to biological resources, soils, cultural resources, water quality, and cumulative impacts. The following is a general list of concerns noted in the comments:

- Reasonable range of alternative pipeline routes including the No Action Alternative;
- Cumulative impacts from oil and gas development within the Project region;
- Fragmentation of and surface disturbance within wildlife habitat;
- Potential impacts at the Lake Sakakawea crossing;
- Potential impacts to groundwater wells;
- Potential decrease in soil productivity;
- Full disclosure of associated facilities needed for Project operation;
- Mass wasting and soil erosion along the north and south bluffs of Lake Sakakawea;

- Potential for pipeline rupture and crude oil release;
- Potential impacts to wetlands as a result of pipeline construction and operation; and
- Potential impacts to cultural resources from pipeline construction.

After the official scoping period closed, a letter was received from the Chairman of the Mandan, Hidatsa, and Arikara Nation (MHAN) in which the Chairman expressed concern with pipeline construction across the lake, potential impacts to plants and animals, and potential groundwater contamination.

1.10.3 Native American Consultation

On April 18, 2013, the BLM sent letters initiating government-to-government consultation with 17 tribes who have tribal treaty interests in, and/or traditional connections to, western North Dakota. These tribes include the Fort Belknap Gros Ventre and Assiniboine Tribes; Santee Sioux Tribe; Lower Sioux Tribe; Lower Brule Sioux Tribe; Northern Cheyenne Tribe; Fort Peck Assiniboine and Sioux Tribes; Sisseton-Wahpeton Oyate Tribe; Three Affiliated Tribes: Mandan, Hidatsa, and Arikara; Flandreau Santee Sioux Tribe; Yankton Sioux Tribe; Spirit Lake Tribe; Oglala Sioux Tribe; Cheyenne River Sioux Tribe; Rosebud Sioux Tribe; Crow Creek Sioux Tribe; Standing Rock Sioux Tribe; and the Turtle Mountain Band of Chippewa. To date, tribal consultation for the Project has included over 50 telephone conversations and 25 emails with the Tribal Historic Preservation Officers (THPOs) and other tribal representatives, several formal letters, and two face-to-face meetings (Chapter 3.0, Section 3.21.5, Cultural Resources/Tribal Treaty Rights and Interests).

2.0 Description of the Proposed Action and Alternatives

2.1 Introduction

BakkenLink's Project analyzed in this EA consists of constructing approximately 37 miles of 16-inch-diameter steel crude oil pipeline and associated infrastructure extending from the Dry Creek Terminal to Beaver Lodge in Williams and McKenzie counties, North Dakota. This pipeline segment would include the crossing of Lake Sakakawea and construction of the Keene and Beaver Lodge receipt facilities (**Figure 1-1**). From these facilities, the crude oil collected by the Project would have improved access to key markets across the U.S. BakkenLink is developing and intends to construct, own, and operate the Project.

Construction of the Project would require the disturbance of approximately 498.3 acres of land. An estimated 419.4 acres would be reclaimed immediately following construction. Modifications or improvements, such as the addition of gravel, also may be required on some of the access roads to allow for the passage of construction equipment. Following construction completion, public roads would be returned to pre-construction conditions. **Table 2-1** provides information regarding land requirements for the pipeline ROW, receipt facilities, MLVs, pipe storage yard, ATWSs, emergency response equipment storage areas, and access roads as part of the Proposed Action. All disturbances, with the exception of receipt facilities, MLV locations, access roads needing improvement, and emergency response equipment storage areas, would be reclaimed following construction. Pipelines are expected to have an average design life of 50 years, but can remain viable for fewer or more years, depending upon corrosion and other physical factors.

Table 2-1 Temporary and Permanent Disturbance Acreage Associated with the Project

Project Component	Number	Approximate Length (miles)	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)
Mainline	NA	37.4	354.7	0
Access Roads Needing Improvement[2]	6	2.9	0	7.1
MLVs[3]	3	NA	0	0.03
ATWSs	176	NA	51.1	0
Pipe Storage Yards[4]	4	NA	13.6	0
Emergency Response Equipment Storage Areas[5]	3	NA	0	0.5
Subtotal			419.4	7.6
Receipt Facilities	3			
Dry Creek Terminal[6]	NA	NA	0	0
Keene	NA	NA	0	29.7
Beaver Lodge[7]	NA	NA	0	41.6
Subtotal			0	71.3
Total Surface Disturbance			**419.4**	**78.9**

[1] Typical temporary construction ROW width would be 100 feet, except on USFS land, where it would be limited to 50 feet. Additional locations, such as wooded areas and wetlands, would be narrowed to 50 feet to minimize surface disturbance and impacts. Surface disturbance may be slightly wider on side hill locations and narrower on flat terrain.

[2] Represents existing two-track access roads that would require improvement with the addition of gravel. Assumed a 25-foot-wide disturbance width for impacts.

[3] BakkenLink is proposing a total of 3 MLVs; however, 2 MLVs would be located within the proposed fenced emergency response equipment storage areas and would not contribute to additional disturbance. The third MLV would be located within the construction ROW and would have permanent disturbance.

[4] One pipe storage yard would be located along the construction ROW near MP 30.1 at an existing scoria pit. BakkenLink is proposing to also utilize pipe storage yards within the existing Dry Creek Terminal and proposed Keene and Beaver Lodge receipt facilities.

[5] Two areas would be located on the north and south sides of Lake Sakakawea. The third area would be located at the proposed Beaver Lodge Receipt Facility.

[6] A pig launcher would be located within this facility.

[7] A pig receiver would be located within this facility.

NA = Not applicable.

Construction of the Project is anticipated to be in the second quarter 2015 timeframe.

2.2 Proposed Action

BakkenLink proposes to construct approximately 37 miles of 16-inch-diameter steel crude oil pipeline extending from the Dry Creek Terminal to the Beaver Lodge Receipt Facility near Tioga, North Dakota. The Project would be located in McKenzie and Williams counties. The system would transport light sweet crude typical of Bakken production with an initial capacity of 100,000 bpd. BakkenLink would transport crude oil from three receipt facilities, including one existing (Dry Creek Terminal) and two new proposed (Beaver Lodge and Keene) crude oil receipt locations. The pipeline would have bi-directional capability and, from the Dry Creek Terminal and Beaver Lodge Receipt Facility, the crude oil collected by the Project would have improved access to key markets across the U.S. Construction of the Project would help to alleviate anticipated pipeline constraints in the oil production area of the Project and reduce the amount of truck traffic for hauling crude oil from the lease to receipt facility locations.

2.2.1 Description of Facilities

The Project would be designed, constructed, and operated in compliance with applicable portions of the USDOT regulations as set forth in 49 CFR 195, Transportation of Hazardous Liquids by Pipeline. These regulations encompass general requirements, accident reporting and safety-related condition reporting, design requirements, construction, pressure testing, operation and maintenance, qualification of pipeline personnel, and corrosion control. Relevant industry standards are incorporated into these regulations by reference, including those of the American Petroleum Institute (API), American Society of Mechanical Engineers, the American Standard for Testing and Materials, and others.

The proposed Project route would extend from three receipt facilities in McKenzie and Williams counties, North Dakota. An overview of the proposed route is provided in **Figure 1-1**. Major components of the Project include:

- Approximately 37 miles of 16-inch-diameter steel mainline for the transportation of crude oil between the proposed Beaver Lodge Receipt Facility on the north end of the system and the existing Dry Creek Terminal on the south end. This mainline would have bi-directional capability and would deliver crude oil to the Dry Creek Terminal and to and from the Beaver Lodge Receipt Facility.
- Three receipt facilities would be used (one existing) or constructed (two proposed) for input of crude oil into the pipeline system.

2.2.1.1 Pipeline Facilities

The proposed route would traverse private, state, and federal lands. Approximately 29.1 miles (77.8 percent) of the proposed route would be on private lands, 3.1 miles (8.3 percent) on state lands, and 5.2 miles (14 percent) on federal lands (2.4 miles [6.4 percent] on USFS lands and 2.8 miles [7.5 percent] on/across USACE lands and water). Land ownership along the proposed route is illustrated on **Figure 2-1**.

The 16-inch-diameter mainline is designed for an initial flow rate of 100,000 bpd. The maximum design flow rate of the 16-inch-diameter mainline is 135,000 bpd. The pipeline would be buried underground. The pipeline is designed for a maximum temperature rating of 120 degrees Fahrenheit (°F) and a maximum operating pressure of 1,480 pounds-force per square inch gauge (psig). The Project would typically operate at 60°F and between 200 to 1,480 psig. The mainline would have a 16-inch outside diameter (OD) x 0.312-inch wall thickness (WT), API 5L -X65 for the majority of the route except at the Lake Sakakawea crossing, which would have a 16-inch OD x 0.500-inch wall thickness WT, API 5L -X60.

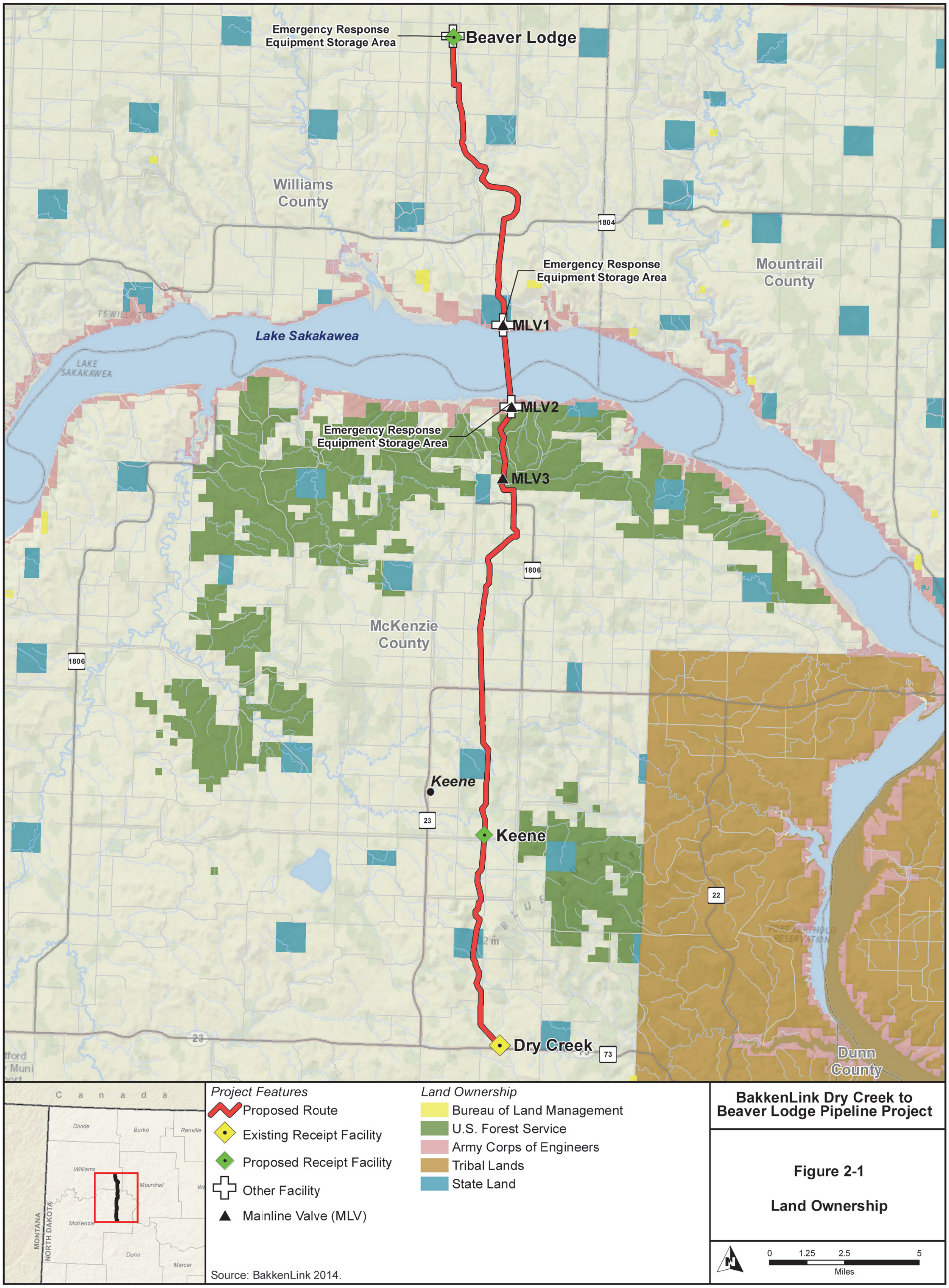


Figure 2-1

Land Ownership

2.2.1.2 Receipt Facilities

Three receipt facilities would be associated with the Project, one of which was constructed by Great Northern Gathering and Marketing LLC (i.e., Dry Creek Terminal) (**Figure 1-1**). All three receipt facilities would allow for input of crude oil by other companies into the proposed pipeline. **Table 2-2** summarizes the milepost (MP) locations for the receipt facilities.

Table 2-2 Receipt Facilities Locations by Milepost

Location	Approximate MP
Dry Creek Terminal (includes pig launcher)	MP – 0
Keene Receipt Facility	MP – 7.4
Beaver Lodge Receipt Facility (includes pig receiver)	MP – 37.4

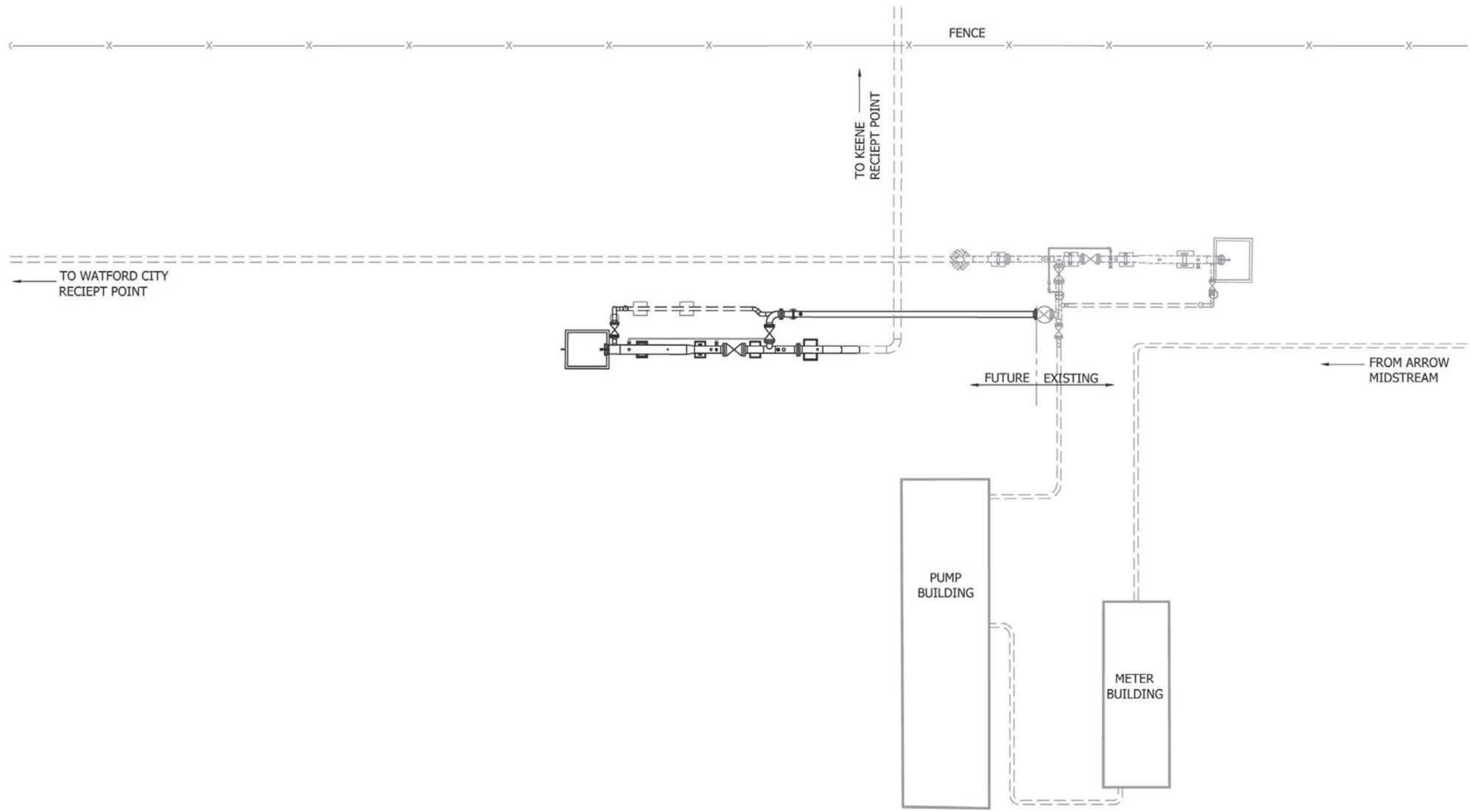
Receipt facilities would be connected via a "T" in the mainline and would provide connection to a truck terminal or other third-party facilities. The pressure provided by input at the receipt facilities would be adequate for operation of the pipeline at the initial projected flow rates. Truck unloading facilities, Lease Automatic Custody Transfer units, meter skids, storage tanks, and delivery pumps would be included in the receipt facilities. Typical drawings of the receipt facilities are provided in **Figures 2-2** through **2-4**.

Power would be required to serve the receipt facilities listed in **Table 2-2**. Of the three receipt facilities serving the pipeline, sufficient onsite power already is available at the existing Dry Creek Terminal. For the proposed Keene and Beaver Lodge receipt facilities, new offsite power sources would be required. Existing transmission lines and/or substations are located in close proximity to the Keene and Beaver Lodge receipt facilities, and are capable of providing the anticipated electrical requirements. For each of the receipt facilities currently without power, less than 0.25 mile of new electrical underground transmission lines would be required. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers.

2.2.1.3 Other Aboveground Facilities

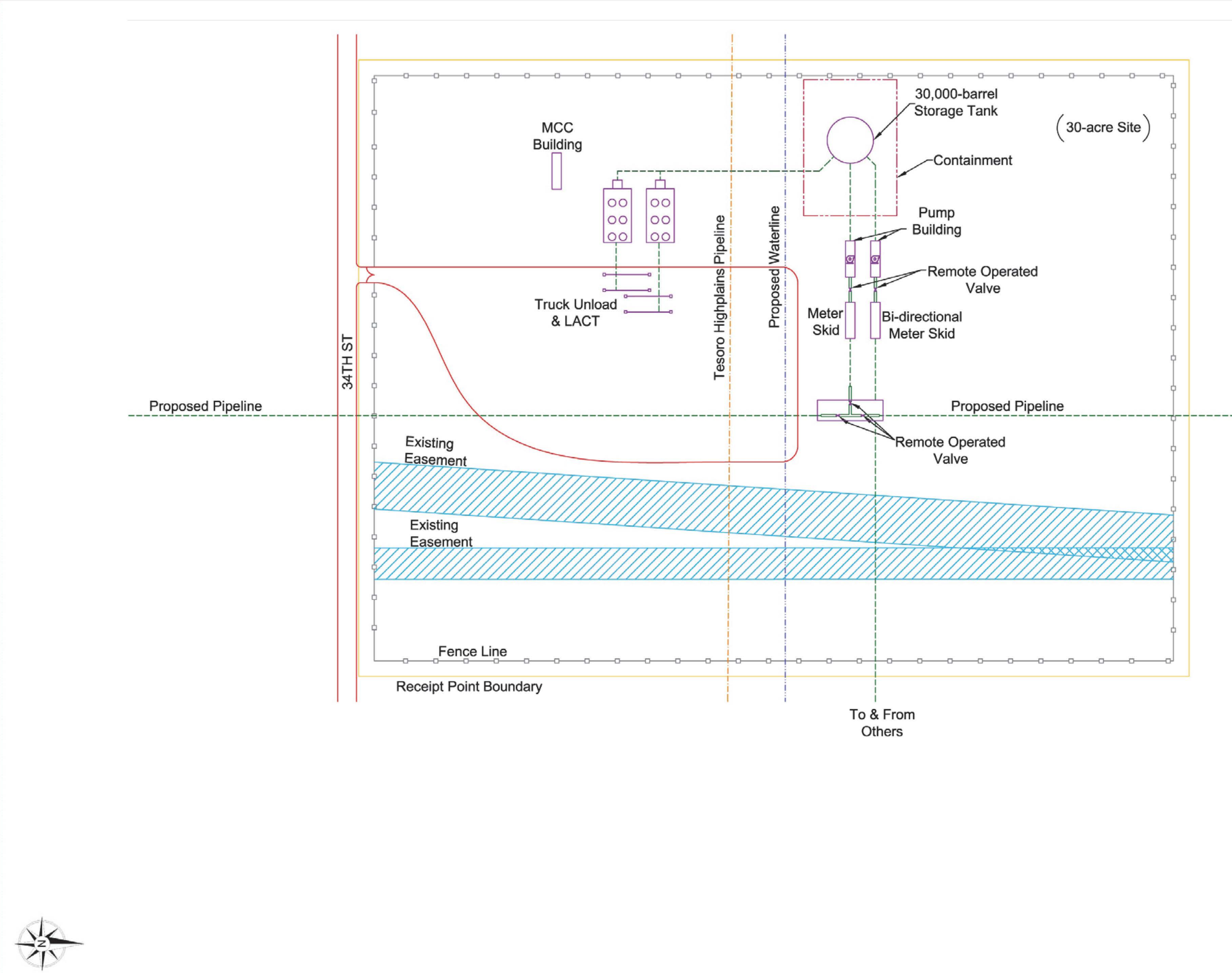
BakkenLink indicates that sufficient pressure would be provided from the pumps within the receipt facilities such that no separate pump stations would be built as part of the Project. The pressure provided by input at the receipt locations through delivery pumps would be adequate for operation of the pipeline at the initial projected flow rates.

Three MLVs would be spaced along the pipeline to meet or exceed the requirements of 49 CFR 195. BakkenLink has conducted a HCA analysis to identify locations of HCAs (Section 2.2.2) near the Project, which helped to refine appropriate placement of the MLVs to minimize potential environmental impacts in the event of a rupture or leak. BakkenLink would meet with the PHMSA to optimize MLV placement along the mainline and gain their concurrence with MLV locations. Additionally, BakkenLink would install communications equipment (Section 2.2.1.5) that would allow all valves to be operated remotely to minimize potential impacts of a spill. BakkenLink has indicated its intent to install remotely controlled MLVs on both sides of Lake Sakakawea (i.e., double block valves) as well as at the southern boundary of USFS property as requested by the USFS and private land. MLVs would be located within 50-foot by 50-foot fenced and graveled enclosures. Plan and profile views of a typical MLV are shown in **Figures 2-5** and **2-6**. A plan and profile view of a typical double block valve is shown in **Figure 2-7**. MLV locations by MP are provided in **Table 2-3**.



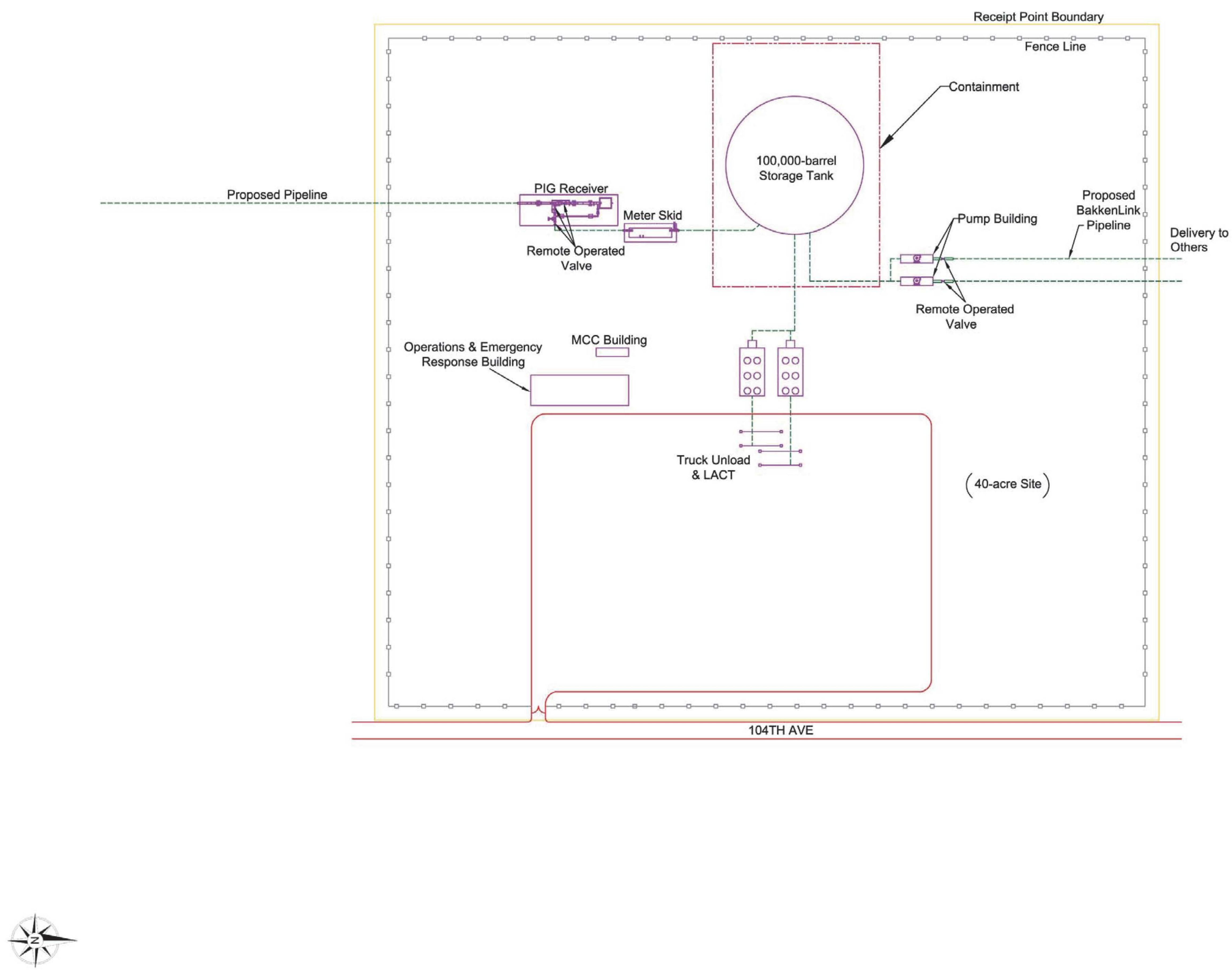
BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-2
Dry Creek Terminal Interconnect Site Plan



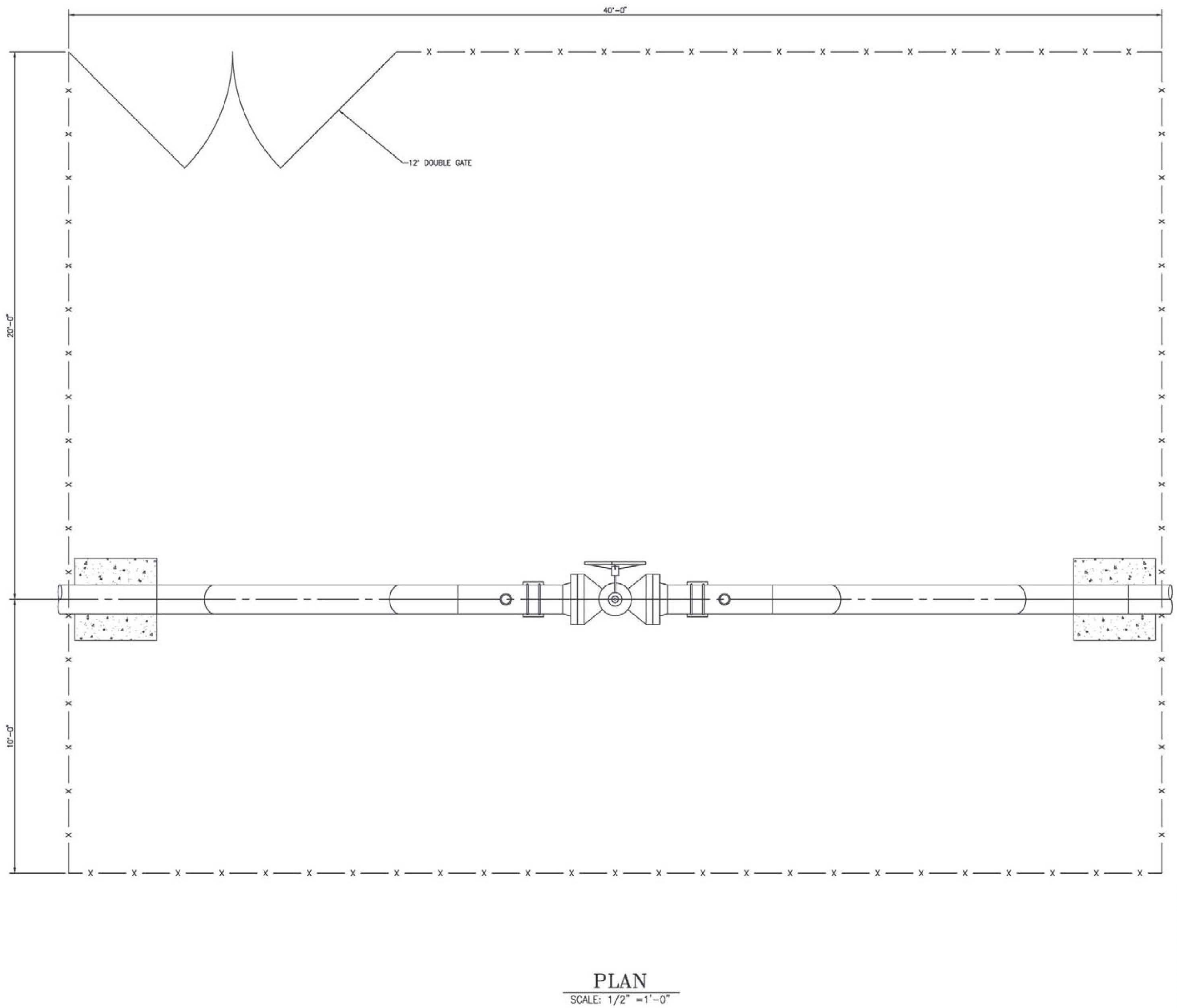
BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-3
Keene Receipt Facility



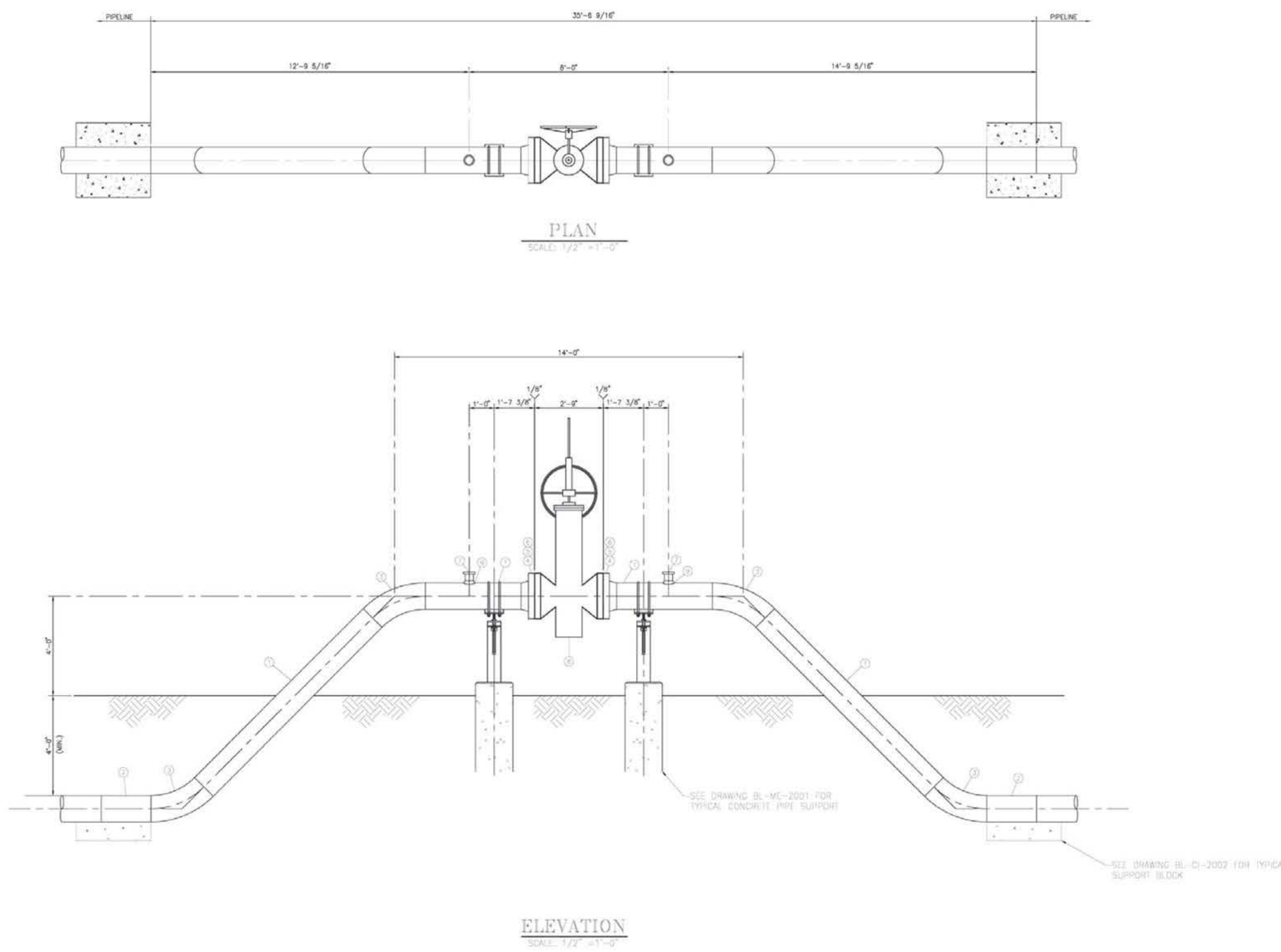
BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-4
Beaver Lodge Receipt Facility



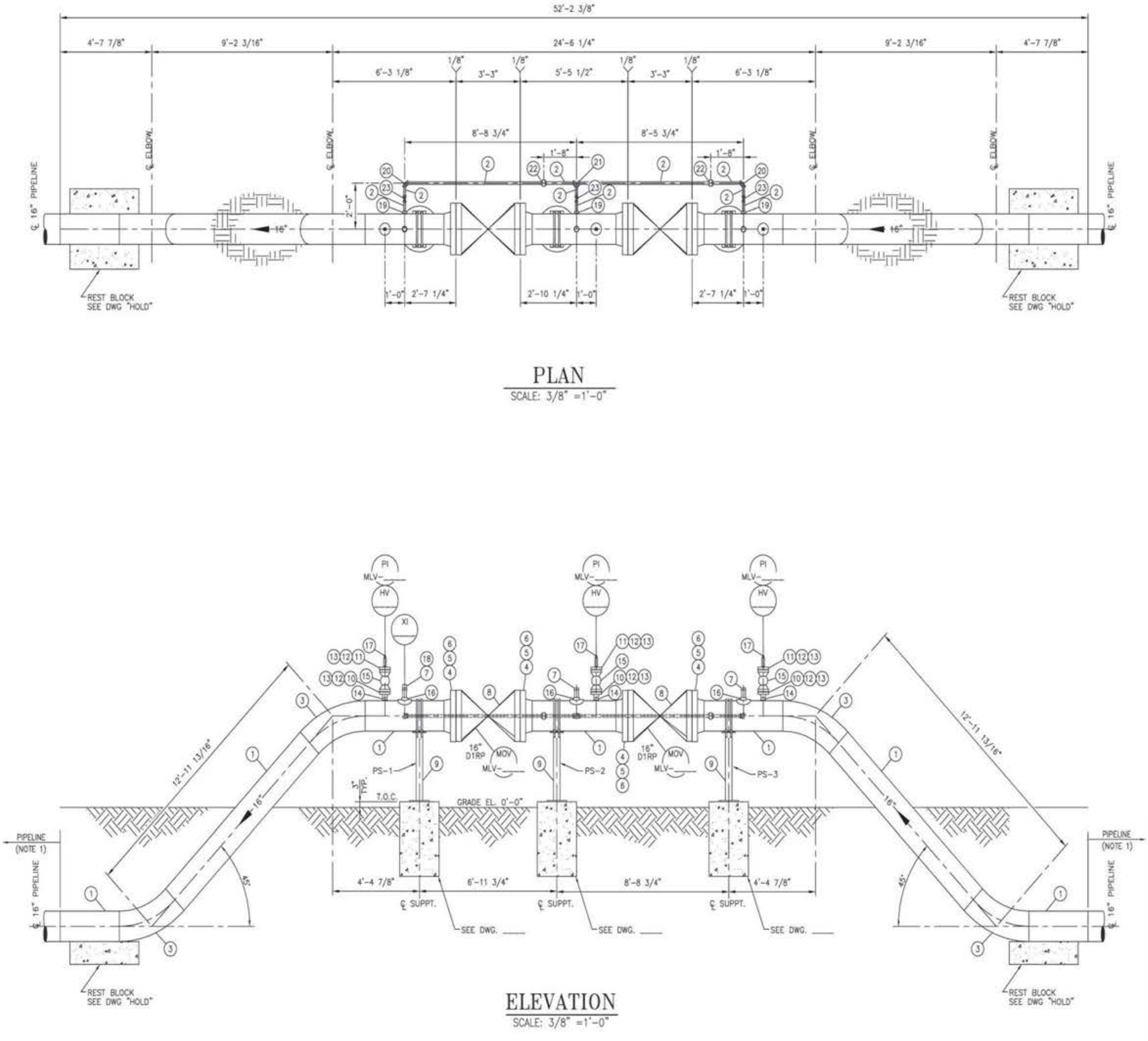
BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-5
Typical Mainline Valve Site Plan



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-6
Typical Mainline Valve (Plan and Elevation)



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-7
Mainline Valve Double Block Plan and Elevation

Table 2-3 Mainline Valve and Pig Launcher/Receiver Locations by Milepost

Location	Approximate MP
Pig launcher located within the Dry Creek Terminal	MP – 0
MLV 3	MP – 20.6
MLV 2	MP – 23.2
MLV 1	MP – 25.9
Pig receiver located within the proposed Beaver Lodge Receipt Facility	MP – 37.4

Pig launchers and/or receivers would be located within receipt facilities to allow for periodic internal pipeline inspections and cleaning. Pig launcher and receiver locations are provided in **Table 2-3**.

Additional aboveground facilities would be limited to cathodic test stations (Section 2.2.1.5) and pipeline markers. Pipeline markers would be installed at line-of-sight intervals and at crossings of roads and other key points (as required by 49 CFR 195) to show the location of the pipeline. Markers would identify the owner of the pipeline and convey emergency contact information. Because pipelines are normally buried underground, markers are used to show the approximate, not exact, location of the pipeline. Special markers providing information and guidance to aerial patrol pilots also would be installed. In order to further minimize the risk of accidental damage from third-party trenching, drilling, or other excavation activities, BakkenLink would subscribe to the North Dakota One Call system.

2.2.1.4 Storage, Staging, and Access

In addition to the construction ROW, ATWS, and permanent aboveground facilities, BakkenLink also would require other areas for pipe storage, construction equipment staging, contractor offices, and emergency response equipment. BakkenLink has proposed to use the Dry Creek Terminal, Keene Receipt Facility, and Beaver Lodge Receipt Facility as pipe storage yards. One additional pipe storage yard located at MP 30.1 (old scoria pit) also would be used during pipeline construction. Any additional pipe storage, equipment staging, or contractor office needs would be located at existing contractor facilities or at the receipt facilities.

BakkenLink would construct three emergency response equipment storage areas for the Project. One of the areas would be located at the proposed Beaver Lodge Receipt Facility. The second area would be located on the south side of Lake Sakakawea near MLV 2 and would contain a small building. The building would house a 30-foot-long aluminum boat (landing craft type vessel) and three trailers (one trailer would have gear for a winter/ice spill response; one trailer would have booms for summer/water spill response; and one trailer would have miscellaneous gear required for initial response, containment, and cleanup) would be on site. The third area would be located on the north side of Lake Sakakawea near MLV 1 and would be used for storing a spill response trailer. The emergency response equipment storage areas at MLV 1 and MLV 2 would each store 1,000 feet of 18-inch-hard boom. In the event of a spill in Lake Sakakawea, the boat stored on the south side of the lake would be used for deploying the boom. BakkenLink is coordinating with the USACE to facilitate launching a boat from the permanent ROW on the south shoreline of Lake Sakakawea. A spill response trailer also would be located at the existing Dry Creek Terminal. In addition to storing emergency response equipment at the aforementioned BakkenLink facilities, BakkenLink has a cooperative agreement with the Sakakawea Area Spill Response LLC (SASR) and would have access to spill response equipment at the SASR storage facility in New Town, North Dakota. BakkenLink would have access to the trailers staged at the response unit in New Town, North Dakota, which includes three trailers (one trailer would have gear for a winter/ice spill response; one trailer would have booms for summer/water spill response; and one trailer would have miscellaneous gear required for initial response, containment, and cleanup). Also, this response unit has three boats for deploying containment and cleanup equipment on Lake Sakakawea and other waterbodies. SASR has 2,000 feet of boom available at the New Town facility. Finally, BakkenLink has a contract with Clean Harbors as their Oil Spill Response Organization. Clean Harbors has 10,000 feet of boom available as well as a large inventory of cleanup equipment in Watford City, North Dakota.

BakkenLink has indicated that all construction vehicles and equipment traffic would be confined to roads and trails open for public travel, private roads acquired for Project use, and the construction ROW. BakkenLink has identified a total of six existing, two-track access roads that would require gravelling/matting prior to use during construction (POD, Appendix XI, Access Road and Improvements Table). A total of 33 roads would be crossed by the centerline (POD, Appendix XX, Road Crossings and Methodology).

BakkenLink also may request access to the ROW via other roads or highways that are crossed, if permitted by the road/highway authority. BakkenLink has not identified the need to construct any new temporary access roads for use during construction. There would be no improvements made on any USFS roads. All construction-related access roads to the ROW would be marked with signs. Any private roads not to be used during construction also would be marked. BakkenLink would offer landowners or land managing agencies the installation and maintenance of access deterrent features to control unauthorized vehicle access to the construction ROW, where appropriate. On federal lands, all travel management would be in accordance with applicable travel management plans. Access deterrent features may include the following, unless otherwise approved or directed by BakkenLink and relevant government authority based on site specific conditions or circumstances:

- Signs;
- Fences with locking gates; and
- Slash and timber barriers, pipe barriers, or boulders lined across the construction ROW.

2.2.1.5 Supervisory Control and Data Acquisition System

Supervisory control and data acquisition (SCADA) system communications would be provided through satellite systems, radio, cell modem, phone line, or fiber optic depending on the availability of such services. Pressures and flow rates would be monitored at a central location (Fryburg Rail Facility) 24 hours a day, 7 days a week. The SCADA system would alert operations personnel to abnormal operating conditions and allow them to respond promptly, including shutdown of the system in the event of a leak or other appropriate circumstance. Additionally, the communications equipment would be installed allowing all of the MLVs to be operated remotely to minimize any potential impacts of a spill. Currently, BakkenLink plans to install remotely controlled MLVs on both sides of Lake Sakakawea and at the southern boundary of USFS property and private property. Any additional remotely controlled valves that may be installed would be dependent upon operator locations, response times, and protocols based on additional consultation with PHMSA.

In addition, BakkenLink would utilize the Atmos Pipe Leak Detection System (Atmos Pipe). This system, which was originally developed by Shell between 1988 and 1994, has continuously been developed by Atmos International since then. It is pipeline leak detection software developed specifically to provide high sensitivity (in detecting leaks) with high reliability (few false alarms) in all operating conditions.

2.2.1.6 Corrosion Protection

Specialized coating for underground pipelines and a cathodic protection system would be utilized to prevent external corrosion. The specialized coating is designed to insulate the pipe from the surrounding earth. An impressed current style cathodic protection system would be installed on the pipeline. The impressed current protects the pipeline by negatively charging the pipeline using ionic exchange from the sacrificial anode beds. Rectifiers and deep well anode beds would be installed at approximately 15-mile intervals. The exact locations would be confirmed with geotechnical testing and availability of commercial electrical power. The deep well anodes would be 8 inches in diameter and would be drilled in 250-foot-deep vertical wells. The final footprint for each deep well anode would be approximately 2 feet by 2 feet. The deep well anodes would have a minimum 20-year life and the assembly would be designed to allow the anodes to be replaced at the end of the design life to extend the operational life of the pipeline. The rectifiers would be sized to allow sufficient adjustment to compensate for varying conditions. In accordance with 49 CFR 195, the rectifiers would be inspected at least 6 times per calendar year. The pipeline potential would be recorded at every test station (approximately 1-mile intervals) every calendar year. A close interval survey, providing a pipeline potential measurement every 3 feet, would occur every 7 years, or more frequently in critical areas identified in the Integrity Management Plan (IMP).

2.2.2 Environmental Protection Measures as Design Features of the Project

BakkenLink has committed to specific environmental protection measures as part of the Project design to minimize potential impacts to natural and human resources during construction and operation. These protection measures are summarized by resource in **Table 2-4**. The temporary construction ROW would be reduced in wooded and wetland areas, as necessary, to avoid impacts to these environmentally sensitive areas. The construction ROW also would be reduced to 50 feet in width across all USFS lands.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Air Quality	Water or chemical soil binders would be used to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements.
Geology and Minerals	The HDD construction method would be used to avoid impacts to landslide areas associated with the bluffs on the north and south sides of Lake Sakakawea.
Soils	Soil erosion would be minimized by implementing procedures described in the Storm Water Pollution Prevention Plan (SWPPP), and the Construction, Mitigation, and Reclamation Plan (CMRP).
	If construction is planned during a storm event, vehicle traffic and equipment would be restricted to prevent excessive rutting.
	Use of temporary roads across agricultural lands may result in some compaction and seasonal loss of crops. When necessary, compacted soils would be disked following Project completion and landowners would be compensated for any crop loss.
	During reclamation, compacted areas (typically any area that received repeated traffic or three or more passes by heavy equipment) would be decompacted, to the depth of compaction, by subsoiling or ripping to the depth of compaction. This would help prepare the seed bed, encourage infiltration, and help to prevent accelerated runoff and erosion. Where topsoil has been salvaged and segregated, decompaction would occur prior to respreading topsoil. Scarification would be used only on shallow soils.
	Salvaged topsoil would be protected from wind and water erosion at all times. To ensure proper erosion control of topsoil piles, all sediment and erosion control measures would be inspected after large rain events and repairs would be performed as needed.
Water Resources and Wetlands	The SWPPP would be implemented to minimize storm water transport of sediment from disturbed areas to streams, wetlands, and Lake Sakakawea. All Project-related storm water and hydrostatic test water discharges would be in compliance with a NPDES permit.
	No aboveground facilities or staging areas would be constructed/located within wetlands, riparian areas, or other WUS.
	Biologists familiar with wetland and riparian area identification would post signs at the edges of the wetland/waterbody features prior to construction to avoid surface disturbance and resource impacts.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Water Resources and Wetlands (Continued)	ATWSs would be located a minimum of 50 feet outside wetland boundaries. Protection measures (including installation of erosion control devices) would be utilized at all wetland and waterbody crossings to minimize sedimentation. For areas where additional setbacks are deemed necessary to protect the resource, the applicability of the appropriate setback would be determined in consultation with agencies on a site-specific basis.
	No refueling or lubricating would occur within 100 feet of wetlands and/or perennial/intermittent waterbodies. Hazardous materials, chemicals, fuels, etc., would not be stored within 100 feet of wetlands or perennial/intermittent waterbodies.
	Application of herbicides or pesticides in the vicinity of wetlands and waterbodies would follow pesticide use protocol, label instructions, and restrictions outlined in the Noxious Weed and Aquatic Nuisance Species Control Plan.
	For dry crossings, topsoil within the trench line would be segregated from subsoil in wetland and riparian areas for use in reclamation as specified in the CMRP.
	For standard wetland or riparian area crossings, topsoil stripping is impractical due to the saturated nature of the soil as specified in the CMRP.
	Where crossings of wetland or riparian areas cannot be reasonably avoided, the construction ROW width would be reduced to approximately 75 feet or less in standard wetlands and measures would be taken to minimize impacts. The construction ROW width would be reduced to approximately 50 feet or less on all federal lands.
	To control aquatic nuisance species, equipment and boats would be washed to remove all vegetative matter and aquatic nuisance species prior to arrival at the construction site and after constructing through waterbody crossings (e.g., Lake Sakakawea), where water is evident.
	Water used for hydrostatic testing, dust control during construction, etc., would be obtained from municipal or other permitted water supply wells. The installation or abandonment of any wells is not anticipated. Surface water or non-permitted groundwater appropriation is not anticipated.
	Sensitive areas would be marked and flagged as an “environmental sensitive area.”
	Pipeline crossings of any surface waterway would be scheduled at times of minimal rainfall to minimize the risk of construction-related sediment sources being washed into waterbodies or wetlands.
	A Section 404 permit would be obtained and mitigation would be required in consultation with the USACE. Mitigation areas would need to be monitored for a minimum of 5 years. Annual reports would have to be submitted to the North Dakota USACE regulatory office. Successful performance criteria would need to be developed in a mitigation and monitoring plan that should be submitted with a completed 404 permit application. North Dakota USACE regulatory staff would be able to provide additional guidance as necessary.
Vegetation	Revegetation seed mixes would be developed in coordination with the local Natural Resources Conservation Service (NRCS) office or agencies and private landowner as specified in the CMRP. All seed would be certified or registered by the State of North Dakota or the state of origin.
	Trees and shrubs would be replaced in accordance with the PSC’s tree and shrub mitigation specifications. BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures following construction.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Vegetation (Continued)	ROW monitoring of reclaimed areas would be conducted annually for 5 years following reclamation on USFS- and USACE-administered land and for 3 years following reclamation on private land. On USFS- and USACE-administered land, reclamation success would be based on the revegetation to 70 percent of the background cover as stipulated by the BLM and USFS (also a North Dakota Department of Health, Water Quality Division requirement). If, at any time during the 5-year monitoring period, revegetation is successful, no additional monitoring would be conducted.
	Sensitive areas would be marked and flagged as an “environmental sensitive area.”
Noxious Weeds	The Project’s Noxious Weed and Aquatic Nuisance Species Control Plan would be implemented to minimize the spread of noxious weeds.
	Noxious weed monitoring and control would continue for any ROW over which BakkenLink would retain control over the land surface use after construction.
	ROW monitoring for noxious weeds and invasive species would be conducted following reclamation in conjunction with ROW monitoring of reclamation success. BakkenLink would be responsible for noxious weed control within the permanent ROW for the life of the Project.
Wildlife and Fisheries	BakkenLink would construct escape ramps every 0.5 mile to reduce the potential for livestock and wildlife becoming trapped in the pipeline trench.
	To the extent practicable, mowing, clearing, and grubbing of the Project ROW would occur in the fall or winter (i.e., outside of migratory bird nesting season [February 1 through July 15]) to minimize disturbance to nesting birds.
	If construction occurs during migratory bird breeding season (February 1 to July 15), BakkenLink would conduct pre-construction surveys for active nests, including raptor nests, in order to avoid disrupting migratory birds during the breeding season. BakkenLink would have a qualified biologist survey the proposed route for nesting migratory birds within 5 days of any ground disturbing activity. To minimize impacts to migratory birds (including some game birds, waterfowl, and raptors), active nests would be avoided during construction and maintenance activities, in coordination with USFWS. If surveys or other available information indicate a potential for take of migratory birds, their eggs, or active nests, BakkenLink would suspend activities and contact the USFWS for further coordination on the extent of the impact and the long-term implications of the intended use of the Project on migratory bird populations.
	Any open posts (1.5-inch-diameter or greater), which may be utilized in pipeline construction or operation (such as markers, signs, stacks, etc.), would be permanently covered or filled with sand or gravel. This is necessary to prevent wildlife mortalities by entrapment.
	To avoid/minimize impacts to nesting bald eagles from construction activities, BakkenLink would: 1) maintain a minimum 0.5-mile buffer between the activity and any bald eagle nest if no landscape buffer exists; 2) maintain a minimum 660-foot buffer and landscape buffer or natural area between the activity and around the nest tree; and 3) avoid activities during the bald eagle nesting season (February 1 to July 15).

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Wildlife and Fisheries (Continued)	To avoid/minimize impacts to golden eagles, BakkenLink would conduct surveys prior to any on-the-ground activities to determine the extent of any golden eagle breeding territories in the area that may be impacted by the Project. BakkenLink would conduct an aerial nest survey (preferably by helicopter) within 1 mile of the Project ROW to identify any occupied and unoccupied golden eagle nest sites in proximity to the Project area. Aerial surveys would be conducted between March 1 and May 15, before leaf-out, so that nests are visible and their status (active or inactive) can be determined. A nesting territory or inventoried habitat would be designated as unoccupied by golden eagles only after at least two complete aerial surveys in a single breeding season. Aerial surveys would include the following: 1. Due to the ability to hover and facilitate observations of the ground, helicopters are preferred over fixed-wing aircraft, although small aircraft also may be used. BakkenLink would report any golden eagle nests, as well as other nests of any other raptors found during the survey. Where possible, BakkenLink would utilize two observers to conduct the surveys. 2. BakkenLink would record any observations of golden eagle nest sites using a global positioning system. The date, location, nest condition, activity status, and habitat would be recorded for each sighting. 3. BakkenLink would share the qualifications of the biologist(s) conducting the survey, method of survey, and results of the survey with the USFWS. Alternatively, BakkenLink may conduct ground surveys to identify golden eagle nests within 1 mile of the Project ROW between March 1 and May 15. However, ground surveys are much less reliable than aerial surveys, even during leaf-off conditions, and 75 percent of golden eagle nests present may be missed. BakkenLink would conduct at least two ground observation periods lasting at least 4 hours or more per linear mile to designate inventoried habitat or territory as unoccupied as long as all potential nest sites and alternate nests are visible and monitored. If a golden eagle nest is observed, BakkenLink would contact the USFWS for further consultation to determine appropriate protection measures and possible “take” permit implications.
Special Status Species	Prior to the initiation of construction, applicable biological surveys would be conducted through areas of suitable habitat for specific species during the appropriate season, as determined by the jurisdictional agencies (e.g., BLM, USFS, USACE, and USFWS) and survey results reported in compliance with Section 7 of the ESA.
	If threatened, endangered, candidate, or sensitive plant species are identified in proposed disturbance areas prior to construction, appropriate protection measures would be determined in consultation with agencies.
	Surface use is prohibited from March 1 through June 15 within 1 mile (line of sight) of active sharp-tailed grouse leks.
	The loss of special status plant species individuals or populations may occur as a result of adjacent noxious weed-related herbicide application treatments. To effectively mitigate this impact, consultation between the special status plant species jurisdictional agency and the weed control specialists would be completed prior to treatments. The location of known special status plant species and noxious weed species individuals and populations would be confirmed prior to treatments. In addition, techniques for special status plant species avoidance via direct and indirect applications would be developed.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Special Status Species (Continued)	To prevent the spread of aquatic nuisance species during construction and operation, BakkenLink would remove aquatic plants and animals from equipment prior to entering and before leaving any waterbody. Project staff would spray/wash equipment with high pressure hot water when leaving a wetland/waterbody, or would dry equipment for at least 5 days before use at a different wetland/waterbody.
	The revegetation plan would include a commitment to reseed disturbed native prairie with a comparable native grass/forb seed mixture and planting a diverse mixture of native cool- and warm-season grasses and forbs.
	BakkenLink would obtain a seed source that is as local as possible to ensure the particular cultivars are well adapted to the local climate.
	Disturbed native prairie would be reclaimed to its original condition using native seed mixes specified by applicable state and federal agencies. The objective is for no net loss of native prairie habitat to occur. Where avoidance of native prairie is not feasible, the following protection measures would be implemented to minimize impacts to the Dakota skipper, regal fritillary, Ottoe skipper, and tawny crescent: 1) Restrict workspaces where the ROW crosses native prairie habitat; 2) Salvage and segregate topsoil in native prairie to maintain the native seed sources for re-vegetation of the ROW in native prairie; and 3) Eliminate herbicide and pesticide use where Dakota skippers, regal fritillaries, Ottoe skippers, and tawny crescents are found.
	If construction occurs during spring or fall migration, BakkenLink would provide whooping crane monitors in suitable habitat along the ROW. If a whooping crane is sighted within 1 mile of a pipeline or associated facilities during construction, all work would cease within 1 mile of the area and the USFWS would be contacted immediately. In coordination with the USFWS, work would resume after the bird(s) leave the area.
	If construction were to occur during the interior least tern or piping plover breeding season (April 1 through August 31), BakkenLink would conduct surveys in suitable habitat within 0.5 mile of the Lake Sakakawea crossing location. A qualified biologist would survey no more than 5 days prior to construction-related activities to identify occupied breeding territories and/or active nest sites. If occupied breeding territories and/or active nest sites are identified, the USFWS would be notified. Appropriate protection measures, such as seasonal constraints and the establishment of a spatial buffer area, would be implemented on a site-specific basis in coordination with the USFWS. Similar constraints and/or mitigation measures may apply to pipeline maintenance activities if conducted during the breeding season within 0.5 mile of the Project area.
	In order to avoid potential spawning impacts to the pallid sturgeon, construction at Lake Sakakawea would occur after June 1, in order to avoid the warmwater fish spawning period (April 15 through June 1).
Land Use	Any range improvements such as fences, gates, cattle guards, and developed water sources located within disturbance or access routes would be repaired to the satisfaction of the agency or private landowner.
	If construction would disturb or destroy a natural barrier used for livestock control, the opening would be temporarily closed during construction and permanently closed following construction, as required by the agency or private landowner.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Land Use (Continued)	BakkenLink would coordinate with landowners to minimize impacts to their lands. Lands would be restored to cropland and farming use following the construction phase of the Project.
	In cultivated areas, the depth of cover may be increased to avoid interference with land use activities.
Recreation and Visual Resources	Measures would be implemented to minimize the visual effects of construction on high value road, river, and trail crossings as identified by the BLM, USFS, or USACE.
	To prevent unauthorized use of the ROW by off-road vehicles and subsequent potential impacts to soil, vegetation, and wildlife resources, access would be blocked at locations specified by agencies and/or private landowners.
	Aboveground structures would be painted with BLM-approved environmental colors to minimize contrasts with surrounding landscapes.
Transportation	All major highway and improved gravel or scoria road crossings would be bored to limit traffic interruptions.
	Placement of temporary access would be designed to avoid sensitive features such as wetlands. Areas used for temporary roads or working areas during construction would be restored to their original condition to the extent practicable.
Cultural and Paleontological Resources	Prior to the Project construction, cultural and paleontological resource inventories would be conducted on all proposed disturbance areas not previously inventoried. All cultural resources recorded during the inventories would be evaluated for eligibility to the National Register of Historic Places (NRHP). Avoidance would be recommended for cultural resources listed on the NRHP or evaluated as eligible for listing on the NRHP. If avoidance is not possible, a treatment plan would be developed by the BLM in consultation with the North Dakota State Historic Preservation Office (SHPO), USFS/USACE (if on their lands), and interested tribes. The treatment plan would be implemented prior to Project construction.
	To minimize indirect impacts to cultural and paleontological resources, Project-related personnel would be educated as to the sensitive nature of the resources; a strict policy of prohibiting collecting of these resources would be implemented.
	Sensitive areas would be marked and flagged as an “environmental sensitive area.”
	If cultural resources, including human remains, are discovered during Project construction, all work would stop in the area of the discovery and the procedures outlined in the Unanticipated Discoveries Plan would be followed. Written permission stating that work in this area no longer presents a hazard to cultural resources would be required before work could resume in the area of the discovery. If paleontological resources are discovered during Project construction, all work would cease, the Unanticipated Discoveries Plan for Paleontological Resources would be followed, and a certified paleontologist permitted by the State of North Dakota and the BLM would be contacted to determine appropriate resource identification and protection procedures.
Noise	The proposed route would be at least 500 feet from occupied houses and structures. At this distance, noise created during construction should be below ambient background levels, especially near highways and railroad lines.
	Construction would occur Monday through Saturday for approximately 10 hours/day.
Health and Safety	The Project would be located a minimum distance of 500 feet from residences to minimize hazards to human health and safety. Also, isolation valves would be installed along the pipeline in accordance with federal regulations to isolate the pipeline during a potential leak to minimize the release.

Table 2-4 Summary of Environmental Protection Measures for the Project

Resource	Environmental Protection Measures As Design Features
Health and Safety (Continued)	A Spill Risk Assessment (**Appendix A**) has been completed to identify HCAs and potential impacts as a result of an accidental release of crude oil during pipeline operation.
	Any burning during the Project would comply with all federal, state, county, and local fire regulations pertaining to burning permits.
	All hazardous and potentially hazardous materials would be transported, stored, and handled in accordance with applicable regulations.
	If toxic or hazardous waste materials are encountered during construction, construction would stop immediately, and would not restart until clearance is granted by the appropriate agency.
USFS Specific Mitigation Measures	Keep disturbance to a minimum to reduce impacts to suitable sensitive species habitat and native vegetation communities in general, and also to reduce spread of invasive species.
	Where the disturbance area would intersect noxious weeds or patches of invasive species, treat the noxious weeds or invasive species at least 2 weeks prior to construction, or salvage and stockpile the topsoil from these sites separately to isolate the vegetative propagules and seed. These areas should be identified to ensure they are monitored after reclamation.
	Use a USFS-approved native seed mix for reclamation; monitor to ensure proper establishment. Monitor annually for 5 years following reclamation to ensure reclamation success and to identify noxious weeds and invasive species establishment. If, at any time during the 5-year monitoring period, revegetation is deemed successful by the USFS, no additional monitoring would be conducted.
	If invasive species are found on reclaimed sites that are in areas mostly dominated by native species, treat the invasive species sites and reseed if necessary.
	If noxious weeds are found on reclaimed sites, treat the weeds and reseed if necessary.
	Clean vehicles and equipment used for construction at approved water or air wash stations (monitored by an EI) prior to entering the National Grassland to remove all seeds and plant propagules (seeds and vegetative parts that may sprout) in order to prevent the potential spread of noxious weeds and invasive species. Approved wash stations would include commercial car washes and on-site locations. This mitigation would be applied when moving equipment from an area containing invasive species to an area that does not contain invasive species.
	Clearly mark (stake/fence/flag) sensitive plant populations within or very near the ROW prior to construction and note them on alignment sheets to ensure that they are avoided. Ensure that such marking is still visible prior to reclamation activities.
	Any discovery of sensitive or watch plants within the Project area should be reported to the McKenzie Ranger District Office. Sensitive plant populations discovered after Project approval should be protected; therefore, last-minute alterations of the Project design or access route may be requested in order to avoid negative impacts to such populations.
USACE Specific Mitigation Measures	Drilling mud pits would not be constructed on lands administered by the USACE.
	Use a USACE-approved native seed mix for reclamation; monitor to ensure proper establishment. Monitor annually for 5 years following reclamation to ensure reclamation success and to identify noxious weeds and invasive species establishment. If, at any time during the 5-year monitoring period, revegetation is deemed successful by the USACE, no additional monitoring would be conducted.

BakkenLink has conducted a HCA location analysis for the Project to help determine appropriate placement of the valves during final design. HCAs are PHMSA-defined locations where the potential impacts resulting from a spill are expected to be greater than in other locations. HCAs include populated areas, unusually sensitive areas, and commercially navigable waterways (49 CFR 195.450). PHMSA has identified HCAs throughout the U.S. and these data are available to pipeline operators and federal agencies through PHMSA's National Pipeline Mapping System (National Pipeline Mapping System 2014). BakkenLink has reviewed the locations of MLVs with PHMSA for the protection of HCAs. The valve spacing is in accordance with the specifications in 49 CFR 195.

The results of the HCA study are documented in the Spill Risk Assessment (**Appendix A**). As required by 49 CFR 195.452(i) and enforced by the PHMSA, BakkenLink would conduct a more detailed risk assessment in compliance with these regulations. While the Spill Risk Assessment is sufficient to support the preparation of the EA, BakkenLink's analysis would be based on the final alignment. Throughout the life of the Project, BakkenLink would continue to be responsible for reviewing HCAs in the vicinity of the pipeline. Furthermore, BakkenLink would ensure compliance with 49 CFR 195.452(i) regulations, including the Integrity Management Rule, and would review the technical basis for the risk assessment's assumptions during integrity management inspections. The Integrity Management Rule specifies regulations to assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that, in the event of a leak or failure, could affect HCAs.

2.2.3 Construction

BakkenLink's facilities would be designed, constructed, tested, operated, and maintained in accordance with applicable requirements of the USDOT regulations in 49 CFR 195, U.S. Department of Labor regulations, Occupational Safety and Health Administration (OSHA) requirements, and other applicable federal and state regulations, such as PHMSA regulations. These regulations are intended to ensure adequate protection for the public and to prevent crude oil pipeline accidents and failures. Among other design standards, 49 CFR 195 specifies pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welding and operations personnel.

2.2.3.1 Safety Requirements and Environmental Inspection

BakkenLink and its contractors would undergo prevention, response, and safety training. The program would be designed to improve awareness of safety requirements, pollution control laws and procedures, and proper operation and maintenance of equipment.

As part of the construction mobilization activities, a pre-construction safety coordination meeting would be held at each spread or project work location by BakkenLink. Designated BakkenLink project management personnel would attend these sessions with the contractor superintendent, foremen, and safety representative(s). The agenda of this meeting would address any specific contractor and/or BakkenLink concerns and expectations; address safety initiatives; and review the safety compliance program, incident reporting, and established protocols for determining, correcting, and documenting safety non-compliance incidents. In addition, this meeting would include expectations in terms of compliance enforcement and accountability.

After the pre-mobilization safety and environmental orientation, the contractor would conduct safety and environmental orientation for all personnel and visitors prior to granting access to any portion of the construction ROW. The contractor would keep a log of all personnel receiving safety and environmental orientation. All work would be conducted in compliance with the contractor's safety plan and procedures as approved by BakkenLink. In addition, all work would be conducted in compliance with the terms and conditions of the approved ROW permit, which would include reasonable and necessary environmental protection measures.

The contractor and associated subcontractors would ensure that persons engaged in Project construction are informed of the construction and environmental requirements, and that they attend and receive training regarding these requirements as well as all laws, rules, and regulations applicable to the work. Prior to construction, all Project personnel would be trained on environmental permit requirements and environmental specifications, including fuel handling and storage, cultural resource protection methods, stream and wetland crossing requirements, and sensitive species protection measures.

The contractor would provide, at a minimum, one qualified and experienced safety representative and one personnel trained in emergency management for each construction spread. BakkenLink would provide a minimum of one environmental inspector per spread to ensure that construction activities are compliant with the permit-approved environmental mitigation and reclamation requirements specified in all permits and this document.

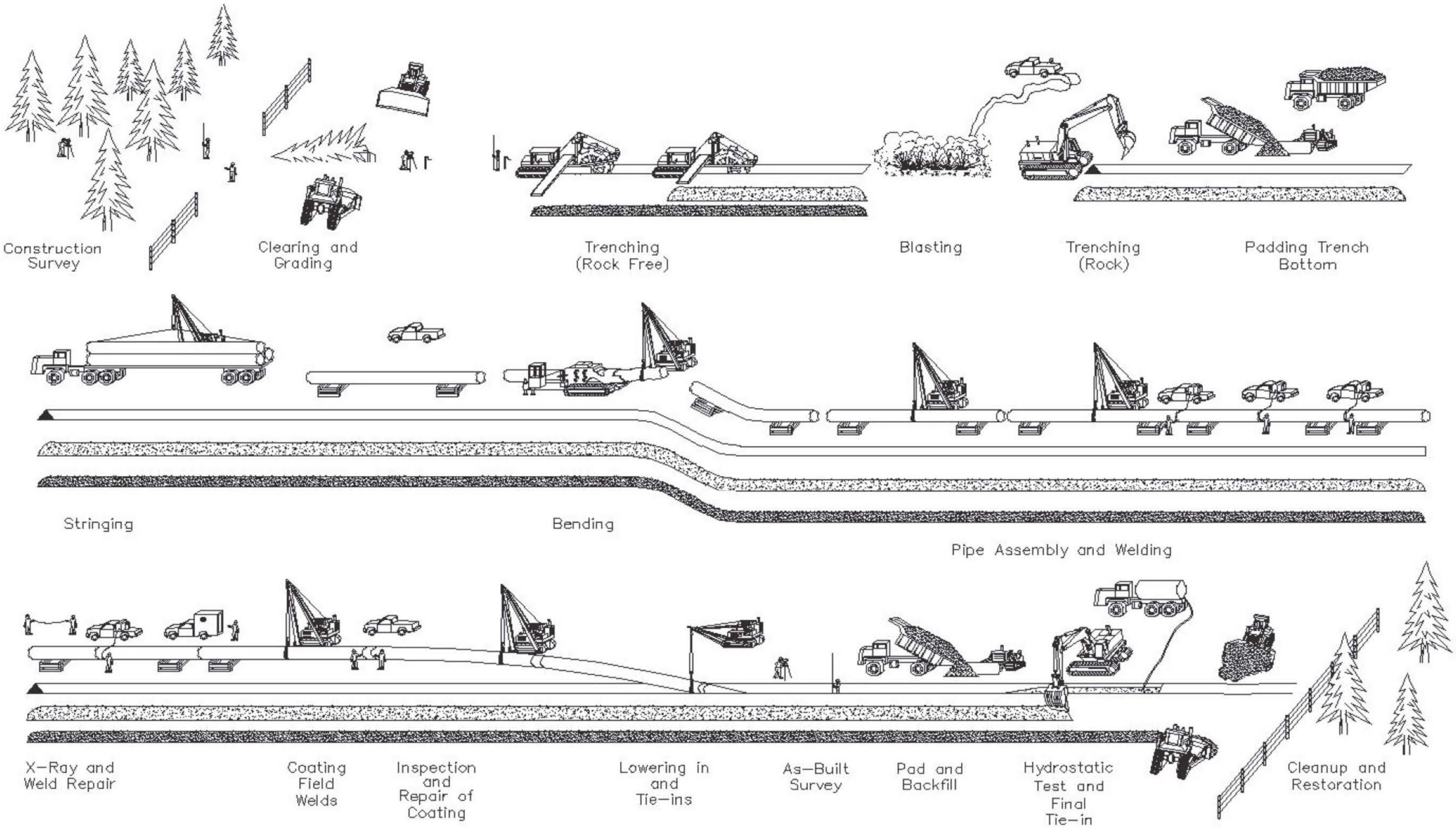
Construction activities would be carried out during daylight hours unless approved by BakkenLink. Burning along the ROW would be controlled and be in accordance with local permits and requirements. Spill prevention measures would be undertaken to maintain the safety of the construction personnel and protect the environment. Access to the ROW would be controlled to allow only authorized vehicles and maintain the safety of the public and construction crews.

Pipeline construction is much like a moving assembly line. Construction of the pipeline involves several procedures that are summarized in the following sections (**Figure 2-8**). These operations include:

- Survey and staking;
- Clearing and grading;
- Trenching;
- Pipe stringing;
- Bending;
- Welding;
- Lowering the pipeline;
- Backfilling;
- Hydrostatic testing; and
- ROW cleanup and restoration.

Construction would proceed along the pipeline in one continuous operation. As construction proceeds along a spread, construction at any single point along the pipeline (from initial surveying and clearing to backfilling and finish grading) is anticipated to last about 6 to 10 weeks. Multiple spreads may be constructed at the same time. The process would be coordinated in such a manner as to minimize the total time an individual tract of land is disturbed, exposed to erosion, or temporarily precluded from its normal use. Construction procedures for the Lake Sakakawea crossing are described in Section 2.2.5.5, Waterbody Crossings.

Temporary workspaces would be required for drilling equipment, pipe assembly, supplies and materials, temporary mud pits and tanks, support vehicles, access to drilling sites, and equipment turn around areas. Erosion control measures would be installed as necessary and in accordance with the SWPPP.



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-8
Typical Pipeline Construction Sequence

2.2.3.2 Survey and Staking

The first step of construction would involve marking the limits of the approved work area (the construction ROW and ATWSs), the pipeline centerline, access roads, existing utility lines, and other special areas. Sensitive areas such as wetland boundaries and cultural resource sites would be marked and flagged for implementing protective measures. Markers would be labeled “Environmental Sensitive Area” and won’t specifically identify the resource. BakkenLink would notify landowners in advance of construction activities that could affect their property, business, or operations.

2.2.3.3 Clearing and Grading

The construction ROW would be mowed, cleared, and graded to provide a relatively level surface for construction equipment, a sufficiently wide workspace for the passage of heavy construction equipment, and safety for the pipeline workers.

To avoid soil mixing, topsoil would be removed and segregated from the underlying subsoil. Topsoil would be removed from the entire width of the ROW (i.e., over the trench, spoil side, and on the working side of the temporary ROW) (**Figure 2-9**) for the entire length of the pipeline. **Figure 2-10** illustrates topsoil salvage on USFS-administered land. For areas where the subsoil experienced significant compaction due to equipment traffic, decompaction would be completed by employing a paraplow or ripper with shanks.

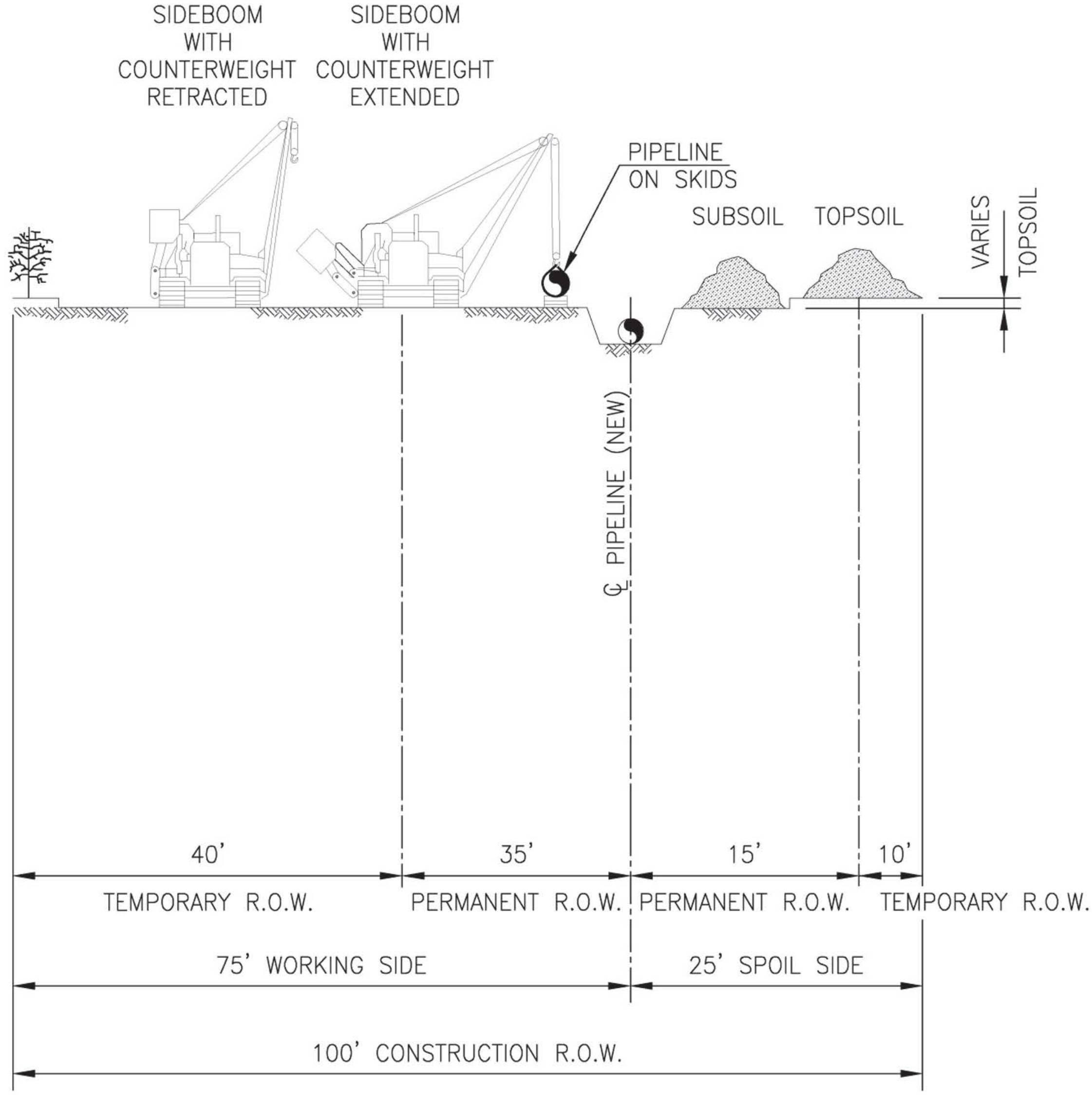
Typically, topsoil would be segregated and stored on the temporary construction ROW on the opposite side of the trench from the “working side” where construction activity would take place. After pipeline installation is complete, the subsoil then would be replaced in the pipeline trench and adjacent areas to restore the land’s natural contours. Only then would the topsoil be replaced in the locations from where it was initially removed. However, special, site-warranted cases (e.g., rugged terrain) may require the storage of topsoil on the working side of the trench (e.g., construction on an upward facing side slope) (Section 2.2.4.1). Typical construction schematics depicting topsoil and subsoil storage locations in proportion to the Project ROW for these special, site-warranted cases, in addition to most other field cases that would be encountered during construction, are provided in the POD, Appendix II, Typical ROW and Temporary Workspace Drawings.

Fences and gates would be constructed during the clearing and grading operations to allow continuous use of pastures, grazing units, and livestock facilities. Silt fence would be installed along the ROW adjacent to wetlands and streams. In locations where BakkenLink is not utilizing HDD techniques for crossing small water features, such as small ponds, streams, and creeks, approved temporary flumed structures would be constructed to minimize impacts to the water feature. Temporary erosion controls would be installed after initial disturbance of soils, where necessary, to minimize erosion (POD, Appendix III, Typical Construction Drawings). Erosion controls would be maintained throughout construction.

2.2.3.4 Trenching

Trenches would be excavated using a wheel trencher or backhoe. Special excavation equipment or techniques may be used if large quantities of solid rock are encountered. Trenches would be excavated to a depth sufficient to provide the minimum cover required by federal, state, and local municipalities as well as landowner requirements. The USDOT specifies a minimum cover of 3 feet from natural ground to top of pipe.

The amount of open trench permitted at any time during the Project would be governed by the stability of the trench and the prevailing weather conditions. The open trench would be restricted so as not to extend more than 3 miles ahead of the welding and x-ray crew unless approved by BakkenLink. When



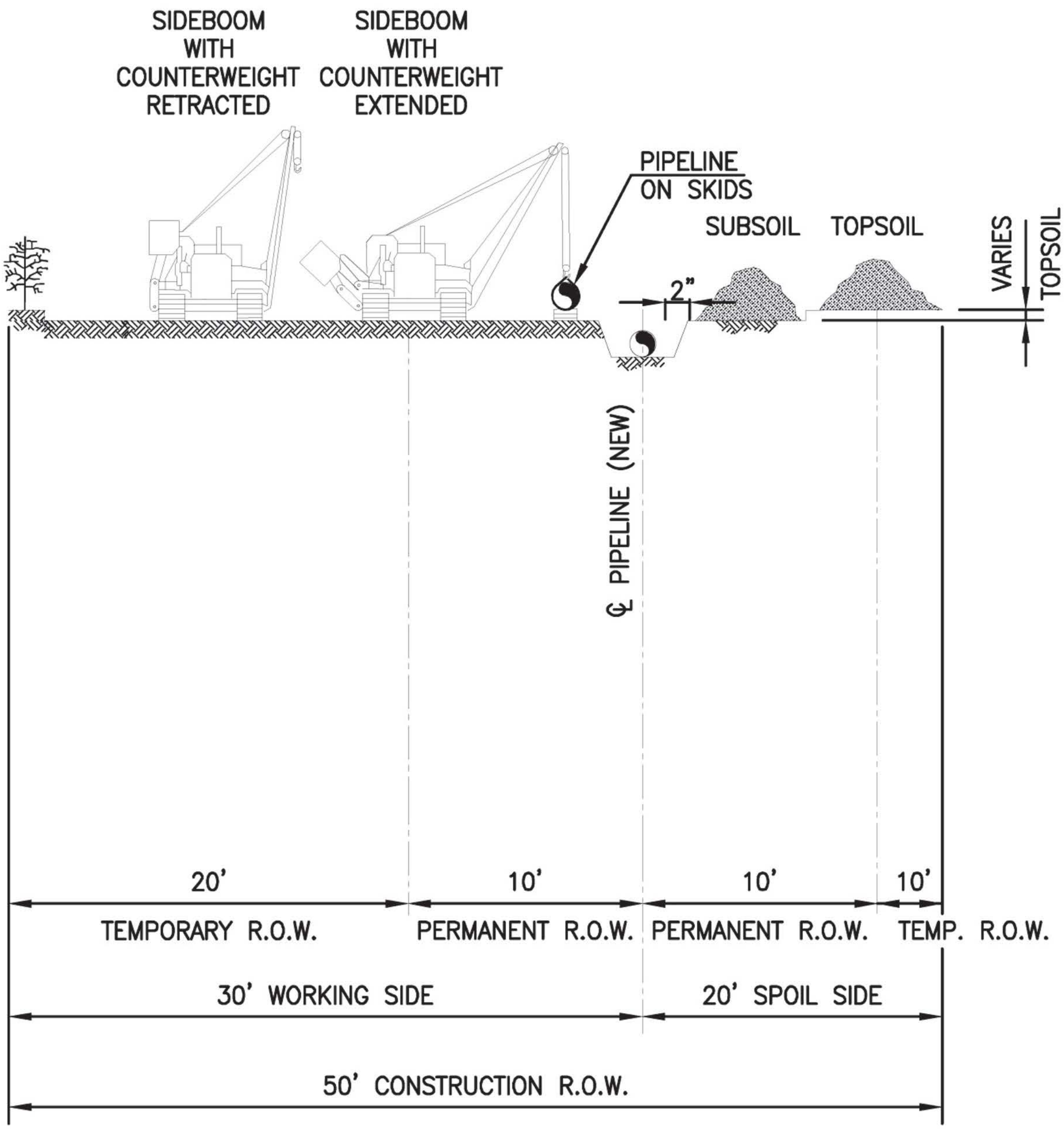
Notes:

1. ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE-SPECIFIC CONDITIONS. UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE FOR THE APPROPRIATE PIPE DIAMETER.

2. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED FOR THE TRENCH AND SPOIL SIDES.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-9
Typical Full Right-of-Way Topsoil Salvage



Notes:

1. ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE-SPECIFIC CONDITIONS. UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE FOR THE APPROPRIATE PIPE DIAMETER.

2. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED FOR THE ENTIRE 50-FOOT ROW (TRENCH, SPOIL, AND WORKING SIDES).

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-10
Typical Full Right-of-Way Topsoil Salvage on USFS Lands

the trench is excavated through lands where livestock are confined or through cultivated fields where it is desirable for the landowner to have a passageway across the trench, temporary fences, gates, and/or bridges would be installed to provide appropriate restriction or safe access across the open trench.

2.2.3.5 Pipe Stringing, Bending, and Welding

Following trenching, the contractor would string the pipe along the ROW. Pipe would either be stored at storage yards or transported directly to the pipeline ROW. The pipe lengths typically are 40 to 80 feet long. A stringing crew using special trailers would move the pipe along the ROW.

A pipe-bending machine would be used to make slight bends in the pipe to account for changes in the pipeline route and to conform to the topography. The bending machine uses a series of clamps and hydraulic pressure to make a smooth, controlled bend in the pipe. All bending is performed in strict accordance with federally prescribed standards to ensure integrity of the bend. Pipe would be bent at the mill when necessary for sharp bends. The pipe would be pre-coated at the mill with a fusion-bonded epoxy external coating (or other coating technique) to provide corrosion protection.

A welding process would be utilized to join the sections of pipe into one continuous length. Each welder would be required to pass an approved qualification test to work on a particular pipeline aspect. The qualification tests would be conducted using project-specific weld procedure(s) that would be developed in accordance with federally adopted welding standards.

Welds would be nondestructively tested to ensure structural integrity and compliance with the applicable USDOT regulations. Those welds not meeting established specifications would be repaired or removed. Once the welds are approved, the welded joints would be externally coated and the entire pipeline would be visually and electronically inspected for coating defects, scratches, or other damage. Any damage or defects would be repaired before lowering into the trench.

2.2.3.6 Lowering-in, Padding, and Backfilling

A series of side-boom tractors would simultaneously lift welded sections of the pipe and carefully lower the sections into the trench. Non-metallic slings protect the pipe and coating as it is raised and moved into position. In rocky areas, the contractor may place sandbags or foam blocks at the bottom of the trench prior to lowering-in to protect the pipe and coating from damage. Trench breakers or water stops would be installed, as necessary, adjacent to wetlands and stream crossings to eliminate groundwater migration along the trench.

The trench would be dewatered, as necessary, prior to pipe lowering. Dewatering effluent would pass through sediment filters (hay bale structures and/or filter bags) to ensure compliance with applicable water quality requirements.

The trench would be backfilled after the pipe has been installed. Soil would be returned to the trench in the reverse order of excavation. Subsoil would be backfilled first followed by the topsoil. The trench line (subsoil) would be compacted with a wheeled-roller or other suitable construction equipment. A crown would be left over the trench line to allow for natural subsidence. If the excavated material (rock) can damage the pipe and/or coating, the pipeline would be protected with a rock shield and/or covered with select fill, obtained from commercial borrow areas or by separating suitable material from nearby trench spoil. Topsoil would not be used for padding.

2.2.3.7 Hydrostatic Testing

The entire length of the pipeline would be hydrostatically tested per USDOT regulations in 49 CFR 195 before being placed into service. Depending on the varying elevation of the terrain and the location of available water sources, the pipeline likely would be divided into sections to facilitate the test. The pipeline test section breakdowns are provided in **Tables 2-5** and **2-6**. BakkenLink anticipates using water use from municipal and/or private wells. No surface water sources would be utilized for hydrostatic testing of the pipeline.

Table 2-5 Hydrostatic Test Segments and Estimated Water Volumes

Segment Number	Segment Break Locations	Approximate MP		Segment length (feet)	Water Volume (gal)	Source[1]	Proposed Discharge Locations (Approximate MP)
1	Dry Creek Terminal – South Lake Sakakawea	0	22.8	120,384	1,161,217	TBD	0
2	Lake Sakakawea	22.8	25.6	14,784	140,278	TBD	25.6
3	North Lake Sakakawea – Beaver Lodge	25.6	37.4	60,720	585,702	TBD	37.4
	Total			**195,888**	**1,887,197**		

[1] Local municipal/private wells to be determined.

Table 2-6 HDD Segment and Estimated Hydrostatic Test Water Volume

HDD Segment	Approximate MP	Segment length (feet)	Water Volume (gal)	Source[1]	Proposed Discharge Locations (Approximate MP)
USFS	20.2	4,183	39,690	TBD	20.2
Lake Sakakawea – South Bluff	22.0	3,767	35,743	TBD	22.0
Lake Sakakawea – North Bluff	26.2	3,050	28,940	TBD	26.2
Total		**11,000**	**104,373**		

[1] Local municipal/private wells to be determined.

Each pipe section would be filled with water and pressurized to a level higher than the operating pressure. The test pressure would be held for a specific period to confirm that it meets the design strength requirements and whether any leaks are present. BakkenLink would require a minimum hydrostatic test pressure of 1,850 psig. The maximum pressure would be limited to 95 percent of the Specified Minimum Yield Strength of the steel pipe, which is 2,408 psig.

Hydrostatic test water would be discharged in upland areas within or along the edges of the construction ROW using energy dissipation devices, such as filter bags or straw bale dewatering structures, to minimize erosion and sedimentation, and in accordance with the approved ROW permit and NPDES discharge permits. No water discharge would occur within 500 feet of waterbodies, and other environmentally sensitive areas would be avoided. Test water would contact only new pipe and BakkenLink does not plan to add chemicals to the test water. Once a test section successfully passes the hydrostatic test, the water is emptied from the pipeline in accordance with federal and state requirements. The pipeline would then be dried to assure it has no free water in it before oil is put into the pipeline.

BakkenLink has provided estimates of the total water use for the hydrotesting and drilling operations (**Table 2-7**). The estimate reflects water volumes needed for the mainline hydrotest, HDD pre-installation hydrotests, and drilling operations independently. It is possible the water amounts can be reduced if the water is reused between test segments. For example, water used during HDD pre-installation hydrotest could be stored, filtered, and reused for mixing in the drilling mud. However, the total water usage in **Table 2-7** does not account for any reuse of water.

Table 2-7 Total Water Usage

Water Usage	Water (gallon)
Hydrostatic Test Total	1,887,197
HDD Pre-installation Hydrostatic Test Total	104,373
Water for Drilling Operations Total*	775,521
Water Totals	2,767,091

* Water use in drilling operations provided in BakkenLink's *Inadvertent Returns Contingency Plan.*

2.2.3.8 Cleanup

The final step in the construction process is restoring the ROW as closely as possible to its original condition. Depending on the Project requirements, this typically involves decompacting construction work areas, replacing the topsoil, and seeding non-cultivated land. BakkenLink has indicated that decompaction would be performed on the working side of the trench where subsoil would experience significant compaction due to equipment traffic. A paraplow or ripper with shanks would be used to loosen the subsoil. Final grading is anticipated to occur within 20 days of backfilling the trench. Permanent erosion control measures including, but not limited to, trench plugs, permanent slope breakers, erosion control matting, and riprap (drawings for which are included in BakkenLink's POD, Appendix III, Typical Construction Drawings, which was submitted to the federal agencies with the ROW Grant application) would be installed as necessary. Additional details pertaining to permanent erosion and sediment control were provided in BakkenLink's CMRP, which also was submitted as part of their POD (Appendix XIII).

Signs denoting sensitive environmental areas would be removed. Pipeline markers and/or warning signs would be placed along the pipeline centerline at line-of-sight intervals and at crossings of roads, railroads, and other key points (as required by 49 CFR 195) to show the location of the pipeline, unless otherwise prohibited by land managing agencies. Public roads would be restored to pre-construction conditions. Private and public property (e.g., fences, gates, driveways, roads, etc.) that were disturbed by construction would be restored to their original or better conditions, consistent with agreements with individual landowners, counties and/or townships, and any applicable permit requirements. Rocks greater than 6 inches across would not be placed within 1 foot of the surface on tilled land. Rocks would be collected and disposed of off the ROW or at a location designated by the landowner.

2.2.3.9 Restoration

The construction contractor would limit ground disturbance wherever possible and use appropriate erosion and sediment control measures. Prior to the completion of construction activities, BakkenLink would ensure that the BLM authorized officer has access to review and inspect vegetation and restoration activities along the ROW on federal lands. BakkenLink and its contractors would be responsible for the removal of temporary construction facilities, structures, or surface materials; reclamation of the original grade contours; and restoration of disturbed areas to a state similar to pre-construction conditions, to the extent practicable, unless landowner consent is obtained to do otherwise. Post-construction reclamation activities include removing and disposing of construction debris, dismantling temporary facilities, leveling or filling tire ruts, soil decompaction, rock removal, soil additives, and seeding and mulching; erosion control measures including trench breakers, slope breakers, and matting and riprap; installing fences, farm terraces, and ROW and pipeline markers; and reseeding non-cultivated areas. Specific information regarding reclamation activities are described in the CMRP (POD, Appendix XIII).

2.2.4 Pipeline Construction Techniques

2.2.4.1 Open Cut Construction

The open cut crossing method of construction involves excavating a pipeline trench across the waterbody, installing a section of pipe, and then backfilling the trench with material excavated from the trench. Excavation and backfilling of the trench would be performed using backhoes or other excavation equipment. BakkenLink proposes to cross some of the waterbodies with little to no flow using the open cut method (POD, Appendix IX, Waterbody Crossings) and the remaining waterbodies using HDD techniques, excluding the Lake Sakakawea crossing.

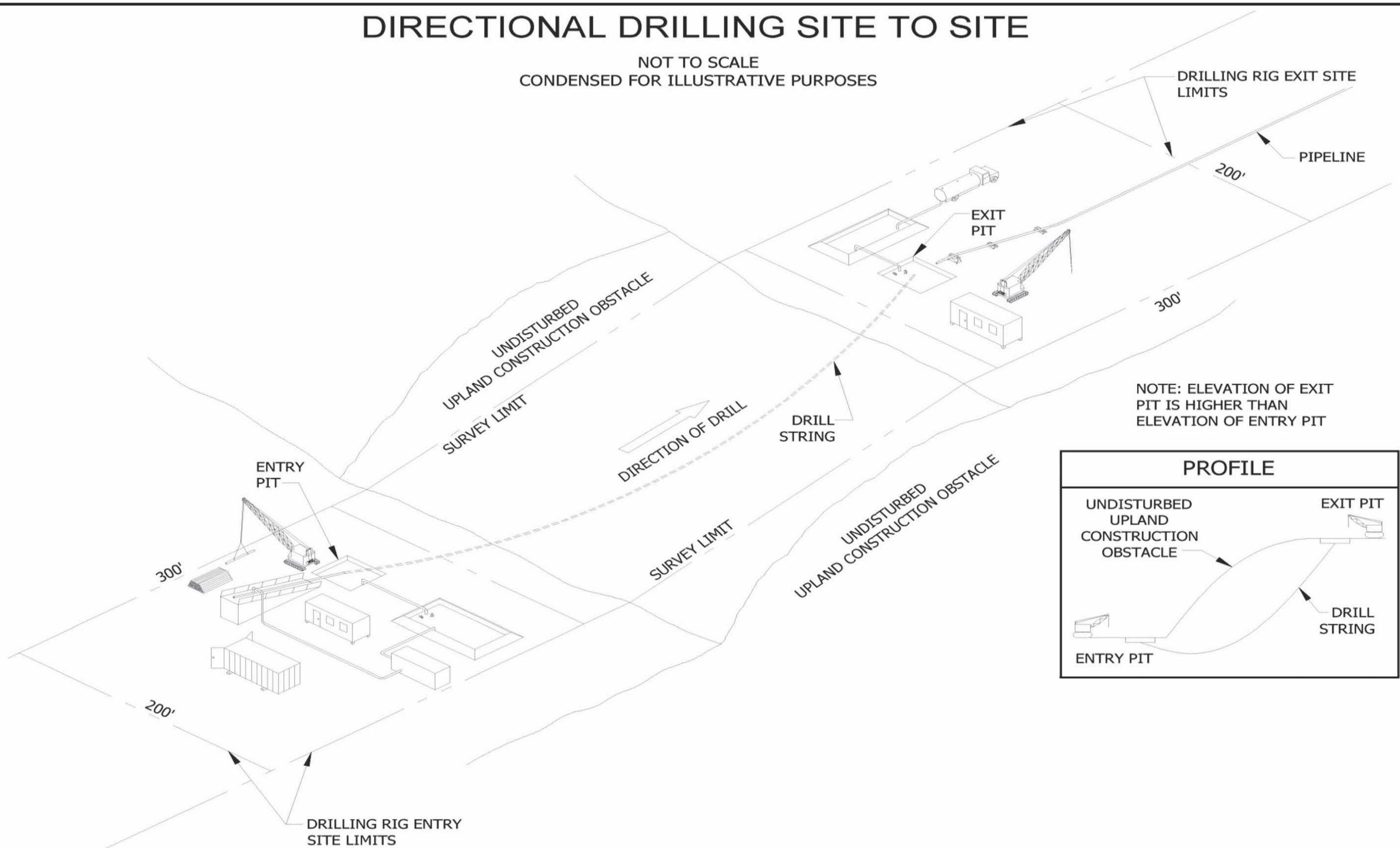
2.2.4.2 Horizontal Directional Drill Construction

In general, HDD is a trenchless technique for installing pipelines or other linear utilities to avoid or minimize surface or sensitive area disruptions and install pipe where conventional installation techniques are unfavorable. The first phase consists of drilling a directionally controlled pilot hole along a predetermined path extending from grade at one end to grade at the opposite end. The entry and exit holes for the HDD typically are designed to be set-back from the area of avoidance to allow for the geometry of the drill to reach a desired target depth. **Figure 2-11** provides an illustration of a typical HDD for a landslide area.

The second phase consists of enlarging the pilot hole to a size that would accommodate pulling the pipeline through the enlarged hole. Generally, the hole should be 1.5 to 2 times the outer diameter of the pipe. Preliminary analysis indicates a 24-inch-diameter hole would be recommended for the 16-inch-diameter pipeline. The enlargement of the pilot hole, or reaming, would be accomplished by pulling reaming heads of specific diameters through the hole, in stages if necessary, to create a wider hole. All stages of HDD involve circulating drilling fluid from equipment on the surface through the drill pipe to a downhole bit or reamer, and back to the surface through the annular space between the pipe and the wall of the hole. During this process, circulating fluid would be contained entirely within a closed system. The circulating fluid primarily consists of bentonite, which is a non-toxic, naturally occurring sedimentary clay composed of weathered and aged volcanic ash. The drilling fluid serves several purposes: to control the frictional heating of the drilling components, remove large cuttings, and keep the drilling equipment lubricated. In a separate operation, while the hole is being drilled, the pipe is being welded to accommodate the length of the HDD and tested in one piece along the construction easement. Once the drilled hole is prepared and stable, the welded pipeline, or drill string, is pulled through the hole. Generally, the pipe string is laid out and welded on the exit side of the drill. The drill string can be assembled in segments instead of a continuous length; however, pipe pulling operations would cease while the segments are being welded together.

During the HDD method, drilling fluid would be under great pressures and when expended down-hole, it would flow in the path of least resistance. In the drilled annulus, this path may be an existing fracture or fissure in the substrata, a high porosity streak, and/or a pocket of incompetent substrate material being penetrated. These paths could lead to the surface and unplanned releases of drilling fluid (“frac out”) could occur. BakkenLink has prepared a contingency plan for the inadvertent returns of drilling fluid to the surface (POD, Appendix XXI, Inadvertent Returns Contingency Plan).

The major advantage of the HDD technique is the minimal effects on environmentally sensitive surface areas, roads, and temporary surface impacts during construction activities. Additional workspaces would be required for the longer HDD segments at the drill entry and exit locations, generally 300 feet by 300 feet, as well as an area to string, weld, and leak test the pipe prior to pull back. This drill stringing area is essential for proper alignment of the pipeline as it is pulled through the hole. BakkenLink proposes to use the HDD method to construct 37 HDD segments for the Project (**Table 2-8**), with the vast majority of the HDD segments being constructed to avoid impacts to wetlands/waterbodies and roads. The six longest HDD segments are shown on **Figures 2-12** through **2-14**.



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-11
Typical Construction
Upland Obstacle HDD

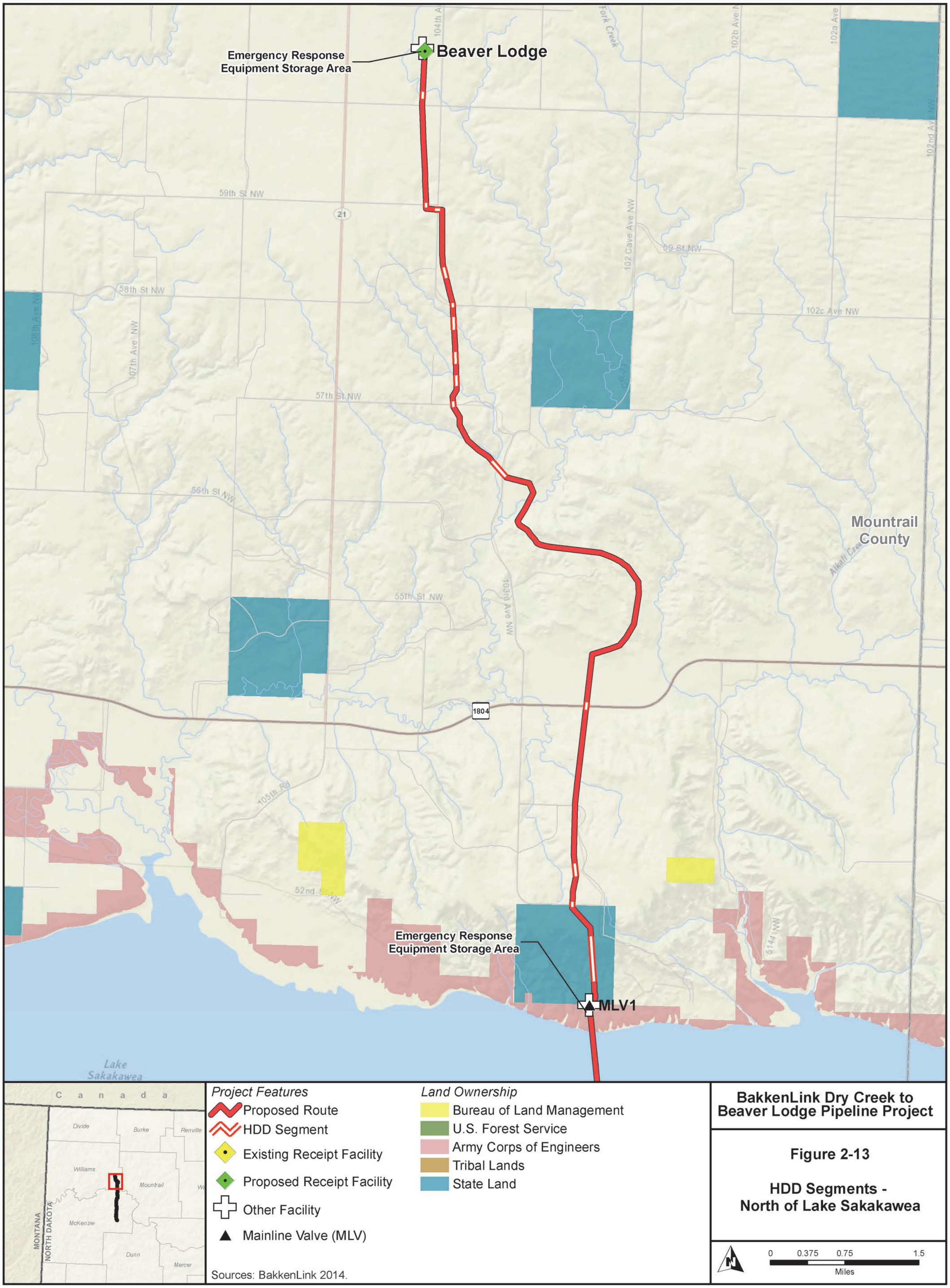
Table 2-8 HDD Segments

Segment ID	Milepost Range	Approximate Length (feet)	Feature Avoided[1]
001	0.21 – 0.27	326	Wetland/Waterbody
002	1.66 – 1.73	398	Road
003	2.59 – 2.67	453	Wetland/Waterbody
004	2.71 – 2.76	228	Environmentally Sensitive Area
005	3.26 – 3.31	248	Road
006	5.37 – 5.45	434	Wetland/Waterbody/Road
007	6.44 – 6.50	317	Road
008	7.45 – 7.50	253	Road
009	11.43 – 11.52	481	Wetland/Waterbody
010	11.59 – 11.65	301	Road
011	12.58 – 12.65	371	Road
012	13.59 – 13.64	265	Road
013	15.78 – 15.83	269	Road
014	16.81 – 16.92	564	Wetland/Waterbody/Road
015	17.70 – 17.76	346	Road
016	18.31 – 18.37	320	Road
017	18.85 – 18.95	493	Wetland/Waterbody
018	19.37 – 19.43	346	Road
019	20.14 – 20.19	252	Road
020	20.67 – 21.22	2,901	Steep Terrain
021	21.26 – 21.32	315	Road
022	21.82 – 21.91	467	Environmentally Sensitive Area
023	22.40 – 22.78	2,031	Steep Terrain
024	26.22 – 26.68	2,397	Steep Terrain
025	27.04 – 27.09	266	Road
026	27.36 – 27.48	681	Wetland/Waterbody
027	29.04 – 29.11	363	Road
028	32.71 – 32.91	1,087	Woodlands/Road
029	33.61 – 33.67	273	Road
030	33.84 – 33.94	560	Wetland/Waterbody
031	34.06 – 34.18	612	Environmentally Sensitive Area
032	34.41 – 34.53	657	Wetland/Waterbody
033	34.63 – 34.67	220	Road
034	34.93 – 35.04	574	Environmentally Sensitive Area
035	35.65 – 35.70	258	Road
036	35.81 – 35.85	238	Road
037	36.90 – 36.97	361	Wetland/Waterbody

[1]No temporary or permanent surface disturbance would occur in these areas.

Source: BakkenLink 2014.


Beaver Lodge
Emergency Response Equipment Storage Area
Williams County
Mountrail County
1804
Emergency Response Equipment Storage Area
MLV1
Lake Sakakawea
MLV2
Emergency Response Equipment Storage Area
MLV3
1806
McKenzie County
1806
Keene
23
Keene
22
Dry Creek
73
Dunn County
Canada
MONTANA
NORTH DAKOTA
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
Project Features
Proposed Route
HDD Segment
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Land Ownership
Bureau of Land Management
U.S. Forest Service
Army Corps of Engineers
Tribal Lands
State Land
Sources: BakkenLink 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 2-12
HDD Segments Overview
0
1.25
2.5
5
Miles


Emergency Response Equipment Storage Area
Beaver Lodge
59th St NW
58th St NW
57th St NW
56th St NW
55th St NW
52nd St NW
105th Rd
102c Ave NW
103rd Ave NW
102 Cave Ave NW
Mountrail County
1804
21
Emergency Response Equipment Storage Area
MLV1
Lake Sakakawea
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
HDD Segment
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Land Ownership
Bureau of Land Management
U.S. Forest Service
Army Corps of Engineers
Tribal Lands
State Land
Sources: BakkenLink 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 2-13
HDD Segments - North of Lake Sakakawea
0
0.375
0.75
1.5
Miles

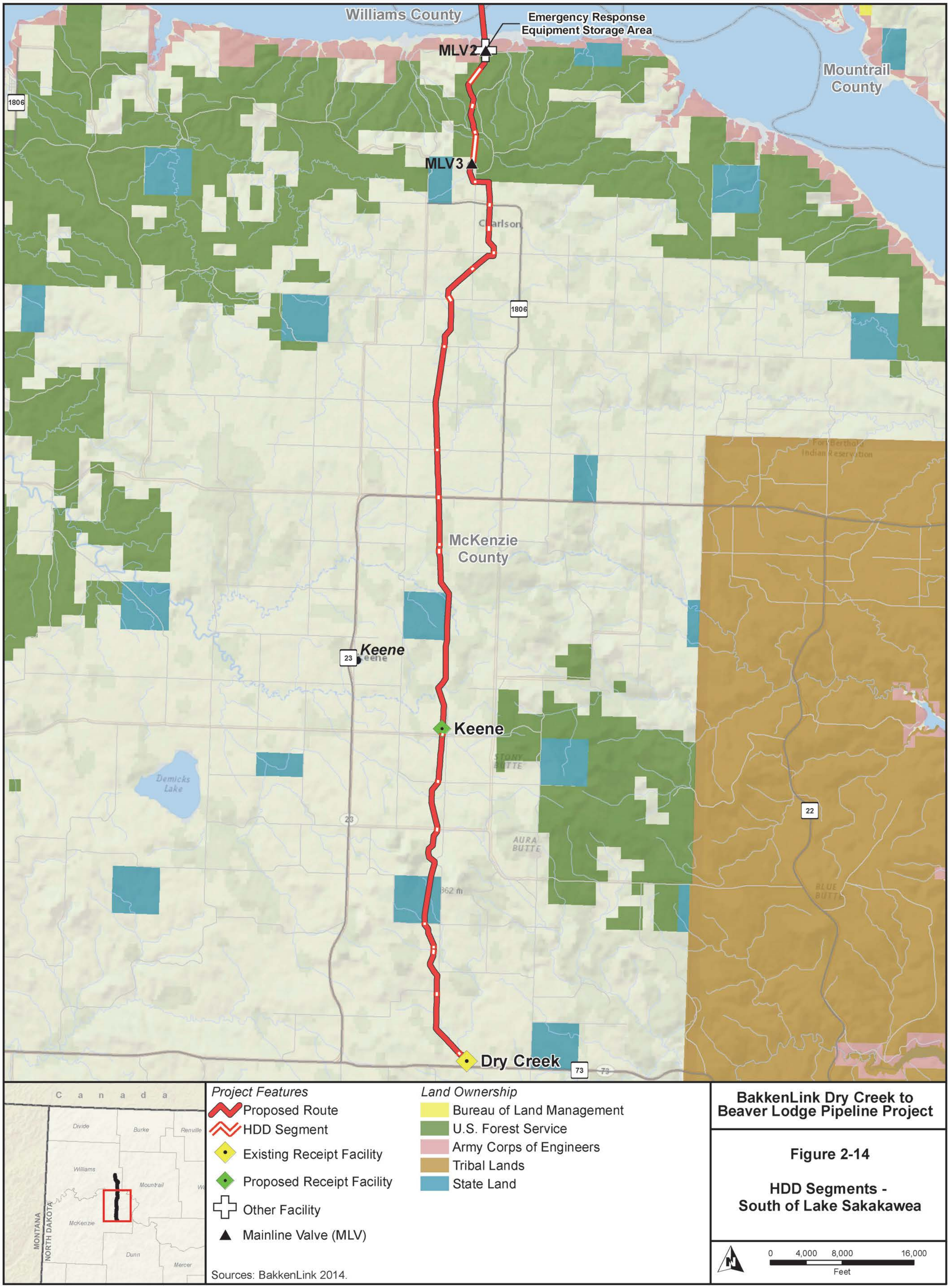


Figure 2-14

HDD Segments - South of Lake Sakakawea

2.2.5 Special Construction Areas

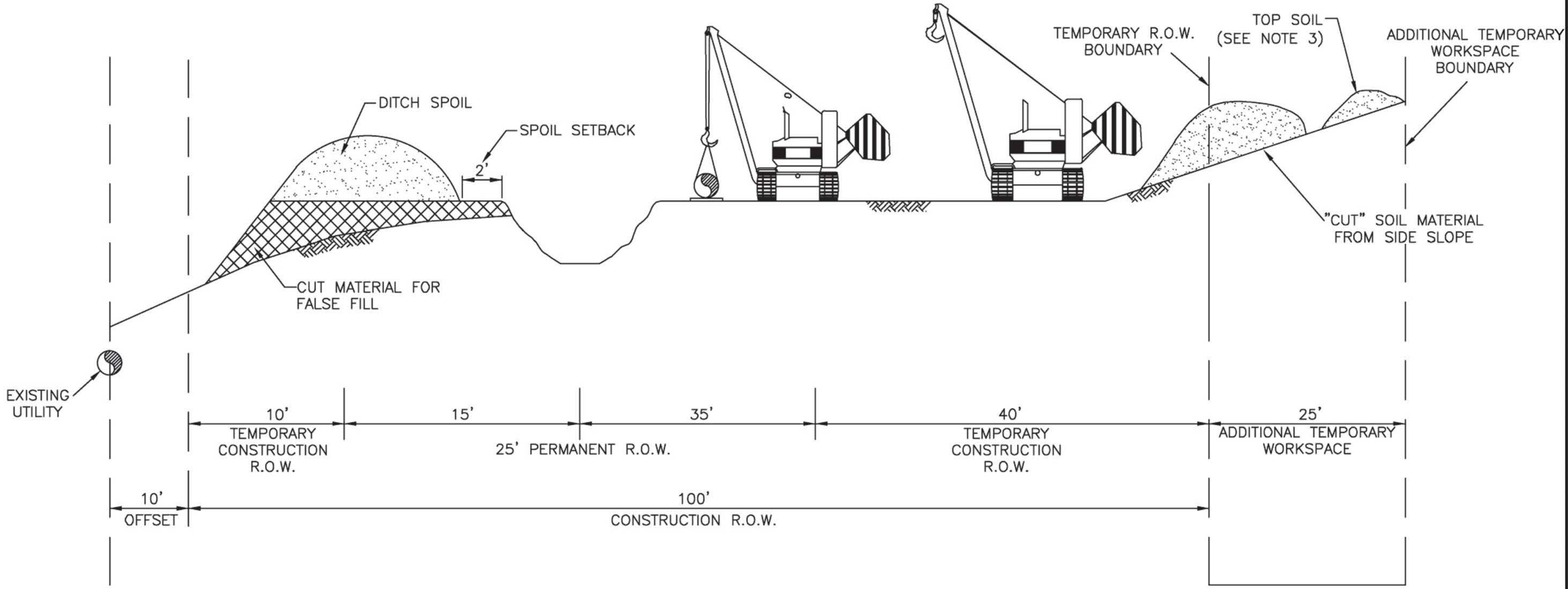
2.2.5.1 Rugged Terrain

Certain locations along the proposed route may require special construction methods used for steep slopes. Some of the steep slope segments may be located across the LMNG and BakkenLink would need to obtain USFS approval to exceed a 50-foot-wide construction ROW at these locations. In these areas, BakkenLink may employ side slope construction techniques. **Figures 2-15** through **2-18** depict the side slope construction technique both within a 100-foot-wide construction ROW and a 50-foot-wide construction ROW, respectively. In both cases, topsoil would be segregated from the full ROW, and the spoil from the cut area and trench would remain on the approved construction ROW. In some cases, it may be necessary to place some of the spoil from the cut areas onto the working side of the trench, and allow the construction equipment to work off of the spoil. In particularly steep areas, safety precautions would be implemented to ensure public and worker safety. It may be necessary to anchor equipment and pipe with cables to secured equipment or “dead men” to prevent the equipment or pipe from sliding down steep slopes. Some equipment also may need mechanical assistance to traverse steep slopes. Such equipment would be winched up or down the slopes. Enhanced erosion control and revegetation measures may be required in areas of rugged terrain.

2.2.5.2 Residential Areas

BakkenLink generally would avoid construction near residential areas to ensure that impacts to residences are minimized. Where applicable, the following measures contained in the POD, Appendix XIII, CMRP, would be implemented to minimize impacts on residences:

- Notifying landowners prior to construction;
- Posting warning signs as appropriate;
- Reducing the width of construction ROW, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing the “stove pipe” or “drag section” construction techniques;
- Removing fences, sheds, and other improvements as necessary for protection from construction activities;
- To the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;
- Fencing the edge of the construction work area adjacent to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- Limiting the hours during which operations with high-decibel noise levels (i.e., drilling and boring) can be conducted;
- Limiting dust impact through pre-arranged work hours and by utilizing dust minimization techniques;
- Ensuring that construction proceeds quickly through such areas, thus minimizing exposure to nuisance effects such as noise and dust;
- Maintaining access and traffic flow during construction activities, particularly for emergency vehicles;
- Cleaning up construction trash and debris daily;



PROFILE

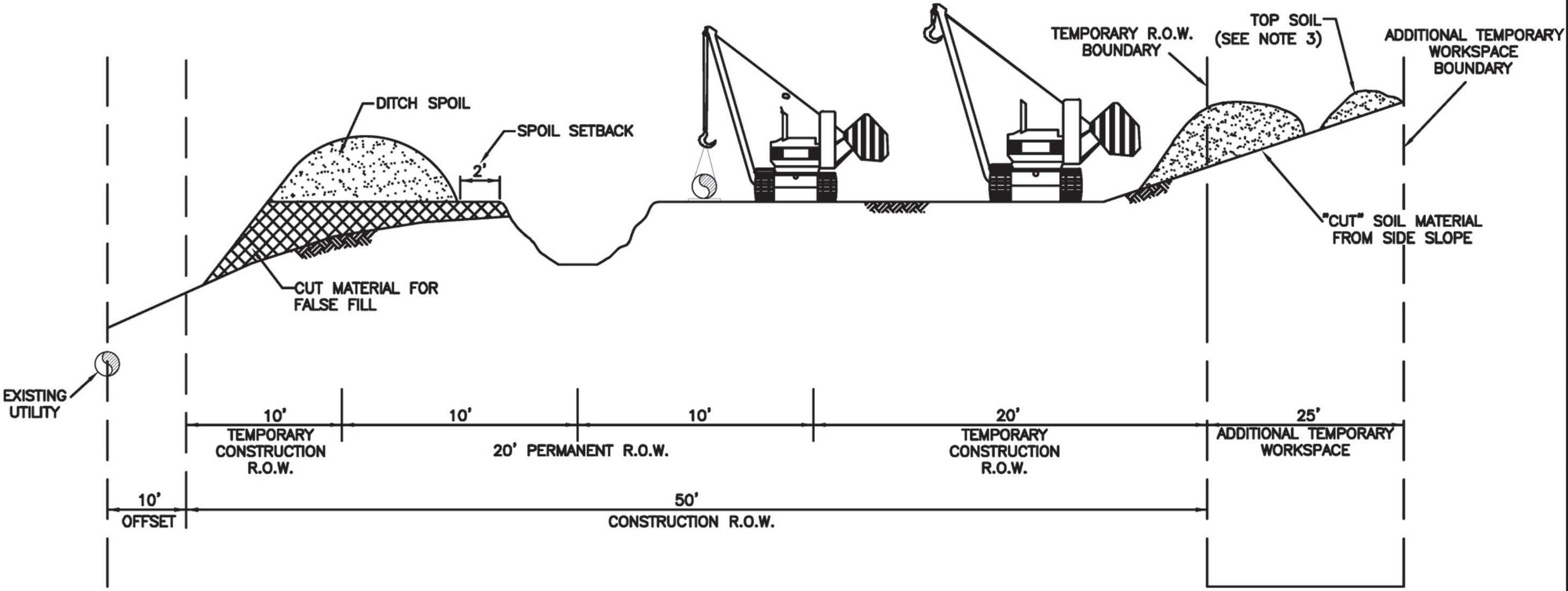
* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY TYPICALLY WILL BE 125 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT, 50 FEET OF TEMPORARY WORKSPACE AND 25 FEET OF ADDITIONAL TEMPORARY WORKSPACE. FURTHER ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL, AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED FOR THE TRENCH AND SPOIL SIDES.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-15
Typical Construction Upward Side Slope Workspace



PROFILE

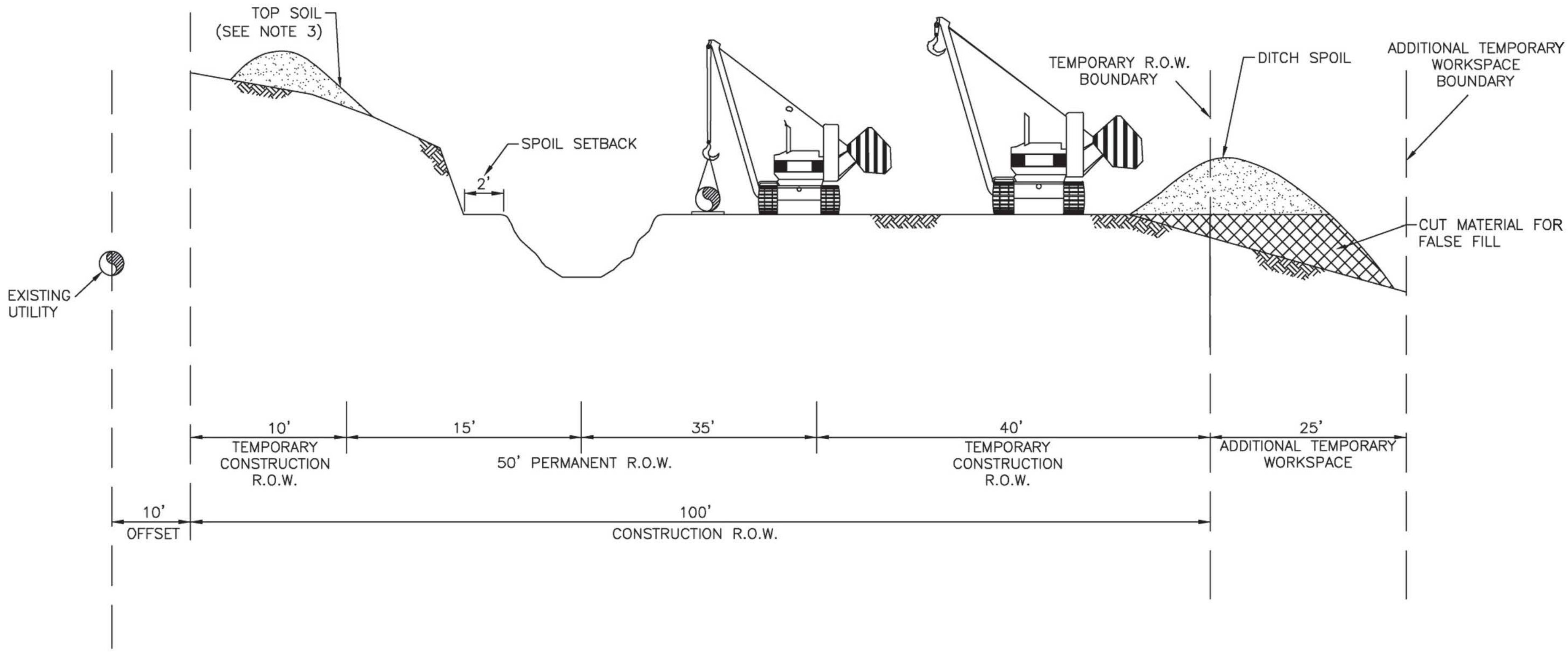
* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY TYPICALLY WILL BE 75 FEET WIDE CONSISTING OF 20 FEET OF PERMANENT EASEMENT, 30 FEET OF TEMPORARY WORKSPACE AND 25 FEET OF ADDITIONAL TEMPORARY WORKSPACE. FURTHER ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL, AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. TOPSOIL AND SUBSOIL SHALL BE STRIPPED AND SEGREGATED FROM THE ENTIRE 75-FOOT ROW (TRENCH, SPOIL, AND WORKING SIDES).

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-16
Typical Construction Upward Side Slope Workspace on USFS Lands



* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

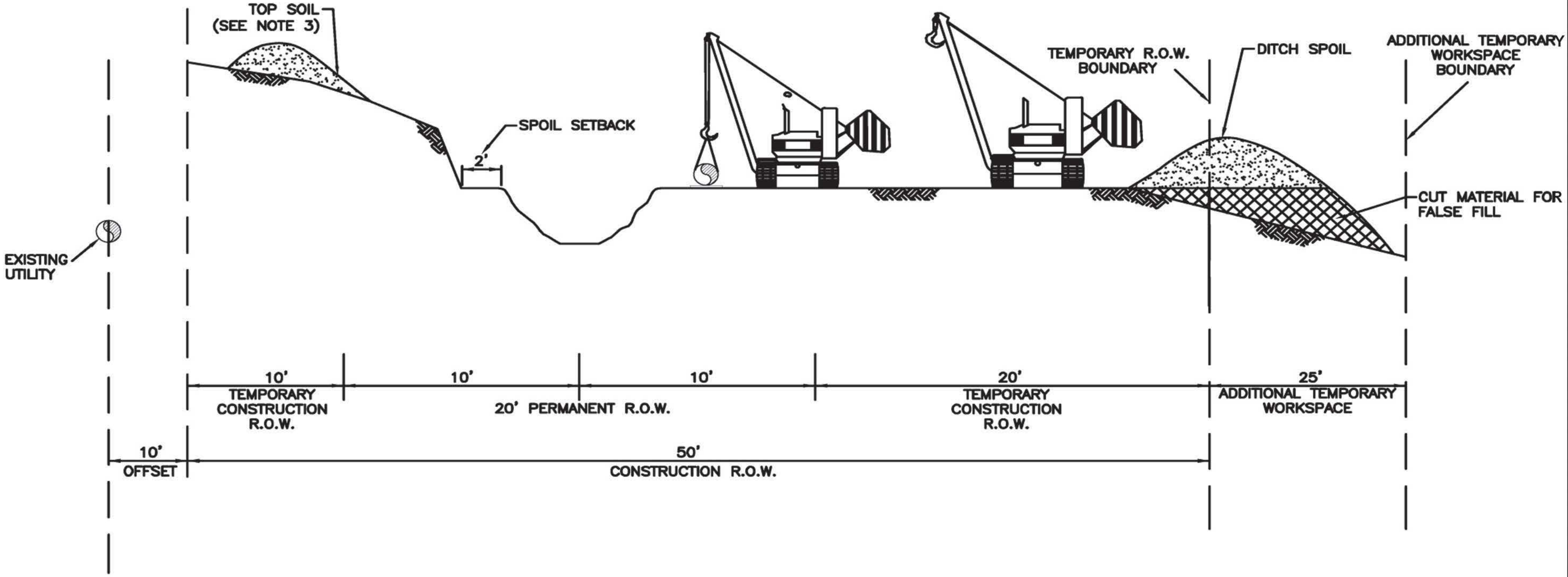
PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY TYPICALLY WILL BE 125 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT, 50 FEET OF TEMPORARY WORKSPACE AND 25 FEET OF ADDITIONAL TEMPORARY WORKSPACE. FURTHER ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL, AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED FOR THE TRENCH AND SPOIL SIDES.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-17 Typical Construction Downward Side Slope Workspace



PROFILE

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY TYPICALLY WILL BE 75 FEET WIDE CONSISTING OF 20 FEET OF PERMANENT EASEMENT, 30 FEET OF TEMPORARY WORKSPACE AND 25 FEET OF ADDITIONAL TEMPORARY WORKSPACE. FURTHER ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL, AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. TOPSOIL AND SUBSOIL SHALL BE STRIPPED AND SEGREGATED FROM THE ENTIRE 75-FOOT ROW (TRENCH, SPOIL, AND WORKING SIDES).

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-18
Typical Construction Downward Side Slope Workspace on USFS Lands

- Fencing or plating open ditches during non-construction activities; if the pipeline centerline is within 25 feet of a residence, ensuring that the trench is not excavated until the pipe is ready for installation and that the trench shall be backfilled immediately after pipe installation; and
- Immediately after backfilling the trench, restoring all lawn areas, shrubs, specialized landscaping, fences, and other structures within the construction work area to its pre-construction appearance or the requirements of the landowner. Restoration work shall be done by personnel familiar with local horticultural and turf establishment practices to the extent possible, preserving mature trees and landscaping.

2.2.5.3 Agricultural Areas

Specific construction measures would be implemented during different phases of construction including:

- Grading
  - Topsoil would be salvaged and segregated from subsoil piles.
  - Terraces would be surveyed to establish pre-construction contours to be utilized for restoration of the terraces after construction.
  - Natural flow patterns would be maintained.
- Drain Tiles and Irrigation Systems
  - Landowners would be contacted prior to construction to locate existing drainage tiles and irrigation facilities. Future plans for drainage tiles and irrigation facility locations also would be requested.
  - Colored flags/stakes marking drain tiles and irrigation pipes would be placed and maintained during construction.
  - Drainage flows and irrigation water supplies would be maintained, unless service interruption is coordinated with the landowner.
  - Drain tiles would be probed to determine if damage has occurred beyond the ditch line. Tiles damaged during construction would be documented by station number and orientation. Tiles damaged during construction would be repaired to their original condition or better.
  - Records of repairs would be maintained by BakkenLink and would be available for landowner reference.
- Restoration and Revegetation
  - Rutting and compaction would be repaired prior to revegetation.

In general, the ROW would revert to previous land use after construction is completed and during operation of the pipeline. Landowners would be compensated for loss of use due to construction.

2.2.5.4 Highway and Road Crossings

Highway and road crossings would be constructed according to applicable crossing permits. Primary roads generally are major roads and highways with relatively large volumes of traffic that have a well-defined traveled roadway (traffic lane) and shoulders with a granular pavement and/or concrete surface. Typically, primary roads would be constructed using the conventional bore method or by the HDD method. Little or no traffic disruption is expected when using the bore or HDD method. BakkenLink currently proposes to open cut all unimproved roads and to bore or HDD all highways and paved or improved roads (POD, Appendix XI, Access Roads and Improvement Table, and Appendix XX, Road Crossings and Methodology).

Unimproved roads generally are minor roads with minimal traffic. They normally would be identified as small roadways, trails, or two-tracks with no embankment or adjacent ditches and constructed/situated in natural earth material. The surface may have a light sprinkling of granular material. Unimproved roads would be crossed using the open cut method.

Open cutting a road may require temporary closure of the road. Detours may be necessary if one lane of traffic cannot be kept open. Temporary closures and/or detours would be conducted according to applicable permits and in coordination with local road authorities and landowners. Safety and minimizing traffic disruptions are important in open cut project implementation.

Depending on permit conditions, the pipe may not be cased at road crossings.

2.2.5.5 Waterbody Crossings

"Waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes. Waterbody crossings would be constructed in accordance with applicable permits. Waterbody crossings would be constructed using various methodologies including: designed pipeline self-lowering, open cut trenching, and/or HDD technology. The methodologies for each waterbody location would be determined by the crossing size, perceptible flow at the time of construction, and sensitivity. Intermittent and ephemeral streams that do not exhibit surface flow and/or saturated soil conditions at the time of construction would be open cut. However, intermittent and ephemeral streams that exhibit perceivable surface flow and/or saturated soil conditions at the time of construction would be crossed using HDD technology. Waterbodies currently designated as being crossed using the open cut methodology were dry and/or had no perceivable surface flow during the 2014 wetland and waterbody field surveys.

Environmental protection measures (**Table 2-4**) and BakkenLink's SWPPP would specify measures that would address erosion control, equipment refueling, temporary bridge crossings, timing, construction methods, and restoration. Temporary workspaces typically are required on each side of a waterbody crossing to stage construction, fabricate the pipeline, and store materials. Temporary workspaces would be located in upland areas a minimum of 50 feet from the waterbody edge. Trench spoil would be stored at least 10 feet from the waterbody banks. Temporary sediment barriers, such as silt fence, would be installed to prevent spoil and sediment-laden water from entering the waterbody.

<u>Lake Sakakawea Crossing</u>

The pipeline-pull method (POD, Appendix X, Lake Sakakawea Crossing) would be used to install and lower a 16-inch-diameter pipeline at the Lake Sakakawea crossing (**Figure 2-19**). The pipeline installation would include a conventional pull with segments of pipe welded together in sections on the north shore of the lake and then joined to form an approximate 13,000-foot-long pipeline that is pulled toward the south shore by a linear winch located on the south shore.

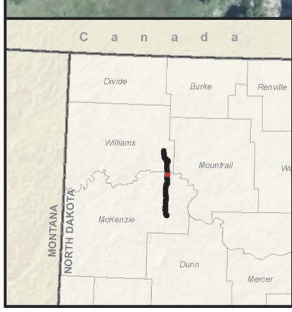
This method would require ATWSs on both shorelines (**Figures 2-20** through **2-21**). On the south shoreline, a high-powered winch would be stationed and aligned to pull the assembled pipeline originating from the north shoreline. On the other side, a construction "assembly line" is constructed that would allow for the systematic assembly of the pipeline. The pipeline would be welded and tested along this assembly line until it is ready to begin crossing the lake. All welds would be 100 percent x-rayed and 100 percent of the pipe would be hydrostatically tested. As new pipe is added to the end of the pipe string, the winch slowly pulls the pipe across the lake one pipe length at a time. As the completed pipe is pulled across, floatation devices would be used to keep the pipe a certain distance above the lake bottom as to not impede surface traffic. After the pipeline has fully crossed the lake, the floatation devices would be removed and the pipeline would be lowered to the lake bottom.

Figure 2-19

Lake Sakakawea Crossing

Figure 2-20

Lake Sakakawea Crossing North Shore



Project Features

- Proposed Route
- Mainline Valve (MLV)
- Permanent ROW
- Temporary Workspace
- Additional Temporary Workspace
- Emergency Response Equipment Storage Building
- Fenced Emergency Response Equipment Storage Area

Source: BakkenLink 2014.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 2-21

Lake Sakakawea Crossing South Shore

0 125 250 500
Feet

The pipeline would be laid in a trench on the lake bottom and would have a minimum cover of 4 feet, as required by federal regulations. The lowering and protection of the pipeline at the north and south shorelines would be achieved by excavating a trench using long-reach excavators on both banks. The excavators would commence at the shoreline and construct a berm from trench materials that is adjacent to the pipeline centerline and use the berm to move the excavator out from the shore as determined by site conditions and water depths. After the pipeline is installed, the excavators would reverse the process and transfer the berm material back into the trench and over the pipeline. In order to prevent shoreline erosion and possible pipeline exposure in the long term, BakkenLink would place a layer of riprap over the pipeline trench along the north and south shorelines of Lake Sakakawea. BakkenLink would submit riprap design details to the USACE Omaha District Hydraulics Section.

BakkenLink has proposed using a common jetting technique that has been adapted for the site-specific conditions of the lake. A customized lowering sled would use fluid jets and suction pumps (Toyo pumps) to fluidize the lake bottom under the pipeline, causing the pipeline to sink into the fluidized substrate as the sled is pulled along the lake bottom. The design of the lowering sled would be specific for the Project; however, the concept of the dual Toyo pumps has been utilized before by several construction groups for pipeline lowering in difficult and environmentally sensitive locations. The ability to trail a turbidity mat over the discharge and diffuser is designed to direct the slurry back into the trench to reduce lateral dispersion and provide positive backfill over the lowered pipeline while reducing water column turbidity.

The support equipment for the lowering operation would include a Flexifloat catamaran that would house the power generator for the Toyo pumps. An initial conceptual set of drawings of the lowering system is included in the POD (Appendix X, Lake Sakakawea Crossing), and would be supplemented by actual design drawings as the program is developed to fabrication. The operation would include a team of divers, vessels, diving equipment, marine and land surveys and instrumentation, an onshore crane, the linear winch and crew, and a hold back winch and crew.

The dive team would operate and monitor the lowering operation including pipeline lowering depths and discharge. Both the Flexifloat catamaran and the lowering sled would be pulled across the lake by the winch previously used for the pipeline pull. The pull cable would incorporate floatation and would connect to both the water surface pontoon and the sled.

The lowering operation would be performed immediately after the installed pipeline is flooded and after the installed pipeline elevation is surveyed. The construction staff would deploy turbidity monitoring instrumentation at agreed locations with the authority to stop construction in case of the construction activity exceeding an agreed turbidity level above that observed prior to work commencement (i.e., background measurement). Additional lowering passes would be performed until the pipeline reaches the designed depth.

For the Lake Sakakawea crossing, the proposed methodology is based on the lowering of the pipeline section. BakkenLink has obtained geotechnical cores at selected locations along the crossing centerline. A study of the soils analysis would determine the specific gravity that would be required for the pipeline to settle through fluidized materials based on its own weight. The BakkenLink design engineers will determine the steel pipe WT and the concrete weight coating that would be applied to the sections of pipe before mobilization to site. It is anticipated that all pipe would be lowered to a minimum of 4 feet of cover based on side-scan sonar and geotechnical evaluations. In addition, as a contingency measure in case the pipe cannot be fully lowered into the trench using the jetting process (which is a minimal probability due to the fully saturated soil conditions on the lake bottom that are conducive to the prescribed jetting construction techniques), flexible concrete mats would be placed over the pipe and set at or below grade level of lake bottom. This would help protect the pipe from physical abrasion, such as contact with boat anchors. Concrete mats are safely used throughout the U.S. for these types of USDOT/PHMSA pipeline applications.

2.2.5.6 Wetland Crossings

BakkenLink would avoid wetlands to the extent practical by routing around them or utilizing HDD techniques. Wetlands that are not avoided by rerouting or HDD techniques would be crossed using open cut trenching similar to conventional upland construction procedures, with modifications and limitations to reduce the potential for pipeline construction to affect wetland hydrology and soil structure.

Techniques for wetland crossing would vary according to the type of wetland to be crossed, the length of the crossing, and the level of soil saturation or standing water at the time of crossing. An open cut trench technique may be used for trenching and installation where soils are saturated. This technique consists of stringing and welding the pipe outside of the wetland and excavating the trench through the wetland using equipment supported by mats. Water that seeps into the trench is used to float the pipeline into place using attached flotation devices and by pushing or pulling the pipe with equipment. The floats are then removed from the pipe and the pipe sinks into place. The trench is then backfilled and cleanup completed. Most pipes installed in saturated wetlands would be coated with concrete or equipped with weights to provide negative buoyancy.

If trench dewatering is necessary within wetlands, water would be discharged in accordance with BakkenLink's SWPPP (POD, Appendix XVII) and in a manner that does not cause erosion and does not discharge silt-laden water into wetlands. Water would be discharged into an energy dissipation device/sediment filtration device such as a straw bale structure or geotextile filter bag. Dewatering structures would be sized to handle the volume of water in the trench.

Construction mitigation measures would limit equipment working in wetlands to that necessary for clearing, excavation, fabricating, and installing the pipeline; backfilling the trench; and restoring the ROW. If equipment must operate within a wetland that cannot support the equipment weight without rutting, the contractor would use wide-track or balloon-tire construction equipment or conventional equipment operated from timber mats or prefabricated equipment mats. All timber mats, prefabricated equipment mats, and subsoil not used as trench backfill would be removed upon completion of construction.

Clearing of vegetation would be limited to trees and shrubs cut flush with the ground surface and removed from the wetlands. Stump removal, grading, topsoil stripping, and excavation would be limited to the area immediately over the trench line. Topsoil segregation would occur if soils are not saturated at the time of construction.

Sediment barriers and erosion control measure would be installed and maintained adjacent to wetlands as necessary to minimize the potential for sediment runoff. Sediment barriers also would be installed where necessary to minimize the potential for sediment to run off the construction ROW and into wetland areas outside of work areas. Sediment barriers would be installed across the full width of the construction ROW at the base of slopes adjacent to wetlands. Sediment barriers installed across the working side of the ROW would be removed when construction equipment is present to allow orderly progression along the ROW. Sediment barriers would be replaced at the end of the day.

Restoration of contours would be accomplished during backfilling. In locations where the topsoil has been segregated from subsoil, subsoil would be backfilled first, followed by the topsoil. Topsoil would be backfilled to the original ground level, leaving a crown over the trench. If rocky soils are present, the pipe would be padded with rock-free soil or sand before backfilling with native bedrock and soil. Trench breakers, consisting of polyurethane foam or sand bags, would be installed where necessary to prevent subsurface drainage of water from wetlands.

Temporary erosion control devices would be installed where necessary until vegetation of adjacent upland areas is successful. Permanent slope breakers may be installed across the ROW in upland areas adjacent to the wetland boundary.

Temporary workspace may be required on both sides of the wetland to stage construction, fabricate the pipeline, and store materials. Temporary workspaces would be located in upland areas at least 50 feet from the wetland edge.

2.2.6 Operation

The pipeline would be monitored 24 hours a day, 365 days a year from an Operations Control Center (OCC), located in Fryburg, North Dakota, using a sophisticated SCADA system. The SCADA system would allow abnormal operating conditions to be discussed immediately and addressed promptly, including shutdown of the system in the event of a leak or other appropriate circumstance.

BakkenLink would implement additional and multiple leak detection methods and systems that are overlapping in nature and progress through a series of leak detection thresholds. The leak detection methods including SCADA are as follows:

- Remote monitoring performed by the OCC Operator, which would consist of monitoring pressure and flow data received from pump stations and valve sites fed back to the OCC by the BakkenLink SCADA system. Remote monitoring typically is able to detect leaks down to approximately 25 to 30 percent of the pipeline flow rate.
- Software-based volume balance systems that would monitor receipt and delivery volumes. These systems typically are able to detect leaks down to approximately 5 percent of the pipeline flow rate.
- Computational Pipeline Monitoring (CPM) or model-based leak detection systems that would break the pipeline into smaller segments and monitor each of these segments on a mass balance basis. These systems typically are capable of detecting leaks down to a level of approximately 1.5 to 2 percent of pipeline flow rate.
- Atmos Pipe is a leak detection system that uses the Sequential Probability Ratio Test (SPRT) to detect changes in the overall behavior of flow and pressure at the receipt and delivery points. Although the control and operation may vary from one pipeline to another, the relationship between the pipeline pressure and flow will always change after a leak develops in a pipeline. For example, a leak will normally cause the pipeline pressure to decrease and introduce a discrepancy between the receipt and delivery flow-rate. Atmos Pipe is designed to recognize these patterns. Leak determination is based on probability calculations at regular sample intervals. Although the flow and pressure in a pipeline fluctuate due to operational changes, statistically, the total mass entering and leaving a network must be balanced by the inventory variation inside the network. Such a balance cannot be maintained if a leak occurs in a network. The deviation from the established balance is detected by SPRT. The combination of SPRT with pattern recognition provides Atmos Pipe a very high level of system reliability (i.e., minimum spurious alarms).
- Computer-based, non-real time accumulated gain/loss volume trending that would assist in identifying low rate or seepage releases below the 1.5 to 2 percent by volume detection thresholds.
- Direct observation methods, which include aerial patrols, ground patrols, and public and landowner awareness programs that would be designed to encourage and facilitate the reporting of suspected leaks and events that may suggest a threat to the integrity of the pipeline.

The leak detection system would be configured in a manner capable of alarming the OCC operators through the SCADA system and also would provide the OCC operators with a comprehensive assortment of display screens for incident analysis and investigation. The pipeline operator also would develop a Pipeline IMP, which together with the ERP, outlines the preventative maintenance, inspection, line patrol, leak detection systems, SCADA and other pipeline integrity management procedures to be implemented during the operation of the Project. The ERP is an action plan for deployment and coordination of response personnel and agencies in the event of an accidental release. The objective is to be prepared to respond 24/7 in case of a spill and prevent injuries/fatalities, protect the environment and communities, and contain the release preventing further impacts. In addition, the mainline valve locations would be sited in accordance with the USDOT PHMSA. BakkenLink would discuss with PHMSA the locations of valves relative to HCAs and unusually sensitive areas for concurrence with the mainline valve placement.

2.2.7 Maintenance

BakkenLink periodically would use the permanent ROW to perform inspections, maintain equipment, and make repairs during the life of the pipeline. Access to the ROW would be controlled so that only authorized vehicles are allowed access for authorized purposes. Undesired vegetation that may interfere with the safe and reliable operations of the pipeline would be removed.

2.2.8 Abandonment

BLM regulations at 43 CFR 2880, Rights-of-way under the MLA, would be followed for the abandonment process. These regulations and stipulations developed by the land management agencies would be incorporated into the approved ROW grant. At the Project termination, all surface facilities would be removed and the disturbed acreage would be reclaimed. The areas would be reshaped to blend into adjoining areas to the extent permitted by existing conditions. All disturbed areas would be seeded with the appropriate seed mixture to ensure that an acceptable stand of vegetation is established.

2.3 No Action Alternative

The No Action Alternative would be the denial of the requested ROW. This means that the Project would not be authorized across federal lands. Neither the benefits nor the impacts outlined in this EA would be realized. Truck traffic and congestion would not be alleviated to the extent that would be afforded by construction of the proposed pipeline.

2.4 Alternatives Considered but Eliminated From Detailed Analysis

2.4.1 Market Alternatives

Currently, there are two refineries in North Dakota. The first is owned by Tesoro, and located near Mandan. Tesoro recently completed an expansion of their existing refinery, which increased its daily capacity by 10,000 bpd to 68,000 bpd. It has increased the take-away capacity by 10,000 bpd. The second refinery is the Dakota Prairie Refinery, owned by Calumet Specialty Products Partners, L.P., and is located two miles west of Dickinson, North Dakota. This refinery is expected to be completed in late-2014 and would process 20,000 bpd.

For some time, there have been efforts to increase refinery capacity locally that have been supported by private industry and the public sector including the State of North Dakota, the U.S. Department of Energy National Energy Technology Laboratory (NETL), and the North Dakota Association of Rural Electric Cooperatives (NDAREC). To date, studies to determine the feasibility of increasing oil refining capacity in North Dakota have been inconclusive. According to the Executive Summary of Pipelines and Refined Products Report presented to the North Dakota Industrial Commission (NDIC) in 2008, a new refinery with reasonable economy of scale likely would cost at least $3 billion dollars, excluding pipeline infrastructure, and the permitting process for a new refinery could take at least 5 to 10 years. A 2010 North Dakota refining capacity study prepared for NETL by NDAREC concluded that a 34,000 bpd diesel and naphtha refinery costing about $700 million may be feasible except for having a less than acceptable project return to attract private industry investment.

Construction of the Thunder Butte Oil Refinery was approved by the U.S. Environmental Protection Agency (USEPA) on the Fort Berthold Indian Reservation. Construction activities have been initiated at the site but the construction of this refinery would not meet BakkenLink's interests and objectives, including the schedule. Even with the Mandan Refinery expansion and the construction of the Thunder Butte Refinery in North Dakota to access new local crude supplies, there would be excess crude that must be transported to other refining centers outside of the state as production from Williston Basin is expected to grow from 1,100,000 bpd to possibly 1,600,000 bpd over the next 5 years. There are no viable local market alternatives to the Project. Pipeline construction must keep pace with this production growth.

2.4.2 North Dakota Pipeline Alternatives

Currently, there are no viable North Dakota pipeline alternatives to the Project within the Project vicinity that would meet BakkenLink's interest and objectives and those of its prospective customers. The Project would enhance overall utilization of the existing pipeline capacity within North Dakota as well as adding needed capacity in new areas of the Bakken oil production area. The Project would place new pipeline capacity in areas where traditionally there has not been significant oil production. Currently, producers with leases along and around U.S. Highway 85 and State Highway (SH) 23 south and east of Watford City, respectively, have to truck crude long distances to access a pipeline receipt facility. The Project would bring pipeline capacity closer to these leases and shorten the trucking distance for these producers.

2.4.3 Truck and Rail Alternatives

The trucking alternative is deemed unacceptable as additional trucking would overburden the existing public road capacity. Rail alternatives are not viable because existing railroads and rail loading facilities are not available within the immediate Project vicinity.

2.4.4 Route Alternatives

BakkenLink evaluated several route alternatives to the proposed route. Each alternative was considered in light of study of underserved Bakken development areas, economics, engineering design, feasibility to construct, and environmental impacts. The location of the proposed route was selected to have minimal effects on natural resources, physical resources, and residents. The proposed route design for the Project would provide frequent origination points (i.e., receipt facilities) in the most prolific and active parts of the middle Bakken and upper Three Forks development, but also would open up new areas that currently are not accessible to pipeline service. The 16-inch-diameter mainline allows for market expansion opportunities. This need for expansion in these areas is supported by proprietary studies conducted to estimate total recoverable Bakken crude oil resources and future production.

On November 7, 2013, BakkenLink, BLM, USACE, and Stantec staff held a meeting in the USACE – Omaha District Office to discuss any issues the USACE had with the Project and the proposed crossing of Lake Sakakawea. At this meeting, the USACE recommended that an alternatives analysis be completed for three alternative routes that they had identified, which included the New Town, 6-Miles West, and Williston Alternative Routes (**Figure 2-22**). **Table 2-9** lists these alternative routes and engineering and environmental factors that were used to evaluate each of the route alternatives. The Proposed Action also was included in the table so the alternative routes could be compared to the Proposed Action.

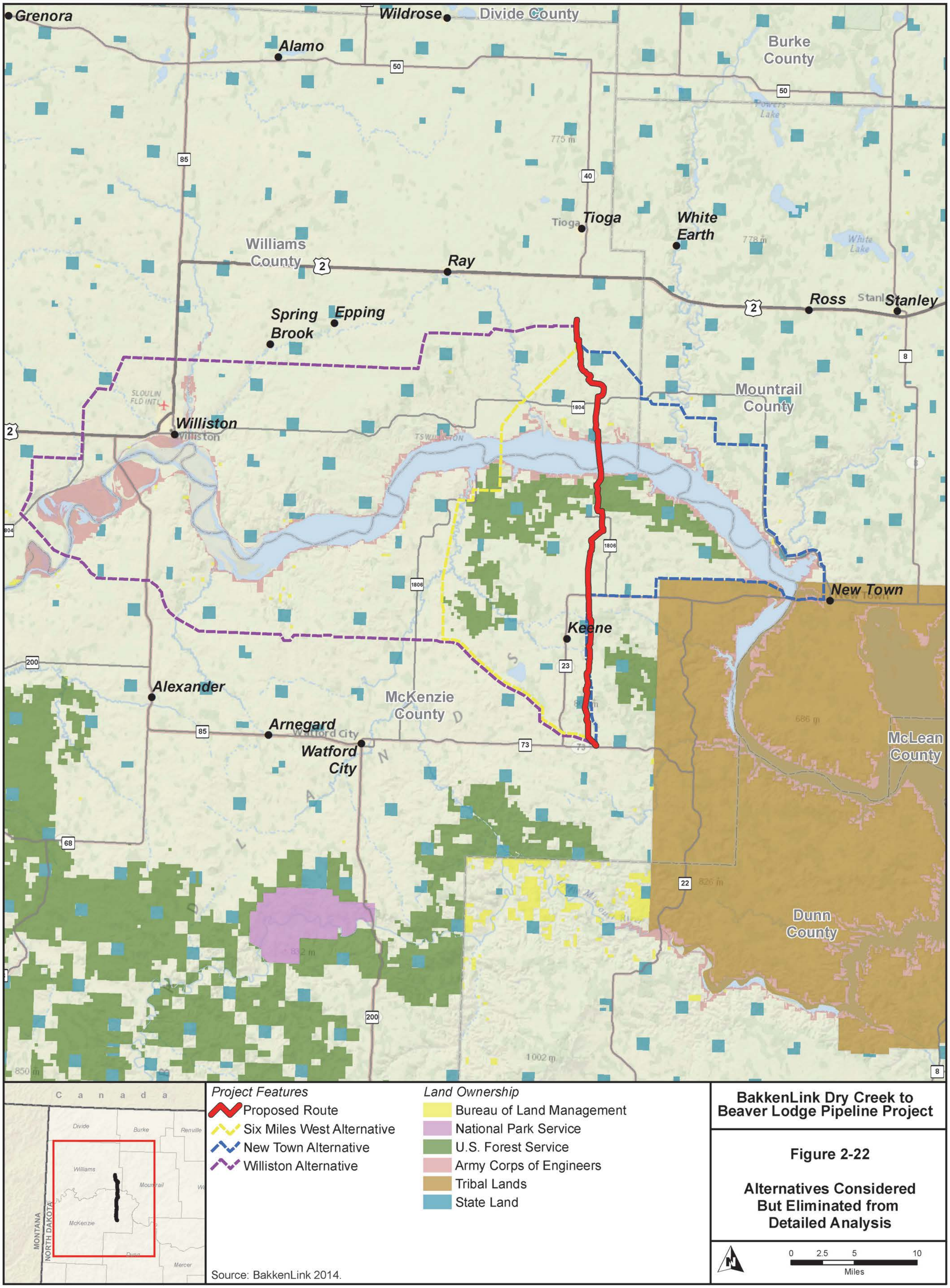

Grenora
Wildrose
Divide County
Alamo
Burke County
Tioga
White Earth
Williams County
Ray
Ross
Stanley
Spring Brook
Epping
Mountrail County
Williston
New Town
Keene
Alexander
McKenzie County
Arnegard
Watford City
McLean County
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Six Miles West Alternative
New Town Alternative
Williston Alternative
Land Ownership
Bureau of Land Management
National Park Service
U.S. Forest Service
Army Corps of Engineers
Tribal Lands
State Land
Source: BakkenLink 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 2-22
Alternatives Considered But Eliminated from Detailed Analysis
0 2.5 5 10
Miles

Table 2-9 Alternatives Evaluation Matrix

Evaluation Factors	New Town Alternative	6-Miles West Alternative	Williston Alternative	Proposed Action
Length of Route (miles)	70.6	46.3	110.1	37.4
Total Acres Impacted	856	561.8	1334.2	498.3
Agriculture (acres)	275.2	244.1	705.4	234.5
Energy Development (acres)	14	2.8	30.2	26.4
Residential (acres)	8.33	5.6	13.1	0
Roads (acres)	5.27	4	8.2	7.1
Wetlands/Waterbodies (acres)	52.9	30.4	31.1	13.2
Perennial Grasslands (acres)	463.2	246.6	527.3	219.4
Woodlands (acres)	37.1	28.3	18.9	5
Number of Aboveground Facilities Required for Operation	6	6	7	6
Number of HDDs[1]	2	1	2	37
Length of HDDs (miles)[1]	0.72	0.60	0.24	3.95
Length of Lake Sakakawea Crossing (miles)	1.7	1.9	0.4	2.3
USFS-administered Land Crossed (miles)	0	2.7	0	2.4
USACE-administered Land Crossed (miles)	4.5	2.3	0	2.8
Waterbodies Crossed (quantity)	52	36	43	20
Wetlands Crossed (quantity)	68	22	60	19
Number of Landslide Prone Areas	9	6	13	4
Length of Landslide Prone Areas (miles)	1.2	0.4	1.8	0.5
Miles of Existing Lines Paralleled	19.5	3.3	10.4	23.3
Cultural Sites	456[2]	175[2]	324[2]	159[2]
Raptor Nests Within a Half Mile Corridor	5	6	10	5
Cost of HDDs ($375/foot)[1]	$1,426,000	$1,188,000	$476,000	$1,961,000
Cost of Lake Sakakawea Crossing ($)[3]	$3,731,000	$5,650,000	$600,000	$7,100,000
Cost of Geotechnical Investigation on Lake Sakakawea HDD options ($)	$920,000	$1,200,000	$350,000	$0[4]
Aboveground Facility Cost – valve settings[5]	$300,000	$300,000	$300,000	$300,000
Aboveground Facility Cost – pump stations	$2,000,000	$0	$4,000,000	$0
Aboveground Facility Cost – receipt facilities	$24,000,000	$24,000,000	$24,000,000	$24,000,000
Cost of Materials ($264,000/mile)	$18,638,400	$12,223,200	$29,066,400	$8,976,000
Cost to Construct Pipeline ($570,500/mile)	$40,242,000	$26,414,000	$62,812,000	$19,400,000
Cost to Acquire ROW ($250/rod)	$5,648,000	$3,704,000	$8,808,000	$2,720,000
Additional Cost of Pipeline Project (i.e., Engineering, Consultants) ($100,000/mile)	$7,060,000	$4,630,000	$11,010,000	$3,400,000
Total Project Cost ($)	**$103,965,400**	**$81,309,200**	**$141,422,400**	**$67,857,000**

1 Excludes Lake Sakakawea activities.
2 Cultural sites identified from a Class I inventory within a 2-mile-wide corridor.
3 This is not a linear value and a dollar per mile equivalent is not applicable.
4 $1,000,000 already has been invested in a geotechnical investigation of the lake crossing at the Proposed Action location.
5 Aboveground valve settings estimated at $100,000 per valve setting.

Note: All figures in this table do not include costs for access roads and pipe yards. These values have been excluded due to the relatively small cost associated with them.

Key evaluation factors that were used to differentiate between the route alternatives and the Proposed Action included:

- Length of route;
- Total acres impacted;
- USFS-administered land crossed;

- USACE-administered land crossed;
- Number of waterbodies crossed;
- Acres of waterbodies impacted;
- Number of wetlands crossed;
- Acres of wetlands impacted;
- Acres of perennial grassland;
- Acres of woodland;
- Number of cultural resource sites;
- Total project costs; and
- HDD construction method feasibility.

2.4.4.1 New Town Alternative

This alternative route would originate at the existing Dry Creek Terminal, head north and east and cross Lake Sakakawea near New Town, North Dakota, and extend north and west to the Beaver Lodge Receipt Facility (**Figure 2-22**). Key factors of this alternative relative to the Proposed Action include:

- Length of route – 33.2 miles longer
- Total acres impacted – 357.4 acres more
- USFS-administered land crossed – 2.4 miles less
- USACE-administered land crossed – 1.7 miles more
- Number of waterbodies crossed – 32 more
- Acres of wetlands/waterbodies impacted – 39.7 acres more
- Number of wetlands crossed – 49 more
- Acres of perennial grassland – 243.8 acres more
- Acres of woodland – 32.1 acres more
- Number of cultural resource sites – 132 sites more
- Total project costs – $36,108,400 more

This alternative would have greater environmental impacts and higher construction costs than the Proposed Action. In addition, this alternative would not be feasible using the HDD construction methodology (see **Appendix B**), nor would it meet BakkenLink's interests and objectives.

2.4.4.2 6-Miles West Alternative

This alternative route would originate at the existing Dry Creek Terminal, head northwest and cross Lake Sakakawea approximately 6 miles west of the proposed Lake Sakakawea crossing, and extend northeast to the Beaver Lodge Receipt Facility (**Figure 2-22**). Key factors of this alternative relative to the Proposed Action include:

- Length of route – 8.9 miles longer
- Total acres impacted – 63.2 acres more
- USFS-administered land crossed – 0.1 mile more
- USACE-administered land crossed – 0.5 mile less

- Number of waterbodies crossed – 16 more
- Acres of wetlands/waterbodies impacted – 17.2 acres more
- Number of wetlands crossed – 3 more
- Acres of perennial grassland – 27.2 acres more
- Acres of woodland – 32.1 acres more
- Number of cultural resource sites – 11 sites fewer
- Total project costs – $13,452,200 more

This alternative would have greater environmental impacts and higher construction costs than the Proposed Action. In addition, this alternative would not be feasible using the HDD construction methodology (see **Appendix B**), nor would it meet BakkenLink's interests and objectives.

2.4.4.3 Williston Alternative

This alternative route would originate at the existing Dry Creek Terminal, head northwest to a crossing of the Missouri River approximately 8 miles southwest of Williston, North Dakota, and extend northeast to the Beaver Lodge Receipt Facility (**Figure 2-22**). Key factors of this alternative relative to the Proposed Action include:

- Length of route – 72.7 miles longer
- Total acres impacted – 835.6 acres more
- USFS-administered land crossed – 2.4 miles fewer
- USACE-administered land crossed – 2.8 miles fewer
- Number of waterbodies crossed – 23 more
- Acres of wetlands/waterbodies impacted – 17.9 acres more
- Number of wetlands crossed – 41 more
- Acres of perennial grassland – 307.9 acres more
- Acres of woodland – 13.9 acres more
- Number of cultural resource sites – 15 sites more
- Total project costs – $73,565,400 more

This alternative would have greater environmental impacts and substantially higher construction costs than the Proposed Action. Based on review of the geologic strata at the crossing of the Missouri River, using the HDD construction methodology may be extremely difficult (**see Appendix B**). However, North Dakota's Western Area Water Supply Project (2,500 foot-long, 20 inch diameter pipeline) was recently installed under the Missouri River near Williston, North Dakota using the HDD construction method. This alternative would not meet BakkenLink's interests and objectives.

2.5 Comparison of the Proposed Action and No Action Alternative

Table 2-10 summarizes and compares the environmental impacts between the Proposed Action and No Action Alternative. Detailed descriptions of impacts are presented in Chapter 4.0, Environmental Consequences. The summarized impacts assume BakkenLink's environmental protection measures, but also assume the absence of potential mitigation measures. Implementation of the potential monitoring and mitigation measures identified in Chapter 4.0 potentially would further reduce impacts.

2.6 Agency Preferred Alternative

The agency preferred alternative is not a final agency decision; rather, it is an indication of the agencies' preference. The BLM has not selected a preferred alternative at this time but will identify the preferred alternative in the Final EA.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Air Quality		
	<u>Construction</u> Construction equipment would emit gaseous criteria pollutants and particulates as a result of tailpipe emissions. Construction equipment also would cause fugitive dust emissions from disturbed areas and along paved and unpaved roads. Carbon dioxide (CO_2) emissions are expected to be far below the USEPA threshold of 25,000 tons per year (tpy), which would be seen as a significant level of emissions. The CO_2 emitted from construction equipment is expected to be only a small fraction of this amount and a minor contribution to national and statewide CO_2 emissions. Negligible impacts to air quality from the operation of heavy construction equipment are expected. <u>Operation</u> Total VOC emissions would be 55,272.59 pounds/year, or 27.64 tpy of all volatile organic compound (VOC) emissions from all onsite storage tanks at all facilities. Given that all hazardous air pollutants (HAPs) emitted would be only a small fraction of VOC emissions, the emissions would not approach major source limits; therefore, negligible impacts to air quality would be expected. It is expected that operation of the Project would preclude the need for approximately 500 oil tanker trucks to haul oil each day. Using the conservative assumptions that each truck hauls 200 barrels, a pipeline capacity of 100,000 barrels per day, and an average roundtrip of 80 miles, approximately 40,000 truck miles per day would be eliminated from western North Dakota roads. This would be expected to provide positive benefits in terms of both traffic congestion and air quality.	Project impacts to air quality would not occur. Continued trucking emissions would occur in lieu of pipeline transport.
Geology and Minerals		
Geology	<u>Construction</u> Construction activities would include disturbances to the topography along the Project route and at associated aboveground facilities due to grading and trenching that may result in slope instability. The Project route crosses steep terrain on USFS land immediately west of the Elm Tree Archaeological District and landslide prone areas on either side of the Lake Sakakawea crossing. However, BakkenLink has committed to using the HDD construction method for pipeline segments in steep terrain on USFS land and landslide-prone areas on the north and south sides of Lake Sakakawea thereby avoiding impacts to these sensitive areas. <u>Operation</u> Operation of the Project would not alter the geological and physiographic conditions. Because there are no identified active faults along the Project route, no impacts due to ground deformation due to fault movement are expected. The Project is in an area not likely to experience strong ground motion during a maximum credible earthquake, therefore impacts due to ground motion are not anticipated.	Project impacts to geologic and mineral resources would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Minerals	Construction Construction would have very minor and short-term impacts on current mineral extraction activities due to the temporary and localized nature of pipeline construction activities. Construction of the Project is not expected to impact gravel mining operations. Because oil and gas are produced at depths considerably deeper than the excavation depth, construction of the Project would not be expected to affect the oil and natural gas producing formations. Operation The Project does not pose a hindrance for accessing oil and gas resources. Impacts on future mineral development would not constitute a substantial loss of mineral resource or mineral availability because of the narrow, linear nature of the pipeline ROW relative to the expanse of areas with mineral resource potential.	
Paleontological Resources		
	Construction Potential impacts to fossil localities during construction would be both direct and indirect. Direct impacts to or destruction of fossils would occur from trenching or facility construction activities conducted through significant fossil beds. Indirect impacts during construction would include erosion of fossil beds due to slope re-grading and vegetation clearing or the unauthorized collection of scientifically important fossils by construction workers or the public due to increased access to fossils along the ROW. Any discovery of paleontological resources would be handled as stipulated in the *Unanticipated Discoveries Plan for Paleontological Resources*. Operation Normal operation of the Project is not expected to disturb important paleontological resources. If there are maintenance activities that would result in surface disturbance, it would occur within previously disturbed ROW and would not be likely to affect paleontological resources. Therefore, there would be no impacts to paleontological resources during operation of the Project.	Project impacts to paleontological resources would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Soils		
	Construction A small percentage of prime farmland would be impacted during construction of the pipeline. With proper topsoil handling techniques, impacts to prime farmland are expected to be temporary. No permanent facilities would be constructed on prime farmland. Two receipt facilities would impact farmland of statewide importance. Soil quality and long-term productivity would be impacted permanently at these locations. Accelerated wind and water erosion would occur where land has been disturbed. Reclamation and erosion control would be difficult on soils that occur on steeper sloping areas (15 percent or more), particularly those steeper sloping areas over shallow soils (60 inches or less to bedrock). Soils with unfavorable properties, including thin topsoil layers, moderate to strong salinity and alkalinity, clayey or sandy surface and subsoils, and shallow depths over bedrock are common and would present problems for erosion control and revegetation. Soil compaction and rutting likely would result from the movement of heavy construction vehicles along the construction ROW, facilities, ATWSs, emergency response equipment storage areas, receipt points, and on access roads. The degree of compaction would depend on the moisture content and texture of the soil at the time of construction. Compaction would be most severe where heavy equipment operates on moist to wet soils with high clay contents. Detrimental compaction also can occur on soils of various textures and moisture contents if multiple passes are made by equipment. If soils are moist or wet where topsoil removal has occurred, topsoil likely would adhere to tires and/or tracked vehicles and be carried away. Operation Some soil loss would result from wind and water erosion until erosion control measures begin to take effect. Very small-scale, isolated surface disturbance impacts, resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation, could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. However, if they do occur, they would be limited to small areas where certain pipeline maintenance activities occur.	Project impacts to soils would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Water Resources		
Surface Water	Construction Surface water and groundwater quality could be adversely affected by incidental spills, pipeline ruptures, or leaks. Trenching, stream crossing disturbance, and discharges of hydrostatic test water may locally increase runoff, turbidity, and sediment transport. Re-mobilization of sediments could disperse existing contaminants. Appropriate environmental practices, permit compliance, and pipeline features (e.g., valves, SCADA) would avoid or mitigate these potential effects. Alternative temporary uses of existing surface or groundwater supplies would occur during construction, through arrangements with existing water rights holders. Operation During operations, impacts to surface water resources would occur if a pipeline leak or rupture released crude oil. The severity and duration of such an impact would depend on its location, the volume of oil released, and the spill response and countermeasures implemented. Pipeline safety provisions and monitoring procedures and equipment would minimize the potential for such impacts during operations. Remotely controlled MLVs on both sides of Lake Sakakawea and on the southern boundary of USFS-administered lands and private lands would help to lessen, but not eliminate, potential impacts to these resources in the event of a spill or rupture.	Project impacts to surface water and groundwater resources would not occur.
Groundwater	Construction Construction and operation of the Project is not expected to adversely affect groundwater resources in the Project area or its vicinity. No unpermitted withdrawals of groundwater would occur. Therefore, impacts to groundwater resources due to construction of the Project are not anticipated. Operation Burial depths at the Lake Sakakawea crossing would counteract the potential for pipeline rupture or leaks at that location. Concrete coating at Lake Sakakawea, and rock covers and/or flexible concrete mats (placed in areas where the pipe would not be buried at sufficient depth and there was a risk of damage) would prevent pipeline damage and potential releases during operations. In addition, the SCADA system and periodic pipeline inspections would monitor conditions during operations. If pipeline releases occurred, responses would be triggered to address impacts to water resources. All of these Project features would avoid residual impacts or reduce their potential to negligible levels.	

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Vegetation		
	<u>Construction</u> Direct impacts from Project-related activities would include the temporary loss of vegetation as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation as a result of construction. Temporary disturbances would be limited to the agriculture, developed, grassland, and wetland/waterbody vegetation cover types within the construction ROW. Long-term impacts (greater than 20 years) would be limited to the shrubland and woodland vegetation cover types within the construction ROW. <u>Operation</u> Permanent disturbances as a result of pipeline operation and maintenance activities would be limited to vegetation communities located within the permanent aboveground facilities. A long-term loss of 79 acres of vegetation associated with the operation of aboveground facilities (e.g., receipt facilities, MLV locations, launcher/receiver facilities, and interconnection facilities) would occur.	Project impacts to vegetation would not occur.
Wetlands and Floodplains		
	<u>Construction</u> The majority of wetlands crossed by the Project route would be avoided using HDD techniques and therefore, impacts would not occur. However, for the wetlands that are not being avoided using HDD techniques, direct impacts from Project-related activities would include the temporary loss of 2.5 acres of wetland vegetation, hydric soils, and potential hydrologic functionality as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation and substrate. <u>Operation</u> Approximately 0.1 acre of permanent disturbance would occur within a wetland due to the construction of aboveground facilities. All impacts to wetland resources would be considered temporary in nature following the completion of successful reclamation, except for the permanent disturbance associated with aboveground facilities. If an accidental spill were to occur within a wetland during operation, BakkenLink would employ the spill prevention, contingency plans, and spill containment and countermeasures outlined within the CMRP.	Project impacts to wetlands and floodplains would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Noxious Weeds and Invasive Species		
	Construction Substantial increases in weed prevalence within the Project area are not anticipated; however, despite efforts to prevent the proliferation of noxious weed species, it is possible that construction activities could result in the spread or introduction of noxious weed species along the ROW or that weed species could be transported into areas that were relatively weed-free. Implementation of the Project's Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) would minimize the introduction and spread of noxious weed species within the Project area. Operation Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. Impacts to vegetation as a result of noxious weed invasions are anticipated to be minimal during Project operation with the implementation of the Noxious Weed and Aquatic Nuisance Species Control Plan, which includes post-reclamation monitoring and noxious weed control measures.	Impacts to vegetation as a result of establishment and spread of noxious weeds and invasive species would not occur.
Wildlife and Fisheries		
Management Indicator Species (MIS)	Construction Three MIS have been identified for the Project: sharp-tailed grouse, greater sage-grouse, and black-tailed prairie dog. Impacts to sharp-tailed grouse are discussed under Small Game Species. No greater sage-grouse leks occur within the Project area; therefore, impacts to the species are not anticipated. No black-tailed prairie dog colonies occur within the Project area; therefore, impacts to the species are not anticipated.	Project impacts to management indicator species would not occur.
Big Game Species	Construction Impacts to big game habitat (e.g., mule deer, white-tailed deer, elk, pronghorn, and mountain lion) include the temporary loss of potential forage and vegetative cover (native and reclaimed vegetation) and increased habitat fragmentation within the Project area. No big game critical ranges are identified within the Project area. A total of 394.7 acres of potential big game habitat would be temporarily impacted by Project construction. This includes 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland. Operation Project operation may result in direct and indirect impacts to big game species. Direct mortality to individuals may result from collisions with maintenance vehicles. In addition, big game species may experience increased hunting and poaching pressure due to increased public access. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Permanent impacts would occur to 77.5 acres of potential big game habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.	Project impacts to big game species would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Small Game Species	Construction Direct impacts to small game would include mortality or displacement as a result of construction activities. Indirect impacts include habitat loss, alteration, and fragmentation. Disturbance from increased levels of noise and human activity also would indirectly impact small game species. Project construction would result in the temporary loss of 394.7 acres of potential small game habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. Construction-related impacts to waterfowl would include the temporary loss of 13.2 acres of wetland/waterbody habitat within the Project area. Temporary loss of habitat would reduce productivity for the current breeding season. However, due to the large amount of suitable habitat in the Project area, impacts to small game species are anticipated to be low. Operation Project operation may result in direct and indirect impacts to small game species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Local populations may experience higher levels of hunting and poaching pressure due to improved public access. Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Permanent impacts would occur to 77.5 acres of potential small game habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.	Project impacts to small game species would not occur.
Sharp-tailed Grouse	Construction One active sharp-tailed grouse lek occurs along the Project route. Project construction during the breeding season may impact the sharp-tailed grouse by destroying nests, causing nest abandonment, or causing injury or direct mortality to the young. Impacts also may occur to sharp-tailed grouse breeding habitat, including the loss of lekking grounds and brood-rearing habitat. No construction, operation, or maintenance activities would be allowed within 1 mile (line of sight) of the active sharp-tailed grouse leks on USFS-administered land during the breeding season (March 1 through June 15). Therefore, impacts to breeding sharp-tailed grouse are anticipated to be low. Operation Project operation may result in direct and indirect impacts to sharp-tailed grouse. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity.	Project impacts to sharp-tailed grouse would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Nongame Species	Construction Construction activities may result in mortalities of less mobile or burrowing nongame species (e.g., small mammals) within the ROW, as a result of crushing by construction vehicles and equipment. Indirect impacts include habitat loss, alteration, and fragmentation. Increased levels of noise and human activity also would indirectly impact nongame species. Project construction would result in the temporary loss of 394.7 acres of potential nongame habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. Due to the large amount of suitable habitat in the Project area impacts to nongame species are anticipated to be low. Operation Project operation may result in direct and indirect impacts to nongame species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Other potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Permanent impacts would occur to 77.5 acres of potential nongame habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.	Project impacts to nongame species would not occur.
Migratory Birds	Construction Migratory birds that utilize various habitats in the Project area may be impacted by construction activities. Direct impacts to avian species include mortality, nest destruction, displacement, and disturbance from increased levels of noise and human activity. Indirect impacts to migratory birds include habitat loss, alteration, and fragmentation. Project construction would result in temporary loss of 394.7 acres of potential migratory bird habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. BakkenLink has committed to conduct pre-construction surveys for active migratory bird nests during the breeding season. To minimize impacts, migratory birds and their nests would be avoided during construction of the pipeline. Mowing, clearing, and grubbing of the Project ROW would occur in the fall or winter to avoid potential impacts to bird nests. Consultation with the USFWS regarding migratory birds would be continued during construction activities. Therefore, impacts to migratory birds are anticipated to be low. Operation Project operation may result in direct and indirect impacts to migratory birds. Direct impacts may result if maintenance activities are conducted during the breeding season. Mortality to individuals or destruction of nests may result from being crushed by, or colliding with maintenance vehicles. Permanent impacts would occur to 77.5 acres of potential migratory bird habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities. Potential impacts to bird species may occur from a spill or leak of crude oil from the pipeline. Direct contact with crude oil would result in oiling of plumage; ingestion of crude oil from contaminated plumage and prey; and transfer of crude oil to eggs and young. The probability of adverse effects to bird species is unlikely, due to the low probability of a spill and the low probability of the spill directly impacting individuals.	Project impacts to migratory birds would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Raptors	Construction Direct impacts to raptor species may include mortality and displacement. Indirect impacts include the loss or alteration of habitat, reduction in prey base, and disturbance from increased levels of noise and human activity. Project construction would result in temporary loss of 394.7 acres of potential raptor habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. To minimize impacts, raptors and their nests would be avoided during construction of the pipeline. Clearing and grubbing of the Project ROW would occur in the fall or winter to avoid potential impacts to raptor nests. Distance buffers for active raptor nests vary by species, ranging from 0.25 mile to 0.5 mile. Consultation with the USFWS regarding migratory birds, including raptors, would be ongoing during construction activities. Therefore, impacts to raptor species are anticipated to be low. Operation Project operation may result in direct and indirect impacts to raptors. Direct impacts may result from collision with maintenance vehicles. Indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Permanent impacts would occur to 77.5 acres of potential raptor habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.	Project impacts to raptors would not occur.
Reptiles	Construction Construction activities may result in direct and indirect impacts to less mobile species, such as reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by vehicles and equipment. Indirect impacts may include habitat loss, alteration, and fragmentation, and disturbance from increased levels of noise and human activity. Project construction would result in temporary loss of 394.7 acres of potential reptile habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. However, due to the presence of suitable habitat adjacent to the disturbed areas and the temporary nature of Project construction, impacts to reptiles are anticipated to be low. Operation Project operation may result in direct and indirect impacts to reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Permanent impacts would occur to 77.5 acres of potential reptile habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.	Project impacts to reptiles would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Aquatic Resources	Construction All intermittent streams and wetland crossings would be constructed using HDD techniques or open cut methods. The Lake Sakakawea crossing would be constructed with a trench/pull technique. Project construction would result in temporary impacts to 13.2 acres of wetland/waterbody habitat, until reclamation has been completed and vegetation is re-established. It is unlikely that a potential spill would affect terrestrial species due to the low probability of a spill and the behavioral avoidance of a spill area by wildlife species. Impacts to aquatic resources from potential fuel or other petroleum product spills are not anticipated. Water withdrawal from municipal water sources for hydrostatic testing would not affect aquatic resources. Operation Project operation may result in direct and indirect impacts to aquatic species. Direct mortality to individuals may result from maintenance activities conducted near waterbodies. Indirect impacts would include displacement of individuals, increased sedimentation, and degradation of habitat. Potential impacts to aquatic species may occur from a spill or leak of crude oil from the pipeline. The probability of adverse effects to aquatic species is unlikely due to the low probability of a spill and the low probability of the spill directly impacting individuals.	Project impact to aquatic resources would not occur.
Special Status Species		
Plants	Stemless Townsend Daisy *(Townsendia exscapa)* and Hooker's Townsendia *(Townsendia hookeri)* One *Townsendia* sp. population was identified within the Project area; however, portions of the population are located between 39 and 78 feet from the pipeline centerline. The population was located outside of the construction and operation disturbance footprints. The population would be noted on alignment sheets and flagged/marked in the field for avoidance. No impacts to this population are anticipated.	Project impacts to special status plant species would not occur.
Wildlife (Mammals)	Northern Long-eared Bat *Construction* Potential direct and indirect impacts to the northern long-eared bat would include displacement related to pipeline construction; habitat loss, alteration, and fragmentation; and increased noise levels and human activity. Project construction would result in the temporary loss or alteration of approximately 3.9 acres of potential roosting habitat and foraging habitat. *Operation* Project operation may result in direct and indirect impacts to the northern long-eared bat. Direct impacts may result if maintenance activities are conducted in during hibernation. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts to 1.1 acre of suitable roosting and foraging habitat would occur as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased noise levels and human activity.	Project impacts to the northern long-eared bat would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
	Black-tailed Prairie Dog *Construction* No black-tailed prairie dog colonies have been identified within the Project area. However, suitable habitat exists within the Project area and the species is known to occur near the Project area in the LMNG complex. Impacts to this species, if present, would include direct mortalities of individuals if burrows are crushed by construction vehicles or equipment. Indirect impacts would result from increased noise levels and human activity. There would be no impacts to individual black-tailed prairie dogs as a result of the Project. However, the Project may impact suitable black-tailed prairie dog habitat. Therefore, direct impacts to this species would be limited to the incremental temporary loss of 212.9 acres of potentially suitable grassland habitat. *Operation* If black-tailed prairie dog colonies become established along the Project ROW in the future, direct and indirect impacts during Project operations may occur. Direct mortality to individuals may result from collisions with maintenance vehicles. Indirect impacts may include habitat fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 6.5 acres of potential grassland habitat as a result of the construction and operation of aboveground facilities.	Project impacts to the black-tailed prairie dog would not occur.
Bird Species Associated with Wetland/ Waterbody Habitat	Whooping Crane *Construction* Indirect impacts may result from individual migrants being flushed from the Project area during construction. Based on the rarity of the species and the lack of occurrence data for the Project area, potential impacts from encountering and flushing a migrating whooping crane from the Project area would be minimal. Habitat loss from Project construction would include the temporary disturbance of 164.7 acres of agricultural land and 13.2 acres of wetland/waterbody habitat within the Project ROW. Crops and rangeland would return to their original state during the following growing season. In most instances, suitable foraging habitat adjacent to disturbed areas would be available to whooping cranes. Additionally, any surface disturbance adjacent to wetland/waterbody habitat would be allowed to completely re-vegetate following Project construction. *Operation* Project operation may result in indirect impacts to the whooping crane, including habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 69.8 acres of agricultural land as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement and increased stress to individuals during migration by increased noise levels and human activity. A spill or leak of crude oil in wetland or agricultural habitat may directly impact the whooping crane and its habitat.	Project impacts to bird species associated with wetland/waterbody habitat would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
	Interior least tern *Construction* Direct impacts to breeding terns and their habitat may occur as a result of the pipeline-pull method, which would be utilized at the Lake Sakakawea crossing. This construction method would result in the incremental reduction of potentially suitable breeding and foraging habitat during construction activities (8.8 acres). Indirect impacts, such as displacement and decreased breeding success, may result from increased noise levels and human activity, if breeding terns are present within 0.5 mile of the Project area. *Operation* Project operation may result in indirect impacts including the displacement and decreased breeding and foraging success caused by increased noise levels and human activity. A spill or leak of crude oil at Lake Sakakawea may directly impact the interior least tern and its habitat.	
	Piping Plover *Construction* Designated critical habitat for the piping plover is present along the Missouri River at the Lake Sakakawea crossing. Direct impacts to breeding habitat and designated critical habitat are possible as a result of the pipeline-pull method that would be utilized at the Lake Sakakawea crossing. This construction method would result in the incremental reduction of potentially suitable breeding and foraging habitat within the Project area during construction (8.8 acres). Indirect impacts may result from increased noise levels and human activity if breeding plovers are present within 0.5 mile of the Project area. *Operation* Project operation may result in indirect impacts to the piping plover. These include displacement and decreased breeding and foraging success caused by increased noise levels and human activity. A spill or leak of crude oil at Lake Sakakawea may directly impact the piping plover and its habitat.	
	Rufa Red Knot *Construction* Indirect impacts may result from individual migrants being flushed from the Project area during construction. Based on the rarity of the species and the lack of occurrence data for the Project area, potential impacts from encountering and flushing a migrating rufa red knot from the Project area would be minimal. *Operation* Project operation may result in indirect impacts to the rufa red knot. These include displacement and decreased foraging success caused by increased noise levels and human activity. A spill or leak of crude oil at Lake Sakakawea may directly impact the rufa red knot and its habitat.	

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Bird Species Associated with Grassland Habitat	Sprague's Pipit, Baird's Sparrow, and Long-billed Curlew *Construction* Direct and indirect impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew would include mortalities or displacement related to pipeline construction if construction occurs during the breeding season (February 1 through July 15); habitat loss, alteration, and fragmentation; and disturbance from increased noise levels and human activity. In addition to habitat loss, reductions in bird population densities also may be attributed to a reduction in habitat quality produced by elevated noise levels. Project construction would result in temporary impacts to 390.8 acres of potential breeding and foraging habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, and 13.2 acres of wetland/ waterbody habitat. *Operation* Project operation may result in direct and indirect impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals or nests may result from being crushed by, or colliding with maintenance vehicles. Indirect impacts may include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 76.4 acres of potential breeding and foraging habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 0.1 acre of wetland/waterbody habitat, as a result of the construction of aboveground facilities. Other potential indirect impacts include displacement of individuals, and decreased breeding success due to increased noise levels and human activity.	Project impacts to bird species associated with grassland habitat would not occur.
	Burrowing Owl *Construction* Potential impacts to the burrowing owl, if present, would result from the incremental reduction of suitable habitat within the Project area during construction activities. Direct mortality to individuals or nests may result from being crushed by, or colliding with, maintenance vehicles. Construction activities also would cause an increase in temporary, short-term noise levels and human activity, which may potentially displace individual owls from the Project area and decrease breeding success. Potential for construction-related impacts to the species are low due to the lack of primary nesting habitat (i.e., prairie dog colonies). *Operation* Project operation may result in direct and indirect impacts to the burrowing owl, if present. Direct impacts may result if maintenance activities are conducted during the breeding season (May 1 to September 15). Direct mortality to individuals or nests may result from being crushed by, or colliding with, maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity.	

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Bird Species Associated with Shrubland Habitat	Loggerhead Shrike *Construction* Potential indirect impacts to the loggerhead shrike would include displacement related to pipeline construction if construction occurs during the breeding season (February 1 through July 15); and increased noise levels and human activity. Project construction would not result impacts or alterations of shrubland habitat; however, suitable shrubland habitat is immediately adjacent to project facilities. *Operation* Project operation may result in indirect impacts to the loggerhead shrike. Indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity near suitable habitat. No permanent impacts would occur to shrubland habitat as a result of the construction and operation of aboveground facilities.	Project impacts to bird species associated with shrubland habitat would not occur.
Butterfly Species	*Construction* The main reasons for the decline of Dakota skippers, Ottoe skippers, regal fritillary butterflies, and tawny crescents include the loss and fragmentation of native habitat through grazing, fire, weed control, pesticide use, and other ground disturbances (Opler et al. 2012). Pipeline construction reduces native grassland areas by removing vegetation and disturbing the prairie sod. Once disturbed, this sod is extremely slow to redevelop. Disturbing soil along the construction ROW encourages the establishment of weeds and other invasive species. Project construction would result in the temporary disturbance to 212.9 acres of grassland habitat, including mixed-grass prairie and sand prairie. *Operation* Project operation may result in direct and indirect impacts to the Dakota skipper, Ottoe skipper, regal fritillary butterfly, and tawny crescent. Direct impacts may result if maintenance activities are conducted when these species are present. Direct mortality to individuals may result from being crushed by or colliding with maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 6.5 acres of mixed-grass prairie habitat and sand prairie habitat as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement of individuals due to increased noise levels and human activity. Project operation would allow vegetation to become established. However, trees and shrubs within 15 feet either side of the centerline would be removed as necessary maintenance during operations to allow for aerial inspections of the ROW.	Project impacts to butterfly species would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Fish Species	Pallid Sturgeon *Construction* The pallid sturgeon may be present at the Lake Sakakawea crossing location. The proposed methodology for this crossing is based on the pipeline-pull construction method. Therefore, direct impacts to the pallid sturgeon and its habitat are possible. *Operation* Routine pipeline operations would not likely impact the pallid sturgeon. In the improbable event of a spill or leak in Lake Sakakawea, exposure to crude oil may result in adverse toxicological effects to the species. However, the probability of adverse effects to the pallid sturgeon is unlikely due to the low probability of a spill or leak of a sufficient amount to cause toxic effects in Lake Sakakawea. Further, if a spill or leak event were to occur, federal and state laws would require cleanup of an event of sufficient size to potentially impact pallid sturgeon.	Project impacts to fish species would not occur.
Land Use		
	Construction No residential lands would be traversed. Likewise, no residential lands are adjacent to aboveground facilities. Furthermore, there are no schools, churches, parks, or any other sensitive land use areas within 500 feet of the Project ROW. Because the construction ROW can be used for crop production and grazing following construction, this loss would be a short-term impact. The Project route does not cross any formal public recreation lands. No national parks, national landmarks, state or municipal parks, or wild and scenic rivers would be traversed by the Project route. The construction ROW would temporarily affect approximately 2.4 miles of national grassland managed by the USFS. Based on the Project plans and other conservation commitments, it is anticipated impacts to special land uses would be minor. Operation The land required for the operation of the Project is approximately 79 acres. This accounts for the permanent placement of pipeline facilities, such as access roads, MLVs, emergency response equipment storage areas, and receipt facilities.	Project impacts to land use would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Recreation		
	<u>Construction</u> Construction during the fall may affect hunting activities. The duration of recreational impacts in any one area usually would be short term, lasting several days to several weeks. Wintertime activities would not be affected. The Project would not transect any wildlife management areas (WMAs), private land open to sportsmen (PLOTs), national parks, state or municipal parks, or developed recreational facilities. Scenic views would be temporarily affected during construction until revegetation blends the colors and textures of the ROW into the surrounding landscape. The recreational enjoyment of wildlife (such as hunting during big game hunting seasons) may be temporarily affected by construction activities, depending on season and location. However, this effect would be short term. Impacts to urban and dispersed recreation resources as a result of the construction work force are expected to be minimal due to the minor short-term population increase (300 workers) and the intensive nature of the construction schedule. <u>Operation</u> The incremental work force size during operations (after construction) for the Project is estimated to be less than 10 pipeline personnel, resulting in a negligible long-term increase to recreational users in the region.	Project impacts to recreation resources would not occur.
Wilderness		
	<u>Construction</u> Construction of the Project would not impact the characteristics of wilderness areas or lands suitable for wilderness west of the Project as none of the activity would occur within either of the respective boundaries (Theodore Roosevelt National Park and Potential Lands with Wilderness Characteristics). Congress' management guidelines for these lands suitable for wilderness areas would not be violated. Construction-related impacts, which would occur outside of the boundaries, would be temporary, and the disturbed areas would be reclaimed and revegetated in accordance with applicable regulations and permit requirements. <u>Operation</u> Operation of the Project would not impair characteristics of the wilderness area or lands suitable for wilderness west of the Project area. Vehicular traffic along the permanent ROW would be limited to workers performing periodic pipeline and valve maintenance and emergency repairs to the pipeline or corrosion protection devices. The aboveground facilities would be located within the permanent ROW. These facilities would not impair lands suitable for preservation as wilderness.	Project impacts to wilderness resources would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Visual Resources		
	Construction Surface disturbances would affect scenery by creating exposed soil across the construction area with a different texture and color and by creating land barren of vegetation and topsoil. A visually strong edge of vegetation would appear along the construction ROW. The construction ROW would visually divide the landscape due to absence of vegetation and the altered lines of topography. Operation The Project likely would create a weak to moderate visual impact in scenic integrity objectives (SIOs) high, medium, low, and very low categories of rangeland and riparian landscapes and a weak visual impact in cultivated cropland landscapes. This impact would be more apparent in visually sensitive areas such as the Lake Sakakawea viewshed. As reclamation progresses, moderate impacts for changes in colors of vegetation eventually would become weak. These weak impacts would meet the objectives for SIO high, medium, low, and very low landscapes. The Project's overall effects on visual conditions during hours of both daylight and darkness would be low. Some nighttime lighting would be required for operational safety and security at the receipt facilities. However, because of other minimal manmade sources of light in these remote areas, when viewed from nearby offsite locations, the overall change in ambient lighting conditions at the Project site may be moderate to substantial.	Project impacts to visual resources would not occur.
Noise		
	Construction No sensitive noise receptors (e.g., residences) are known to occur within 500 feet of the receipt facilities. Noise resulting from construction activities would be short term (2 to 3 weeks in any given area) in duration and limited to daylight hours. Based on construction noise analyses conducted for other pipeline projects (USEPA 1974), noise levels of 60 decibels (dB) on the A-weighted scale (dBA) or above could extend perpendicularly up to 12,000 feet (2.5 miles). These levels could occur sporadically over the construction period, and the zone of impact would be limited to the local area of construction activities as construction activities progress along the construction ROW. Operation Operation-related noise would be limited to the three receipt facilities where tanker trucks would be periodically unloading crude oil at storage tanks and support vehicles and equipment would be used by maintenance personnel. Residences are located more than 500 feet from the receipt facilities; therefore, impacts to these residences are not anticipated as a result of operational activities.	Project impacts related to noise would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Socioeconomics		
Population and Communities	<u>Construction</u> The Project construction spreads would require an average of 100 workers per spread to construct the Project, with three spreads and approximately 300 workers total, working simultaneously. Work force availability in Williston and Dickinson may contribute to the percentage of local workers. Unemployment rates near or under 1 percent in the affected counties are indicative of the extremely tight local labor market; however, BakkenLink would attempt to hire 25 percent of its construction work force from local labor. Local employment opportunities initiated by the Project construction would be considered beneficial to the local area economies. As a result of the short duration of construction, it is assumed that only a small percentage of the non-local work force would bring their families. Adverse social, economic, and community infrastructure impacts of construction personnel are considered minimal because of the quick pace and short duration of the construction schedule. The number of workers would be small relative to the regional population. Assuming a maximum of 351 non-local people during the peak construction period, including workers and a limited number of family members, the largest population increase that could occur would be approximately 1.0 percent of the population of the two-county study area. <u>Operation</u> The Project-related permanent workforce would be very small, at most, so the effects of operations of the Project on the local population would be minimal, as would any adverse social, economic, and community infrastructure impacts.	Project impacts related to socioeconomics would not occur.
Community Services and Temporary Housing	<u>Construction</u> Because construction would be short in duration, housing demand would be temporary. Based on typical pipeline construction, it is assumed that housing for the non-local pipeline work force would be divided among rental units, hotels/motels, recreational vehicles, and other accommodations; however, the current western North Dakota boom in oil and gas development has stretched existing housing resources in the Project vicinity. BakkenLink anticipates that accommodations at existing man camps would be available and sufficient to house the anticipated construction workforce as other projects are completed and workers depart so that beds become available. If local housing is not available for construction workers, some may commute long distances and some may locate RVs in ad hoc locations in the area. A potential effect of the construction work force on housing would be competition with travelers, recreationists, and more notably, industry workers for temporary accommodations. Impacts to government services would be added incrementally by the Project, but due to the short pipeline construction schedule, these impacts would be temporary and would end once construction is completed. As a result of the short-term and transient nature of pipeline construction, many workers do not bring along school-aged children, therefore, increases in school enrollments, if any, are expected to be minimal. <u>Operation</u> The Project permanent work force would be small and would place a negligible demand on local services such as police, medical facilities, fire or educational services, and would not cause any significant detrimental effects to community social well-being.	

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Tax Revenues and Finance	Construction The estimated cost for construction of the Project is expected to be $19.4 million. This cost would be spread over the construction period and includes salaries for contract supervisors' wages, benefits, and overtime for skilled and unskilled labor, and rental on labor force trade equipment. A portion of this total labor cost would be spent in the area and would result in increased economic activity. Increased spending in the local areas would result in increased retail sales to merchants, as well as increased sales tax to local municipalities (neither McKenzie County, nor Williams County levies sales taxes). The overall impact of this local spending and tax generation would be positive. Operation The permanent work force for operation would be minimal, probably stationed at Dickinson and Williston. Maintenance would be done with local contractors specializing in this type of work. Each county and school district would benefit from the increased tax base and additional revenues. Both McKenzie and Williams counties would experience increases in their property tax bases, generating additional revenue for county services and facilities.	
Environmental Justice		
	Construction Because the Project is not located in large communities or urban areas, and would be at least 5 miles from the Fort Berthold Indian Reservation, there is no evidence the Project would have a disproportionately high adverse human health or environmental effect on minority or low-income populations. Therefore, no adverse environmental justice effects on minority and/or low-income populations are expected to occur as a result of the Project. Operation No disproportionate adverse effects on minority or low-income populations would occur as a result of operation of the Project.	Project impacts related to environmental justice would not occur.
Transportation		
	Construction Construction of the Project would generate short-term traffic increases from truck transport of pipe and construction materials and from commuting by construction workers. Effects on traffic flows would be minor and short term, although the increase in heavy trucks could create some queuing delays on road segments where passing is restricted. Effects of traffic increases on county roads would be minor. Project-related effects on traffic accidents would be expected to be minor. Operation Operation of the Project would have a positive measurable effect on transportation in the Project vicinity. Long-term traffic would decrease by approximately 500 daily truck trips as a result of crude oil transportation occurring by pipeline instead of tanker truck. Localized truck traffic in the vicinity of the two proposed receipt facilities, and possibly at the Dry Creek Terminal, would increase relative to existing levels.	Project impacts to transportation resources would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Public Safety		
	Construction Construction of the Project would generate the possibility of elevated risks to public safety through increased traffic, local population, and hazardous chemical and fire related risks. Traffic along the Project route would temporarily increase during construction; however, this increase is expected to be negligible when considered in the scope of the increased traffic as a result of recent oil and gas development. Operation A spill of crude oil during Project operation as a result of a pipeline leak could contaminate soil and groundwater if the leak is not properly contained and remediated. The pipeline would be monitored by an electronic system that would sense pressure and flow rates 24 hours a day, as well as by aerial patrols. Consistent monitoring would allow concerns to be immediately identified and addressed. A Pipeline IMP would be developed, which, in conjunction with the ERP, would outline pipeline integrity management procedures to be implemented during operation.	Project impacts related to public safety would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Hazardous Materials and Solid Waste		
	Construction *Hazardous Materials* Soil and water contamination along the ROW may result from spills during construction and trench excavation. Impacts from spills typically would be minor because of the low frequency of spill occurrence and relatively low volume of materials being handled and potentially spilled. The Project Spill Prevention, control, and Countermeasures Plan (SPCC Plan) would address procedures to ensure the proper handling and storage of these materials and procedures for the containment and cleanup of spills at aboveground facilities. *Solid Waste* BakkenLink would dispose of construction waste in accordance with applicable rules. Construction debris would not be placed in or adjacent to waterways and construction trash would be removed from the ROW. BakkenLink would comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. *Contaminated Sites* It is possible that contaminated soil and groundwater (e.g., hydrocarbon contamination) could be encountered during trench excavation operations. In case contaminated soil is encountered, BakkenLink would suspend work in the area of the suspected contamination until the type and extent of the contamination was determined. Operation *Hazardous Materials* The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR 195. The regulations are intended to ensure adequate protection for the public and to prevent pipeline and facility accidents and failures. Part 195 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion. BakkenLink would design, construct, and operate the pipeline in accordance with federal regulations. *Solid Waste* The waste generated during operations would be similar to waste generated during construction, except for certain waste that may be generated from pipeline maintenance operations. Such waste materials may be considered hazardous and would be accumulated, stored, and disposed of in accordance with applicable rules and regulations.	Project impacts related hazardous materials and solid waste would not occur.

Table 2-10 Proposed Action and No Action Alternative Comparison

Resources	Proposed Action	No Action Alternative
Cultural Resources		
	<u>Construction</u> Ground-disturbance associated with Project construction has the potential to directly impact known historic properties and unknown historic properties that may be discovered during construction activities. Indirect impacts, such as illegal artifact collecting, vandalism, and soil erosion, also could occur. Cultural resources surveys identified 19 prehistoric sites, 2 historic sites, and 1 multi-component site in the proposed pipeline ROW. With the exception of 1 site, minor variations to the Project ROW have resulted in avoidance of all sites by at least 50 feet, thereby avoiding direct impacts to these resources. Historic properties that may be discovered during Project construction would be handled as stipulated in the Unanticipated Discoveries Plan. <u>Operation</u> Impacts to historic properties are not anticipated as a result of Project operation.	Project impacts to historic properties would not occur.
Tribal Treaty Rights and Interests		
	<u>Construction</u> Ground-disturbing activities associated with the Project have the potential to directly impact known properties of traditional, religious, and cultural importance to the tribes and unknown properties that may be discovered during Project construction. Tribal surveys identified 21 features/sites within the Project ROW. All of the features/sites have been avoided by at least 50 feet, thereby avoiding direct impacts to these resources. Properties of traditional, religious, and cultural importance that may be discovered during Project construction would be handled as stipulated in the Unanticipated Discoveries Plan. No impacts to cultural resources potentially submerged by the creation of the lake are anticipated given the lack of previously recorded cultural resources in the Project area as indicated through examination of historical documents, and the fact that no features/anomalies were identified during the use of remote sensing technologies. Construction activities associated with the Project temporarily may reduce the amount of federal lands outside of the reservation where tribal members could exercise their hunting, fishing, and gathering rights; change the way a tribal member accesses resources for tribal use; and restrict certain activities (e.g., hunting or gathering). However, these temporary impacts would be negligible. There would be no restrictions on access to resources and/or areas for religious purposes after construction has been completed. <u>Operation</u> Impacts to properties of traditional, religious, and cultural importance to the tribes are not anticipated as a result of Project operation.	Project impacts to treaty rights and properties of traditional, religious, and cultural importance to the tribes would not occur.

3.0 Affected Environment

This chapter describes the environment that would be affected by the development of the Project. The baseline information summarized in this chapter was obtained from published and unpublished materials; discussions with local, state, and federal agencies; field studies conducted in the Project area; and on-site experience with oil pipelines in western North Dakota. The affected environment for individual resources was delineated based on the area of potential direct and indirect environmental impacts for the Project. For resources such as soils and vegetation, the affected area was determined to be the physical location and immediate vicinity of the areas to be disturbed by the Project. For other resources such as air quality, water quality, wildlife, and social and economic values, the affected area spans a larger area, as described in each resource section (e.g., airshed, watershed, extent of available habitat, local communities, etc.).

Potential impacts to Authorized Project Purposes as described in Section 408 regulations need to be addressed for any project that would occur within a USACE Project area (e.g., the Garrison Dam/Lake Sakakawea area). Of the eight Authorized Project Purposes, four Purposes (i.e., municipal and industrial water supply, fish and wildlife, recreation, and water quality) may be affected by the Project and four Purposes (i.e., flood control, navigation, irrigation, and hydropower) would not be affected by the Project. The purposes that may be affected by the Project and resource sections in which these are addressed include the following:

- Municipal and industrial water supply – Section 3.5, Water Resources;
- Fish and wildlife – Sections 3.9, Wildlife and Fisheries, and 3.10, Special Status Species;
- Recreation – Section 3.12, Recreation; and
- Water quality – Section 3.5, Water Resources.

Flood control, navigation, irrigation, and hydropower would not be affected by the Project.

3.1 Air Quality

Air quality in a given location is defined by pollutant concentrations in the atmosphere and generally is expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Visibility also is a measure of ambient air quality. Air quality within the Project area has the potential to be affected by such activities as emissions from the construction and operation of oil and gas facilities, access roads, and other elements of management activities. Regional air quality also is affected by natural events such as windstorms and wildfires, and larger emissions generating sources such as power plants, large manufacturing facilities, and transportation activities in urban corridors. Natural events generally are short lived, lasting from several hours to perhaps several weeks.

Both long-term climatic factors and short-term weather fluctuations are considered part of the air quality resource because they control dispersion and affect ambient air concentrations. The physical effects of air quality depend on the characteristics of the receptors (human or environmental) and the type, amount, and duration of exposure. This section describes the existing air quality resource of the region and the applicable air regulations that would apply to the Proposed Action and alternatives.

3.1.1 Air Quality Regulatory Framework

The CAA (42 U.S.C. 7401 et seq.) as amended in 1977 and 1990 is the basic federal statue governing air pollution. Provisions of the CAA that are relevant to the Project include:

- National Ambient Air Quality Standards (NAAQS);
- Prevention of Significant Deterioration (PSD);
- New Source Performance Standards (NSPS);
- Maximum Achievable Control Technology (MACT) Standards;
- Conformity Requirements; and
- Greenhouse Gas (GHG) Permitting and Climate Change.

In addition to federal regulations, the CAA provides states with the authority to regulate air quality within state boundaries. The State of North Dakota has enacted additional Ambient Air Quality Standards (AAQS) that are applicable to the Project area.

3.1.1.1 National and State Ambient Air Quality Standards

The federal CAA and the amendments of 1990 require all states to control air pollution emission sources so that NAAQS are met and maintained, enforced by the USEPA (USEPA 2004). The CAA directs the USEPA to delegate primary responsibility for air pollution control to state governments. The State of North Dakota adopted the NAAQS as state air quality standards and has added more stringent AAQS applicable only to North Dakota. In addition to these requirements, the National Park Service (NPS) Organic Act requires the NPS to protect the natural resources of the lands it manages from the adverse effects of air pollution.

The NAAQS establishes maximum acceptable concentrations for oxides of nitrogen (NO_X/nitrogen dioxide [NO_2]), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM) with an aerodynamic diameter of 10 microns or less (PM_{10}), PM with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), ozone (O_3), and lead. These pollutants are known as criteria pollutants. Primary standards set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, and against damage to animals, crops, other vegetation, and buildings. These standards represent the maximum allowable atmospheric concentrations that may occur without jeopardizing public health and welfare, and include a reasonable margin of safety. The air quality impacts in the Project area must meet the NAAQS, which apply nationwide. An area that does not meet the NAAQS is designated as a non-attainment area on a pollutant-by-pollutant basis. A list of the criteria pollutants regulated under the CAA for which specific concentration levels have been established, their currently applicable NAAQS, and State of North Dakota AAQS are listed in **Table 3.1-1**.

Table 3.1-1 National and North Dakota Ambient Air Quality Standards

Pollutant	Averaging Period	AAQS ($\mu g/m^3$)	
		National[1]	North Dakota[2]
NO_2	1-hour[3]	188	188
	Annual[4]	100	100
CO	1-hour[5]	40,000	40,000
	8-hour[5]	10,000	10,000
SO_2	1-hour[6]	196	196
	3-hour[5]	1,300	1,300
	24-hour[7]	Revoked	260[4]
	Annual[7]	Revoked	60
PM_{10}	24-hour[8]	150	150
	Annual[9]	Revoked	Revoked
$PM_{2.5}$	24-hour[10]	35	35
	Annual[4]	15	15
O_3	8-hour[11]	147	147
Lead	Rolling 3-month[12]	0.15	0.15
Hydrogen sulfide (H_2S)	Instantaneous[4]	--	14,000
	1-hour[13]	--	280
	24-hour[5]	--	140
	3-month[12]	--	28

1 Source: http://www.epa.gov/air/criteria.html#3.
2 Source: http://www.legis.nd.gov/information/acdata/pdf/33-15-02.pdf.
3 The 3-year average of the 98th percentile of the daily maximum 1-hour average is not to exceed this standard.
4 Not to be exceeded. Instantaneous H_2S would be assessed using 1-hour modeled impacts.
5 Not to be exceeded more than once per year.
6 The 3-year average of the 99th percentile of the daily maximum 1-hour average is not to exceed this standard.
7 The 24-hour and annual SO_2 NAAQS were revoked by USEPA on June 2, 2010; 75 Federal Register (FR) 35520.
8 Not to be exceeded more than once per year on average over 3 years.
9 The annual PM_{10} NAAQS of 50 $\mu g/m^3$ was revoked by USEPA on September 21, 2006; FR Volume 71, Number 200, 10/17/06.
10 24-hour average of the 98th percentile concentrations (effective December 17, 2006).
11 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
12 Maximum arithmetic mean concentration averaged over 3 consecutive months.
13 Not to be exceeded more than once per month.

3.1.1.2 New Source Review

New Source Review (NSR) requires stationary sources of air pollution to get permits before construction. NSR also is referred to as construction permitting or pre-construction permitting. The three types of NSR requirements that a source may need to meet are:

- PSD permits that are required for new major sources or existing major sources making a major modification in an attainment area;
- Non-attainment NSR permits that are required for new major sources or existing major sources making a major modification in a non-attainment area; and
- Minor source (non-PSD) permits.

3.1.1.3 Prevention of Significant Deterioration

PSD regulations apply to proposed new or modified sources in an attainment area that have the potential to emit criteria pollutants in excess of predetermined *de minimis* values (40 CFR 52). PSD regulations restrict the degree of ambient air quality deterioration that would be allowed. Allowable deterioration to air quality can be expressed as the incremental increase to ambient concentrations of criteria pollutants, or PSD increment. Increments for criteria pollutants are based on the PSD classification of the area. Class I designations allow the lowest amount of permissible deterioration by essentially precluding development near these areas. Class II areas are designed to allow for moderate, controlled growth, and Class III areas allow for heavy industrial use.

The NPS Organic Act requires the NPS to protect the natural resources of the lands it manages from the adverse effects of air pollution. Federal PSD Class I areas, which include certain national wilderness areas, national memorial parks, and national parks, are afforded the highest level of protection. Ambient air quality criteria that apply within Class I areas are the most stringent and include the regulation of air quality related values (AQRVs) within their borders. Federal Land Managers (FLMs) are responsible for the management of PSD Class I areas. The nearest Class I area is Theodore Roosevelt National Park, which is approximately 15 miles southwest of the Dry Creek Terminal.

The North Dakota Department of Health (NDDH) – Air Quality Division (NDDH-AQD) generally does not require modeling for O_3 impacts of minor sources. For PSD major sources, an evaluation of ozone levels and impacts is required if the total emission rate of VOCs is 100 tpy or more (40 CFR 52.21(i)(5)(i)) (USEPA 1990).

PSD Increment

A project's PSD increment consumption typically is determined through the use of an air quality dispersion model. Atmospheric concentrations of NO_2, SO_2, and PM_{10} predicted by the air quality model are compared with allowable PSD increments. The allowable PSD increments for Class I and Class II areas are provided in **Table 3.1-2**.

Table 3.1-2 Class I and Class II Area PSD Increments

PSD Class	Pollutant	Allowable Increment (μg/m^3)		
		Annual Arithmetic Mean	24-hour Maximum	3-hour Maximum
Class I	NO_2	2.5	-	-
	SO_2	2	5	25
	PM_{10}	4	8	-

Table 3.1-2 Class I and Class II Area PSD Increments

PSD Class	Pollutant	Allowable Increment (µg/m^3)		
		Annual Arithmetic Mean	24-hour Maximum	3-hour Maximum
Class II	NO_2	25	-	-
	SO_2	20	91	512
	PM_{10}	17	30	-

Source: 40 CFR 51.166(c).

PSD Class I and sensitive Class II areas are located within the Project region. The closest PSD Class I area is Theodore Roosevelt National Park, which is approximately 15 miles southwest of the Dry Creek Terminal. The nearest PSD Class II area is the Fort Berthold Indian Reservation, which is approximately 4 miles east of the proposed route. The PSD Class I areas and sensitive Class II areas in the Project region are shown in **Figure 3.1-1** and include the following areas:

NPS Class I Areas

- Theodore Roosevelt National Park

USFWS Class I Areas

- Lostwood Wilderness Area
- Medicine Lake Wilderness Area

Voluntary Class I Areas

- Fort Peck Indian Reservation

Sensitive Class II Areas

- Fort Berthold Indian Reservation

Air Quality Related Values

In addition to the more stringent PSD increments, Class I areas are protected by the FLMs who manage AQRVs. AQRVs include the potential air pollutant effects on visibility, atmospheric deposition, and the acidification of sensitive lakes and streams. They are applied to PSD Class I areas and sensitive Class II areas and set the level of acceptable change for each value. AQRVs reflect the land management agency's policy and are not legally enforceable standards.

Visibility

Visibility can be defined as the distance one can see (a standard visual range) or by the ability to perceive changes in color, contrast, and detail. The most commonly used reference for measuring visibility is the deciview, which is defined as a change in visibility that is just perceptible to the average person.

Regional haze is visibility impairment that is caused by the cumulative air pollutant emissions from numerous sources over a wide geographic area. Scattering and absorption of light by fine pollutant particles results in the development of regional haze and consequent visibility reduction. Some particles and gases scatter light while others absorb light. The primary cause of regional haze in many parts of the country is light scattering resulting from fine particles (i.e., $PM_{2.5}$) in the atmosphere. Coarse particles between 2.5 and

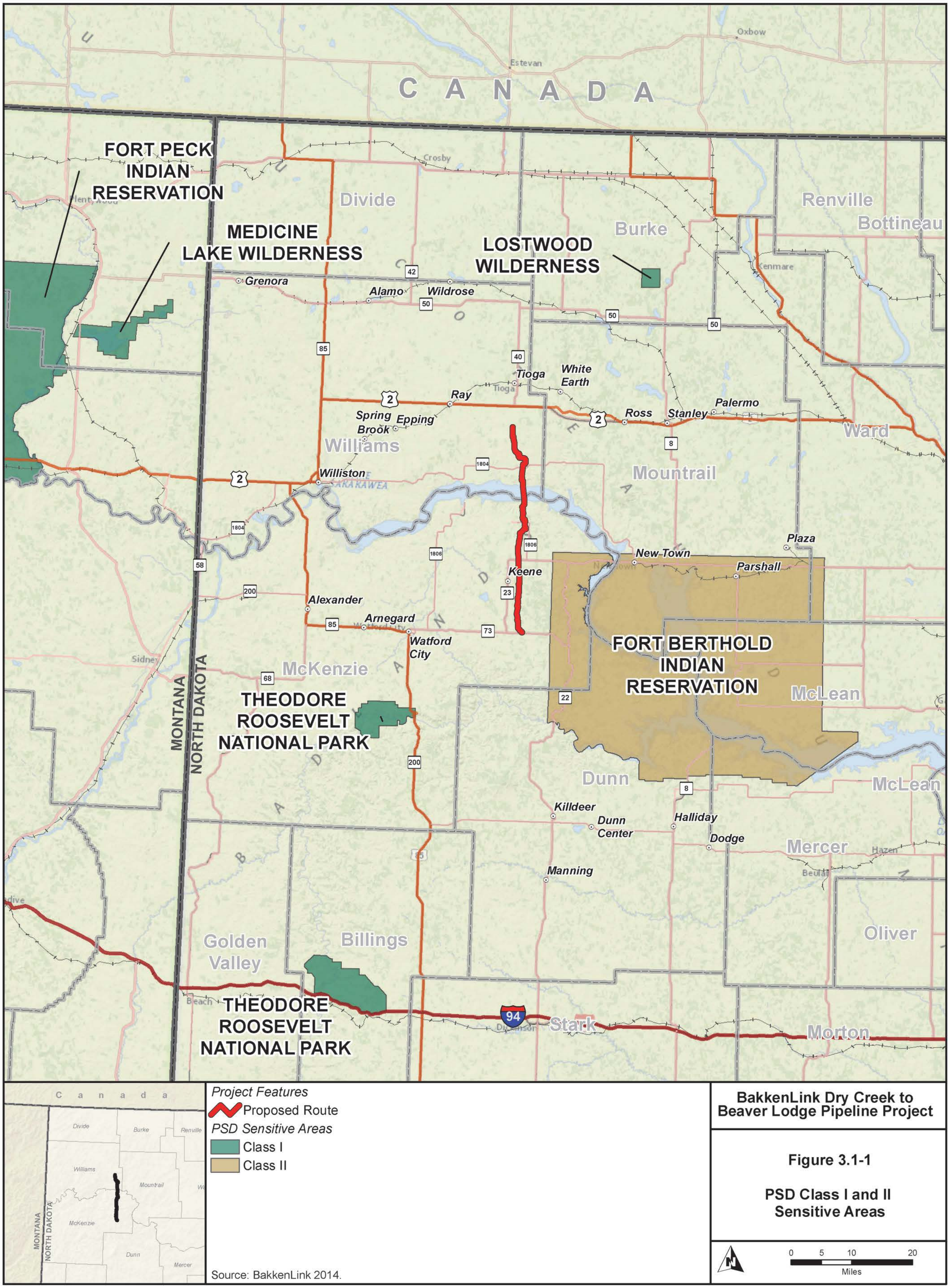


Figure 3.1-1

PSD Class I and II Sensitive Areas

10 microns in diameter can contribute to light extinction. Each of these components of regional haze can be naturally occurring or the result of human activity. The natural levels of these components may result in some visibility impairment, even in the absence of human influences, and would vary with season, daily meteorology, and geography (USEPA 2003).

Atmospheric Deposition and Acid Neutralization Capacity

Atmospheric deposition, wet and dry, is the process whereby airborne particles and gases are removed from the atmosphere and deposited on the earth's surface.

Wet deposition is defined as the portion of atmospheric deposition contained in precipitation. Wet deposition is monitored by the National Atmospheric Deposition Program, a consortium of a large number of federal, regional, and state agencies, and academic institutions.

Dry deposition is the fraction deposited in dry weather through such processes as settling, impaction, and adsorption. The factors that influence dry deposition include whether the substance is in gaseous or particulate form, the solubility of the species in water, the amount of precipitation in the region, and the terrain and type of surface cover.

Mixing of specific compounds in the atmosphere can lead to acid deposition. Acidic wet deposition is called acid precipitation or, more commonly, acid rain. Acidity in precipitation is measured by collecting samples of rain and measuring its pH, which is lower when acidic compounds are present. "Clean" or unpolluted rain has a slightly acidic pH of 5.6, because CO_2 and water in the air react together to form carbonic acid, a weak acid. Throughout much of the eastern U.S., pH in rain is less than 4.5 (strongly acid). Acid deposition occurs when compounds in the atmosphere such as SO_2 and NO_X react to form sulfuric acid and nitric acid. These pollutants originate from natural sources (such as forest fires and volcanoes), as well as anthropogenic ones (such as the burning of fossil fuels in power plants and motor vehicles, and from agricultural practices). Acid deposition lowers pH in lakes and streams, which harms fish and other aquatic organisms, alters forest soils, degrades the growing conditions for some tree species, and affects other vegetation.

Existing Air Quality

Air quality in a given location is defined by pollutant concentrations in the atmosphere and generally is expressed in units of ppm or µg/m^3. The proposed route traverses McKenzie and Williams counties and representative ambient background levels of pollutants measured in both counties (where possible) from the most recent year of data are shown in **Table 3.1-3**. Data for this table were obtained from the USEPA Air Monitoring Network data archives website. The sites were selected to provide a representative estimate for current background conditions in the Project area.

Table 3.1-3 Ambient Air Quality Background Values

Pollutant	Averaging Period	Ranking[1]	Year	Concentration (ppb)	Monitor/ County	AQS Site ID
NO_2	1-hour	98th Percentile	20011-2013 Average	10.3	Dunn	38-025-0003
		98th Percentile	20011-2013 Average	10	McKenzie	38-053-0002
	Annual	H1H	2013	1.7	Dunn	38-025-0003
		H1H	2013	1.2	McKenzie	38-053-0002
CO	1-hour	H2H	2013	866	Cass[2]	38-017-1004
	8-hour	H2H	2013	400	Cass[2]	38-017-1004

Table 3.1-3 Ambient Air Quality Background Values

Pollutant	Averaging Period	Ranking[1]	Year	Concentration (ppb)	Monitor/ County	AQS Site ID
SO_2	1-hour	99th Percentile	20011-2013 Average	8.7	Dunn	38-025-0003
		99th Percentile	20011-2013 Average	8.6	McKenzie	38-053-0002
	3-hour	H2H	2013	4.4	Dunn	38-025-0003
		H2H	2013	5.9	McKenzie	38-053-0002
	24-hour	H2H	2013	1.8	Dunn	38-025-0003
		H2H	2013	2.5	McKenzie	38-053-0002
	Annual	H1H	2013	0.4	Dunn	38-025-0003
		H1H	2013	0.6	McKenzie	38-053-0002
PM_{10}	24-hour	H2H	2013	74.0[3]	Dunn	38-025-0003
		H2H	2013	19.0[3]	McKenzie	38-053-0002
$PM_{2.5}$	24-hour	98th Percentile	2013	14.6[3]	Dunn	38-025-0003
		98th Percentile	20011-2013 Average	15.3[3]	McKenzie	38-053-0002
	Annual	H1H	2013	4.4[3]	Dunn	38-025-0003
		H1H	2013	3.6[3]	McKenzie	38-053-0002
O_3	8-hour	H2H	2013	60	Dunn	38-025-0003
		H2H	2013	62	McKenzie	38-053-0002

1 H1H represents the highest overall value for the given year. H2H represents the high second high concentration (the second highest value form the highest impact receptor). The 98th and 99th percentile values were averaged over 3 years.

2 CO measured at Cass County monitor, which is the only CO monitor in the State of North Dakota that is still active.

3 All PM_{10} and $PM_{2.5}$ concentrations are expressed in units of µg/m^3.

Source: http://www.epa.gov/airdata/ad_rep_mon.html.

Air Quality Attainment Status

As the data shown in **Table 3.1-3** demonstrates, the area surrounding the Project area is in attainment for all criteria pollutants. Currently, North Dakota is in attainment for all criteria pollutants in all counties. However, if an area is designated as non-attainment, the State of North Dakota is required to develop a State Implementation Plan (SIP) under the CAA Section 176(c)(4)(E), which provides the requirements for SIPs.

3.1.1.4 Non-attainment New Source Review and Conformity for General Federal Actions

While new emissions sources in attainment areas are required to follow PSD regulations, Non-attainment NSR is required for major stationary sources locating or expanding in non-attainment areas. According to Section 176 of the CAA (40 CFR 51.853), a federal agency must make a conformity determination in the approval of a project having air emissions that exceed specified thresholds in non-attainment and/or maintenance areas. This General Conformity Rule ensures that the actions taken by federal agencies in non-attainment and maintenance areas meet national standards for air quality and/or do not cause further degradation to air quality that would not be consistent with the attainment and maintenance of ambient air quality standards. The Project is not located within a non-attainment or maintenance area (identified by the USEPA or the NDDH-AQD); therefore, a general conformity analysis would not be required for evaluating impacts to air quality before implementing the Project.

3.1.1.5 New Source Performance Standards

The regulation of new sources, through the development of standards applicable to a specific category of sources, was a significant step taken by the CAA. NSPS apply to all new, modified, or reconstructed sources within a given category, regardless of geographic location or the existing ambient air quality. The standards defined emission limitations that would be applicable to a particular source group. The NSPS potentially applicable to the Project include the following subparts of 40 CFR Part 60:

- Subpart A – General Provisions
- Subpart Kb – Standards of Performance for Volatile Organic Storage Vessels
- Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- Subpart JJJJ – Standards of Performance for Stationary Spark-Ignition Internal Combustion Engines

3.1.1.6 Maximum Achievable Control Technology

The CAA Amendments of 1990, under revisions to Section 112, required the USEPA to list and promulgate national emission standards for hazardous air pollutants from categories of major and area sources. Under the National Emissions Standards for Hazardous Air Pollutants (NESHAP), the USEPA regulates emissions of toxic air pollutants, listed as HAPs, from a published list of industrial sources referred to as “source categories.” The USEPA has developed a list of source categories in 40 CFR 63 that must meet MACT requirements for these HAPs. The MACT categories that potentially would be applicable to the Project include:

- Subpart A – General Provisions; and
- Subpart EEEE – Organic Liquids Distribution (Non-gasoline).

3.1.1.7 Federal Operating Permits Program

All major stationary sources (primarily industrial facilities and large commercial operations) emitting certain air pollutants are required to obtain Title V operating permits under the Federal Operating Permits Program outlined in 40 CFR 70 of the CAA. Whether a source meets the definition of “major” depends on the type and amount of air pollutants it emits and, to some degree, on the overall air quality in its vicinity. Generally, major sources include those stationary facilities that emit 100 tpy or more of a regulated air pollutant. Regulated pollutants include compounds such as NO_X, CO, SO_2, PM_{10}, $PM_{2.5}$, and VOCs. Facilities that emit lesser amounts of a regulated air pollutant are considered major in areas that do not meet the national air quality standards for a particular pollutant. For example, certain sources releasing 10 to 25 tpy of pollutant emissions are considered major in areas with extreme ozone problems.

The Operating Permit program also covers a variety of other significant operations, including:

- Sources that are subject to requirements under NSPS and NESHAP.
- Sources of toxic air pollutants (i.e., any source that emits more than 10 tpy of an individual toxic air pollutant or more than 25 tpy or any combination of toxic air pollutants).
- Sources required to have pre-construction or new source permits (under NSR or PSD requirements); often very large facilities with a wide variety of process operations and hundreds of emission sources.

3.1.1.8 Hazardous Air Pollutants

HAPs are those pollutants known or suspected to cause cancer or other serious health effects, such as damage to reproduction, birth defects, or adverse environmental impacts. The USEPA has classified 187 air pollutants as HAPs, including formaldehyde; benzene, toluene, ethylbenzene, and xylenes compounds; and normal hexane (n-hexane).

The area surrounding the Project has large sources of HAPs coming from oil and gas operations. These existing sources of HAPs include emission sources such as compressor engines (benzene, ethylbenzene, formaldehyde, toluene, xylenes, and n-hexane) and glycol dehydrators (benzene, toluene, ethylbenzene, H_2S, and xylenes). Neither the State of North Dakota nor USEPA have established AAQS for HAPs; however, the 1990 CAA amendments established a program to regulate emissions of 190 HAPs by developing and promulgating technology-based standards based on the best-performing similar facilities in operation. The NESHAP established by the USEPA are part of the MACT standards. MACT standards are designed to reduce HAP emissions to a maximum achievable degree, taking into consideration the cost of reductions and other factors.

3.1.2 Climate Change

3.1.2.1 Regional Climate

Western North Dakota is considered part of the Great Plains and as such has a variable semi-arid climate characterized by extended periods of drought, high winds, low relative humidity, and a relatively large annual and diurnal temperature range. A climate summary for Williston, North Dakota, is presented in **Table 3.1-4**.

Table 3.1-4 Monthly Climate Summary, Williston, North Dakota

Period of Record : 1981 to 2010													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Avg. Max. Temp. (°F)	21.9	27.5	40.4	57.0	67.7	76.8	84.4	83.8	71.3	56.3	37.9	24.4	54.1
Avg. Min. Temp. (°F)	0.1	6.3	18.2	29.7	40.5	49.7	55.8	53.9	42.1	29.8	16.4	3.3	28.8
Avg. Total Precipitation (inches)	0.59	0.39	1.74	1.00	1.92	2.52	2.00	3.54	1.06	0.92	0.65	0.62	16.95
Avg. Total Snow Fall (inches)	10.0	5.7	6.2	3.7	1.3	0.0	0.0	0.0	0.2	2.6	6.1	9.5	45.3
Accumulated Annual. Snow Depth (inches)	10.0	15.7	21.9	25.6	26.9	26.9	26.9	26.9	27.1	29.7	35.8	45.3	45.3

Source: National Climatic Data Center.

State-wide average annual precipitation ranges from about 14 inches over much of the western portion of the state to more than 22 inches in the east. At the reporting station in Williston, North Dakota, precipitation during the warmest 6 months of the year, May through October, adds up to about 70 percent of the annual total in the Project area.

Winter precipitation is caused mainly by frontal activity associated with the general movement of Pacific Ocean storms across the country from west to east and pressure systems forming off the eastern slopes of the Canadian Rockies. As these storms move inland, much of the moisture is precipitated over the coastal and inland mountains ranges of California, Nevada, and Arizona. Much of the remaining moisture falls on the western slope of the Continental Divide and over northern high mountain ranges. Western North Dakota receives slightly more than 0.5 inch of precipitation each month during the period November through April.

3.1.2.2 Climate Change

As discussed and summarized in the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota (URS 2010), earth has a natural greenhouse effect wherein naturally occurring GHGs such as water vapor, CO_2, methane (CH_4), and nitrous oxide (N_2O) absorb and retain heat. Without this natural greenhouse effect, earth would be approximately 60°F cooler (URS 2010). Current ongoing global climate change is believed by scientists to be linked to the atmospheric buildup of GHGs, which may persist for decades or even centuries. Each GHG has an individual global warming potential that accounts for the intensity of the GHG's heat-trapping effect and its longevity in the atmosphere (URS 2010). The buildup of GHGs such as CO_2, CH_4, and N_2O since the start of the industrial revolution has substantially increased atmospheric concentrations of these compounds compared to background levels. At such elevated concentrations, these compounds absorb more energy from the earth's surface and re-emit a larger portion of the earth's heat back to the earth rather than allowing the heat to escape into space than would be the case under more natural conditions of background GHG concentrations.

Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) GHG emissions and changes in biological carbon sequestration due to land management activities on a global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by impeding the rate of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide equivalent (CO_2e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that warming of the climate system is unequivocal and most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations (IPCC 2007). Warming has occurred on land surfaces, oceans, and other water bodies, and in the troposphere (lowest layer of earth's atmosphere, up to 4 to 12 miles above the earth). Other indications of global climate change described by IPCC include:

- Rates of surface warming increased in the mid-1970s and the global land surface has been warming at about double the rate of ocean surface warming since then;
- Eleven of the last 12 years rank among the 12 warmest years on record since 1850; and
- Lower-tropospheric temperatures have slightly greater warming rates than the earth's surface from 1958 to 2005.

Global mean surface temperatures increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC projected that by the year 2100, global average surface temperatures could increase anywhere from 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences (2010) agrees with these findings, but also has indicated that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature would not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures have been observed to increase in the region during the last few decades, while there are no strong indications of increases in daily maximum temperatures. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

As with any field of scientific study, there are uncertainties associated with the science of climate change; however, this does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty because they are based on well-known physical laws and documented trends (USEPA 2011).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO_2 and CH_4) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo) of the earth-atmosphere system. It is important to note that GHGs would have a sustained climatic impact over different temporal scales. For example, recent emissions of CO_2 proper may influence climate for anywhere from 50 to 200 years.

It may be difficult to discern whether climate change already is affecting resources globally, let alone those in the Project vicinity. In most cases, there is little information about potential or projected effects of global climate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be discernible within the reasonably foreseeable future. Existing climate prediction models are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts of the climate change on the Project area and vicinity.

GHG is now regulated by the USEPA like other criteria pollutants. The permitting is being implemented through a phased process known as the Tailoring Rule. On May 13, 2010, the USEPA issued the Tailoring Rule, which establishes an approach to addressing GHG emissions from stationary sources under the CAA permitting programs. This final rule set the thresholds for Steps 1 and 2 of a phase-in approach to regulating GHG emissions under the PSD and Title V Operating Permit programs.

Under Step 1 of the Tailoring Rule, PSD requirements applied to sources' GHG emissions if the sources were subject to PSD anyway due to their non-GHG regulated air pollutants ("anyway" sources) and emit or have the potential to emit at least 75,000 tpy CO_2e. For Title V, existing sources with, or new sources obtaining, Title V permits are required to address GHG emissions in those permits as necessary.

Under Step 2, PSD applies to the largest GHG-permitting sources that are not "anyway" sources and that are either new sources that emit or have the potential to emit at least 100,000 tpy CO_2e, or existing sources that emit at that level and that undertake modifications that increase emissions by at least 75,000 tpy CO_2e and also emit at least 100/250 tpy of GHGs on a mass basis. In addition under Step 2, Title V applies to existing sources that are not "anyway" sources and that emit or have the potential to emit 100,000 tpy CO_2e. USEPA's Step 3 of the GHG Tailoring Rule, issued on June 29, 2012, continues to focus GHG permitting on the largest emitters by retaining the permitting thresholds that were established in Steps 1 and 2. Furthermore, the Step 3 rule improves the usefulness of plantwide applicability limitations (PALs) by allowing GHG PALs to be established on CO_2e emissions in addition to the already available mass emissions PALs, and to use the CO_2e-based applicability thresholds for GHGs provided in the "subject to regulation" definition in setting the PAL on a CO_2e basis. The rule also revises the PAL regulations to allow a source that emits or has the potential to emit at least 100,000 tpy of CO_2e, but that has minor source emissions of all other regulated NSR pollutants, to apply for a GHG PAL while still maintaining its minor source status.

State and local permitting authorities are responsible for the GHG permitting implementation. It is unlikely that the Project or alternatives would require GHG permitting.

3.2 Geology and Minerals

3.2.1 Geology

The Project area is located in the Great Plains physiographic province (Fenneman 1928). In western North Dakota, the Great Plains is divided into two major sections, the Glaciated Missouri Plateau and the Unglaciated Missouri Plateau (**Figure 3.2-1**). The Missouri Plateau is a dissected plateau characterized by badlands, buttes and mesas, and exhumed mountain ranges such as the Black Hills. The glaciated area generally is of low relief as compared to the unglaciated area, which has more variety of landforms (Trimble 1980). The Glaciated Missouri Plateau is covered by glacial deposits, but the boundary between the glaciated and non-glaciated sections is not distinct because the glacial deposits thin gradually.

The proposed route is located in the Glaciated Missouri Plateau and elevations range from less than 2,000 feet above mean sea level (amsl) at the Missouri River crossing to 2,400 feet amsl in the upland areas in eastern McKenzie County.

The bedrock geology consists of the Bullion Creek, Sentinel Butte Formations of the Paleocene Fort Union Group, and the Eocene Golden Valley Formation. These formations are largely composed of claystone, siltstone, sandstone, and lignite. There are very few exposures of bedrock along the proposed route north of Keene, North Dakota, in eastern McKenzie County. North of Watford City, North Dakota, the bedrock is mostly covered by glacially derived surficial deposits (Carlson 1985, 1983; Freers 1970). Glacial materials consist of till, lake deposits, and terraces and are composed of gravel, sand, and clay.

The Project area is located in the Williston Basin, a major structural basin that covers northeastern Montana, most of North Dakota, and northwestern South Dakota (**Figure 3.2-2**) (Peterson and McCary 1987). The Williston Basin also extends north into Alberta, Saskatchewan, and Manitoba in southern Canada. The basin contains about 15,000 feet of Paleozoic through Tertiary sedimentary rock. The center of the basin is located in McKenzie County. The major structural feature in the Project vicinity is the Nesson Anticline, a north-south trending structure in eastern Williams and McKenzie counties (**Figure 3.2-3**) (Gerhard et al. 1987). North-south trending fault zones paralleling the Nesson Anticline have been mapped in the deeper bedrock in Williams County, but do not extend up to the surface.

3.2.2 Mineral Resources

The major mineral resources in the Project area include oil, natural gas, and lignite (**Figure 3.2-3**) (Freers 1970). The important non-fuel mineral resources are sand and gravel, clay, and scoria.

3.2.2.1 Oil and Natural Gas

The Williston Basin is a major oil and gas producing basin. Production in the basin began in 1951 and, by the end of 2012, annual production was approximately 3.8 billion barrels of oil and over 470 billion cubic feet of gas (U.S. Energy Information Administration 2014; NDIC 2014; South Dakota Oil and Gas Section 2014). The first commercial oil well in North Dakota was drilled in Williams County on the Nesson Anticline in 1951, about 7.0 miles south of Tioga (Freers 1970). The oil production decline in the 1990s has been offset in recent years by technological advances, which have allowed for increased production from the Bakken Formation that has an estimated mean technically recoverable resource of 7.4 billion barrels of oil and 6.7 trillion cubic feet of associated/dissolved natural gas, and 0.53 billion barrels of natural gas liquids (U.S. Geological Survey [USGS] 2013). The proposed route in McKenzie and Williams counties generally parallels the axis of the Nesson Anticline where numerous oil and gas fields have been developed and is the epicenter of the current Bakken Play in North Dakota. Bakken production in 2012 accounted for approximately 24 percent of total cumulative oil production in North Dakota (NDIC 2014). **Table 3.2-1** lists wells that are within 200 feet of the proposed route.

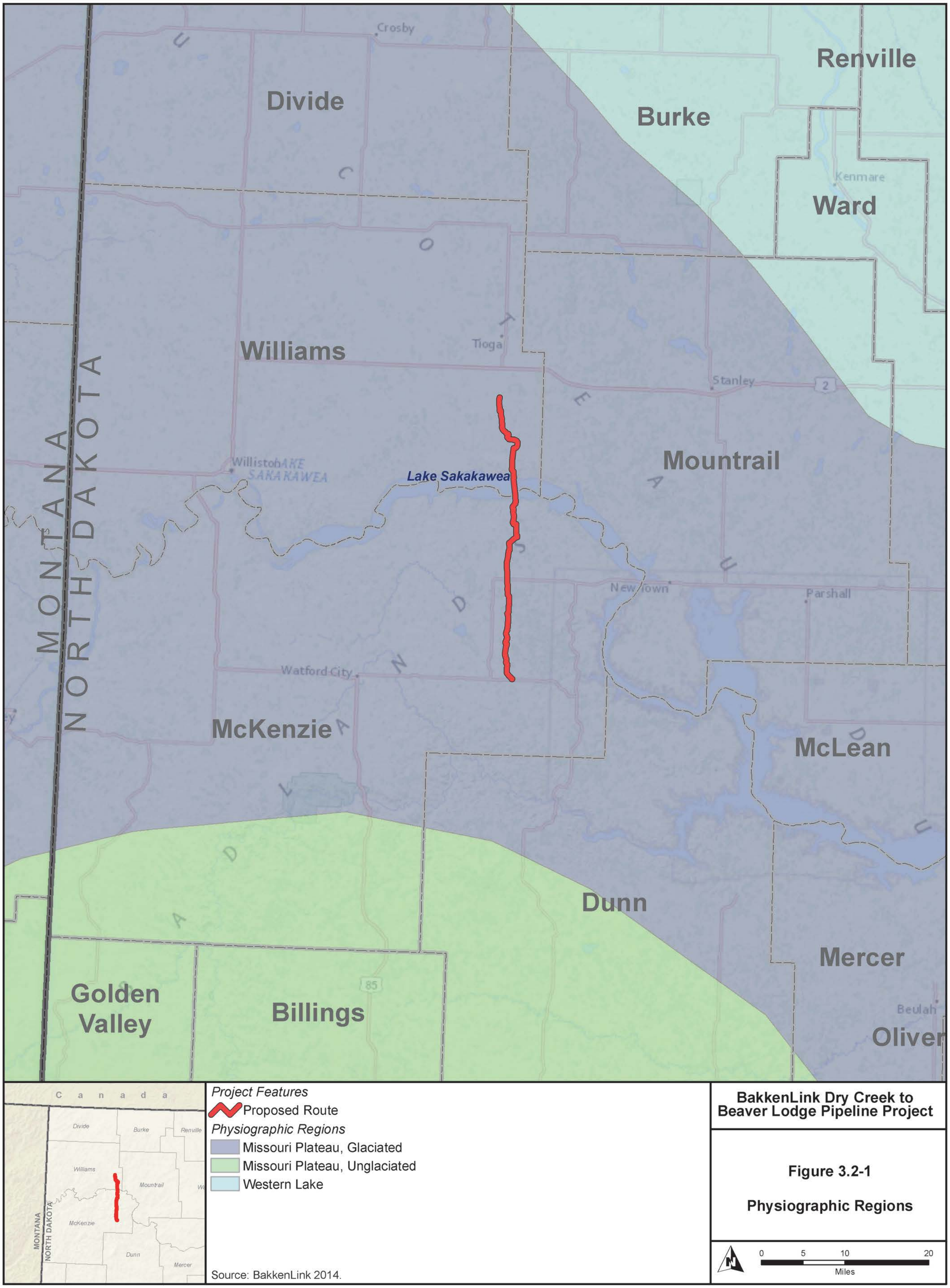
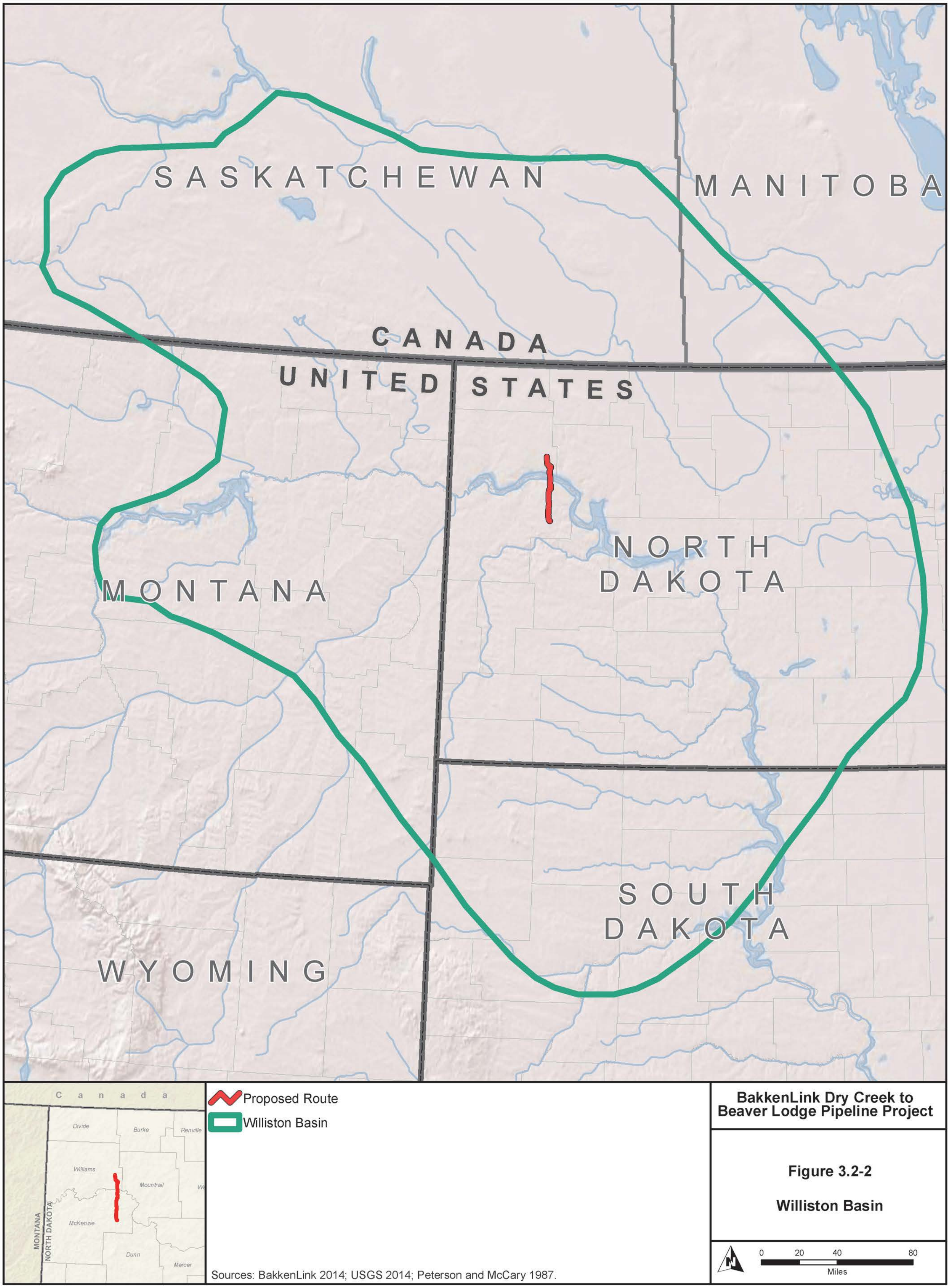


Figure 3.2-1

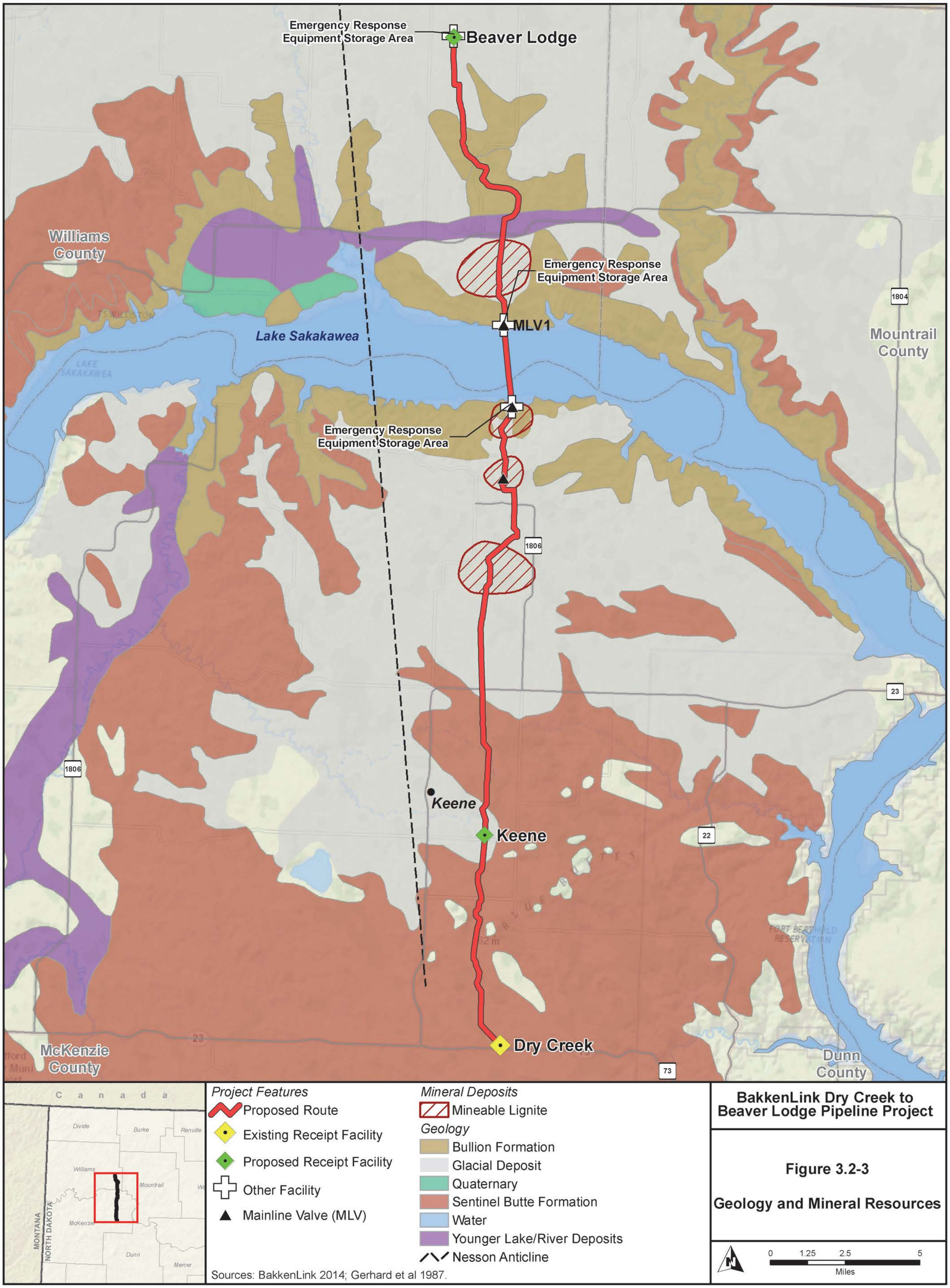
Physiographic Regions



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.2-2

Williston Basin



Emergency Response Equipment Storage Area
Beaver Lodge
Williams County
Emergency Response Equipment Storage Area
MLV1
Lake Sakakawea
Mountrail County
Emergency Response Equipment Storage Area
1804
1806
23
1806
Keene
Keene
22
Dry Creek
73
McKenzie County
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Mineral Deposits
Mineable Lignite
Geology
Bullion Formation
Glacial Deposit
Quaternary
Sentinel Butte Formation
Water
Younger Lake/River Deposits
Nesson Anticline
Sources: BakkenLink 2014; Gerhard et al 1987.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.2-3
Geology and Mineral Resources
0 1.25 2.5 5
Miles

Table 3.2-1 Oil and Gas Wells Within 200 Feet of Proposed Route

MP	Direction and Distance from Centerline (feet)	API Number	Operator	Well Name	Well Type[1]	Status[2]
5.3	East, 167	33-053-01468-00-00	Texaco Inc.	Everett Feldman NCT-1	OG	DRY
13.5	East, 10	33-053-00826-00-00	Terra Energy Corp.	Matheisen 31-13	SWD	PA
18.5	South, 190	33-053-00313-00-00	Petro-Hunt, L.L.C	CMSU D-222	OG	PA
21.9	West, 155	33-053-00165-00-00	Texaco Exploration & Production Inc.	Charlson-Madison North Unit D-404	OG	PA
23.1	East, 176	33-053-00020-00-00	Texaco Exploration & Production Inc.	Charlson-Madison North Unit D-134	OG	PA
23.2	West, 14	33-053-01061-00-00	Petro-Hunt, L.L.C.	CMNU C134X	OG	PA
23.3	East, 153	33-053-02369-00-00	Amerada Hess Corporation	Sandy Creek 27-14-H	OG	PA
23.4	East, 109	33-053-00065-00-00	Texaco Exploration & Production Inc.	Charlson-Madison North Unit A-134	OG	PA
26.9	West, 102	33-105-00499-00-00	SM Energy Company	Hofflund 15	OG	PA
27.4	East, 198	33-105-00493-00-00	Flying J Exploration & Production, Inc.	Hofflund-Madison Unit 11	OG	PA
28.4	East, 157	33-105-00476-00-00	SM Energy Company	Hofflund 4	OG	PA
31.5	East, 198	33-105-00582-00-00	Koch Industries, Inc.	Capa-Madison Unit R-209	WI	DRY
33.2	West, 183	33-105-00444-00-00	Hess Corporation	Capa Madison Unit N-213	OG	PA
36.0	East, 15	33-105-00208-00-00	Amerada Hess Corporation	Beaver Lodge-Madison Unit N-9	OG	PA

[1] SWD – Salt Water Disposal Well; WI – Water Injection; OG – Oil or Gas Well.

[2] A – Active; PA – Plugged and Abandoned; Dry – Dry Hole.

Source: NDIC 2014.

3.2.2.2 Lignite

The Project area is located in the Fort Union Coal region (Averitt 1972). The lignite coal in the Project area is found in the Sentinel Butte Formation of the Fort Union Group. The proposed route crosses areas that may contain economically minable coals (**Figure 3.2-3**) (Murphy 2008a,b, 2007, 2006, 2005). **Table 3.2-2** summarizes the locations where the proposed route crosses potentially minable coal deposits.

Table 3.2-2 Mineable Coal Resources Crossed by the Proposed Route

Approximate MP	General Location (Section-Township-Range)	County
2.2 – 4.3	36, T151N, R96W; 1, T150N, R96W	McKenzie
10.5 – 14.6	12, 13, 24, 25, T152N, R96N	McKenzie
15.8 – 22.7	4, 16, 28, 33, T153N, R95W	McKenzie
27.1 – 28.1	9, T154N, R95W	Williams

Sources: Murphy 2008a,b, 2007, 2006, 2005.

3.2.2.3 Aggregate

Aggregate (sand and gravel) production is from localized deposits in floodplains or glacial deposits (Carlson 1985, 1983; Freers 1970). Some areas in McKenzie County also have scoria deposits that are used for road topping. Scoria is formed from the in-situ burning of coal seams that result in baked rock. An existing inactive scoria pit is located immediately adjacent to the proposed route at approximately MP 30.

3.2.3 Geological Hazards

3.2.3.1 Seismic Hazards

There are three major phenomena associated with seismic hazards: faults, seismicity, and ground motion. The following describes the potential for seismic hazard occurrence in the Project area.

Faults are dislocations whereby blocks of earth material on opposite sides of the faults have moved in relation to one another. Rapid slippage of blocks of earth past each other can cause energy to be released, resulting in an earthquake. As described in Section 3.2.1, there is evidence of fault offset in older strata underlying the surficial cover, but no evidence that would lead to a conclusion of movement on the faults in the last 10,000 years. No active faults have been identified in the Project area (Crone and Wheeler 2000). An active fault is one in which movement can be demonstrated to have taken place within the last 10,000 years (USGS 2009).

Seismicity includes the intensity, frequency, and location of earthquakes in a given area. From 1990 to 2006, almost no seismic events were recorded in North Dakota (USGS 2006).

Ground motion hazards result when the energy from an earthquake is propagated through the ground. The USGS ground motion hazard mapping indicates that potential ground motion hazard in the Project area is low. The hazard map used estimates peak ground acceleration expressed as a percentage of the acceleration of gravity with a 2 percent probability of exceedance in 50 years (Peterson et al. 2008).

3.2.3.2 Landslides

Landslide is a term used for various processes involving the movement of earth material down slopes (USGS 2004a). Landslides can occur in a number of different ways in different geological settings. Large masses of earth become unstable and, by gravity, begin to move downhill. The instability can be caused by a combination of steep slopes, periods of high precipitation, undermining of support by natural processes (stream erosion), or unintentional undercutting or undermining the strength of unstable materials in the construction of roads and structures.

Along the proposed route, there are landslide-prone areas on either side of the Lake Sakakawea crossing (POD, Appendix XXII) (Murphy 2004a,b, 2003) (**Figure 3.2-4**). In the case of the Lake Sakakawea approaches, deeply incised glacial sediment has created badland topography and, combined with the steeper slopes, has created areas of instability. Additionally, bentonite layers that may be exposed also contribute to instability, especially during periods of high precipitation.

3.2.3.3 Subsidence

The major cause of concern regarding subsidence is historical mining of lignite. Lignite has been mined in the Project vicinity for many years and, before modern surface mining methods were employed that involve stripping off the overburden, backfilling, and reclamation, lignite was mined by room-and-pillar underground methods. Because the overburden was thin (often less than 50 feet), underground voids would collapse to the surface creating sinkhole-type subsidence, fissures, and unstable ground conditions. Two abandoned lignite mines are present in the Project vicinity and are listed on **Table 3.2-3** (North Dakota Abandoned Mine Land Reclamation Division 2005).

Table 3.2-3 Abandoned Underground Lignite Mines in the Project Vicinity

Mine	County	Location	Dates of Operation	Nearest MP and Distance from Proposed ROW
Edwardson	McKenzie	Section 23, T152N, R96W	1937 to 1944	MP 12, 0.7 mile west
Franson	Williams	SW Section 9, T155N, R95W	Active in 1923, duration of operation not known.	MP 35, 1 mile east

Source: North Dakota Abandoned Mine Land Reclamation Division 2005.

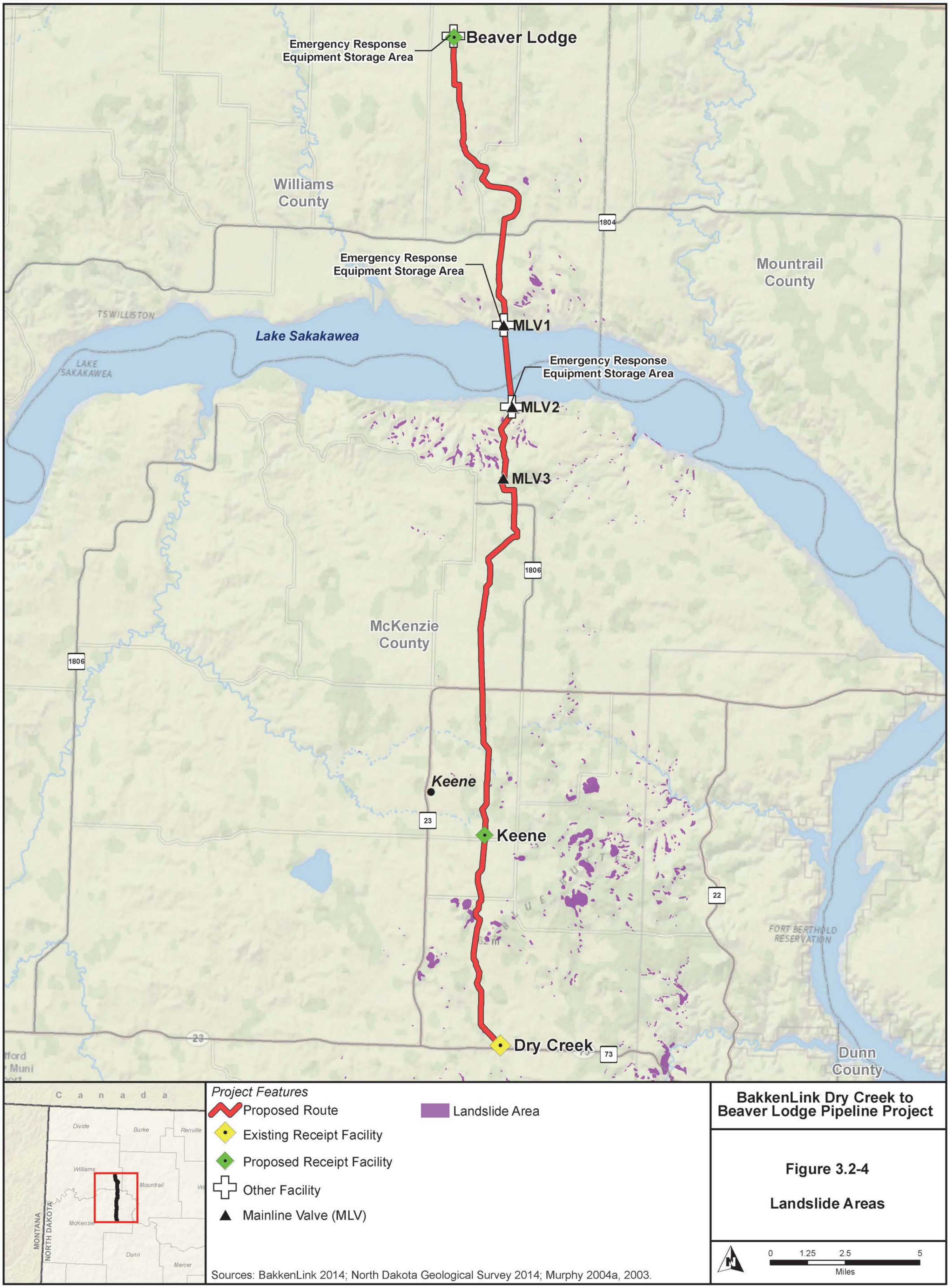


Figure 3.2-4

Landslide Areas

3.3 Paleontological Resources

3.3.1 Regulatory Structure

The Paleontological Resources Preservation Act (PRPA) became law in 2009 with the passage of Public Law 111-011 (BLM 2014). The PRPA included specific provisions addressing management of these resources by the BLM, NPS, Bureau of Reclamation (BOR), USFWS, and USFS. It affirmed the authority for many policies that those agencies already had in place for the management of paleontological resources, such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locality data. The PRPA only applies to federal lands and does not affect private lands. It provides authority for the protection of paleontological resources on federal lands including criminal and civil penalties for fossil theft and vandalism. Consistent with policy up to its passage, the PRPA also includes provisions allowing for casual or hobby collecting of common invertebrate and plant fossils without a permit on federal lands managed by the BLM, BOR, and USFS, under certain conditions. Casual collecting is not allowed within national parks or other lands managed by the NPS. The PRPA directed federal agencies to begin developing regulations, establishing public awareness and education programs, and inventorying and monitoring federal lands.

The BLM also manages paleontological resources (fossils) on federal lands under the following statutes and regulations (BLM 2014):

- Federal Land Policy and Management Act of 1976 (FLPMA) (Public Law 94-579);
- NEPA (Public Law 91-190); and
- Various sections of BLM's regulations found in Title 43 CFR that address the collection of invertebrate fossils and, by administrative extension, fossil plants.

In addition to the statutes and regulations listed above, fossils on public lands are managed through the use of internal BLM guidance and manuals. These include the BLM Manual 8270 and the BLM Handbook H-8270-1 (BLM 2014). Various internal instructional memoranda have been issued to provide guidance to the BLM in implementing management and protection of fossil resources.

North Dakota has two laws (passed in 1989) that deal with the management of paleontological resources (North Dakota Geological Survey [NDGS] 2007). The North Dakota Paleontological Resource Protection Act (Section 54-17.3, NDCC), gives the NDIC, acting through the office of the State Geologist, the responsibility to protect paleontological resources located on state land. The second law gives the NDGS authority to operate and maintain a public repository for North Dakota fossils. In addition, the State of North Dakota has entered into Memoranda of Understanding with the BLM and USFS for cooperative management of paleontological resources within the state.

3.3.2 Potential Fossil Yield Classification System

Recently, the BLM has adopted the Potential Fossil Yield Classification (PFYC) system to identify and classify fossil resources on federal lands (BLM 2014). Paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

The PFYC system is a way of classifying geologic units based on the relative abundance of vertebrate fossils or scientifically significant fossils (plants and invertebrates) and their sensitivity to adverse impacts. A higher class number indicates higher potential. The PFYC is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities occasionally may occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions. The BLM intends for the PFYC system to be used as a guideline as opposed to rigorous definitions. Descriptions of the potential fossil yield classes are summarized in **Table 3.3-1**.

Table 3.3-1 Potential Fossil Yield Classification

Class	Description	Basis	Comments
1	Igneous and metamorphic (tuffs are excluded from this category) geologic units or units representing heavily disturbed preservation environments that are not likely to contain recognizable fossil remains.	Fossils of any kind known not to occur except in the rarest of circumstances. Igneous or metamorphic origin. Landslides and glacial deposits.	The land manager's concern for paleontological resources on Class 1 acres is negligible. Ground disturbing activities would not require mitigation except in rare circumstances.
2	Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically important invertebrate fossils.	Vertebrate fossils known to occur very rarely or not at all. Age greater than Devonian. Age younger than 10,000 years before present. Deep marine origin. Aeolian origin. Diagenetic alteration.	The land manager's concern for paleontological resources on Class 2 acres is low. Ground disturbing activities are not likely to require mitigation.
3	Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence. Also sedimentary units of unknown fossil potential.	Units with sporadic known occurrences of vertebrate fossils. Vertebrate fossils and significant invertebrate fossils known to occur inconsistently; predictability known to be low. Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.	The land manager's concern for paleontological resources on Class 3 acres may extend across the entire range of management. Ground disturbing activities would require sufficient mitigation to determine whether significant paleontological resources occur in the area of a proposed action. Mitigation beyond initial findings would range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.

Table 3.3-1 Potential Fossil Yield Classification

Class	Description	Basis	Comments
4	Class 4 geologic units are Class 5 units (see below) that have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation.	Significant soil/vegetative cover; outcrop is not likely to be impacted. Areas of any exposed outcrop are smaller than 2 contiguous acres. Outcrop forms cliffs of sufficient height and slope that most is out of reach by normal means. Other characteristics that lower the vulnerability of both known and unidentified fossil localities.	The land manager's concern for paleontological resources on Class 4 areas is toward management and away from unregulated access. Proposed ground disturbing activities would require assessment to determine whether significant paleontological resources occur in the area of a proposed action and whether the action would impact the paleontological resources. Mitigation beyond initial findings would range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.
5	Highly fossiliferous geologic units that regularly and predictably produce invertebrate fossils and/or scientifically significant invertebrate fossils, and that are at risk of natural degradation and/or human-caused adverse impacts.	Vertebrate fossils and/or scientifically significant invertebrate fossils are known and documented to occur consistently, predictably, and/or abundantly. Unit is exposed; little or no soil/vegetative cover. Outcrop areas are extensive; discontinuous areas are larger than 2 contiguous acres. Outcrop erodes readily; may form badlands. Easy access to extensive outcrop in remote areas. Other characteristics that increase the sensitivity of both known and unidentified fossil localities.	The land manager's highest concern for paleontological resources should focus on Class 5 areas. Mitigation of ground disturbing activities is required and may be intense. Areas of special interest and concern should be designated and intensely managed.

Source: BLM 2008.

3.3.3 Fossil Resources in the Project Area

The geology of the northern half of the Project area is largely comprised of glacial deposits overlying the Tongue River/Bullion Creek Formation; whereas, the southern half of the Project area consists largely of Pre-Wisconsonian glacial and Wisconsonian periglacial deposits overlying the Sentinel Butte Formation (Arcadis 2014a). The Tongue River/Bullion Creek and Sentinel Butte formations are fossiliferous and, where they are well exposed in the badlands west of the Project area, numerous fossil localities have been identified (Hoganson 1997; Hoganson and Campbell 1997). Fossils common to both formations include invertebrates (freshwater mollusks), plants (petrified wood), and vertebrates (reptiles and mammals).

The proposed route traverses areas where the Tongue River/Bullion Creek and Sentinel Butte formations are the primary bedrock strata. These formations provide some of the best Paleocene geological and paleontological records in North Dakota (Arcadis 2014a). Due to the high potential of these formations to consistently and predictably produce paleontologically significant vertebrate fossils or scientifically significant invertebrate and plant fossils that are at risk of human-caused adverse impacts or natural degradation, the BLM has ranked these Paleocene formations as Class 4 (PFYC) formations (Arcadis 2014a).

In July and August 2014, a paleontological assessment was conducted along the proposed route. The assessment was conducted in three phases. Phase I included a desktop review of readily obtainable published geological and paleontological literature and a review of agency and institutional records for known paleontological resources within expected bedrock formations. Phase II utilized aerial photography to identify potential outcrops of bedrock formations with moderate to high potential to yield scientifically significant paleontological resources. Phase III involved pedestrian survey of the bedrock outcrops identified in Phase II. Selection of potential bedrock outcrops for survey was limited to state and federal lands. The pedestrian survey was conducted within a 200-foot-wide corridor centered on the proposed pipeline centerline. No new scientifically significant paleontological resources were discovered during the survey of exposed bedrock outcrop areas (Arcadis 2014b).

3.4 Soils

Information on Major Land Resource Areas and soil characteristics was obtained from U.S. Department of Agriculture (USDA) NRCS literature or databases, including the Land Resource Regions and Major Land Resource Areas (MLRAs) of the U.S., the Caribbean, and the Pacific Basin, USDA Handbook 296 (USDA 2006) and the Soil Survey Geographic Database (SSURGO). Soil baseline characterization for the Project area is based on SSURGO database review and analyses. SSURGO is the most detailed level of soil mapping completed by the NRCS. The SSURGO databases for Williams and McKenzie counties, North Dakota (NRCS 2014), are the source for the soils data in this section. **Tables 3.4-1** and **3.4-2** provide a summary of the soil characteristics within the Project area generated from the SSURGO data. The various soil map units within the Project area were combined into generalized groups of soils to evaluate potential impacts and to determine effective erosion control measures, reclamation, and revegetation potential in the area.

Table 3.4-1 Summary of Soil Characteristics Along the Proposed Route (Miles Crossed)

	Droughty	Prime Farmland	Farmland of Statewide Importance	Hydric	Wind Erodible	Water Erodible	Shallow Depth to Bedrock	Compaction Prone
Proposed Route	0.9	0.2	8.0	0.5	0.3	1.9	7.6	0.5

Source: NRCS 2014.

Table 3.4-2 Soil Characteristics at Proposed Receipt Facilities, Emergency Response Equipment Storage Areas, MLV Sites, Pipe Storage Yards, and Access Roads

Facilities	Droughty	Compaction Prone	Farmland of Statewide Importance	Hydric	Wind Erodible	Water Erodible	Shallow Depth to Bedrock
Receipt Facilities							
Keene	X		X		X		X
Beaver Lodge	X	X	X	X			
Emergency Response Equipment Storage Areas							
Lake Sakakawea – North Shore	-	-	-	-	-	-	-
Lake Sakakawea – South Shore	X	-	-	-	-	-	X
MLV Sites							
MLV 1	-	-	-	-	-	-	-
MLV 2	X	-	-	-	-	-	X
MLV 3	X	X	-	X	-	X	X
Pipe Storage Yards							
Moe	X	-	-	-	X	-	X
Access Roads							
36th Street	X	X	-	X	X	X	X
37th Street	X	X	X	X	-	X	X
MOE 3	X	-	-	-	X	-	X
41st Street	X	X	X	X	-	-	X

Table 3.4-2 Soil Characteristics at Proposed Receipt Facilities, Emergency Response Equipment Storage Areas, MLV Sites, Pipe Storage Yards, and Access Roads

Facilities	Droughty	Compaction Prone	Farmland of Statewide Importance	Hydric	Wind Erodible	Water Erodible	Shallow Depth to Bedrock
53rd Street	-	X	-	X	-	-	-
OIL PAD ROAD	X	X	-	X	-	-	X

Source: NRCS 2014.

The Project area is located within the following 2 MLRAs of soil resources (USDA 2006):

- MLRA 54 – Rolling Soft Shale Plain; and
- MLRA 53B – Central Dark Brown Glaciated Plains.

MLRA 54 is predominantly unglaciated, but the eastern and northern edges have been glaciated. The area is located on an old, moderately dissected, rolling plain with some local badlands, buttes, and isolated hills. Terraces are adjacent to broad floodplains along most of the major drainages. Elevation ranges from 1,650 feet amsl in the east with a gradual slope to about 3,600 feet amsl in the west. The soils generally formed in residuum and alluvium from sedimentary parent materials. They are shallow to very deep, generally somewhat excessively drained to moderately well drained, and loamy or clayey. The dominant soil orders in this MLRA are Mollisols and Entisols. Mollisols are fertile soils with high organic matter and a nutrient-enriched, thick surface. In contrast, Entisols are considered recent soils that lack soil development because erosion or deposition rates occur faster than the rate of soil development.

The nearly level to rolling till plains in MLRA 53B include kettle holes, kames, moraines, and small glacial lakes. Moderately steep and steep slopes are adjacent to the major stream valleys. Elevation ranges from 1,640 to 1,970 feet amsl increasing gradually from southeast to northwest. Almost all of this MLRA is covered by glacial till plains. Some glaciolacustrine deposits also occur. Alluvial deposits are extensive along the Missouri River but occur in narrow and discontinuous strips along other streams and rivers. Low terraces occur along the major rivers. The dominant soil order in this MLRA is Mollisols. The soils generally are very deep, well drained to very poorly drained, and clayey or loamy.

Soil characteristics such as susceptibility to erosion and the potential for revegetation are important to consider when planning for construction activities and stabilization of disturbed areas. These hazards or limitations for use are a function of many physical and chemical characteristics of each soil, in combination with the climate and vegetation. **Tables 3.4-1** and **3.4-2** summarize important soil characteristics to be considered when evaluating the effects of surface-disturbing activities.

Water erosion is the detachment and movement of soil by water. Natural erosion rates depend on inherent soil properties, slope, soil cover, and climate. Approximately 5 percent of the soils crossed by the proposed route are highly erodible to water. Water erodible soils are illustrated in **Figure 3.4-1**. Wind erosion is the physical wearing of the earth's surface by wind. Wind erosion removes and redistributes soil. Small blowout areas may be associated with adjacent areas of deposition at the base of plants or behind obstacles, such as rocks, shrubs, fence rows, and roadbanks (Soil Quality Institute 2001). Wind erodible soils comprise approximately 1 percent of the soils crossed by the proposed route. The occurrence of wind erodible soils is illustrated in **Figure 3.4-2**. Highly erodible soils typically require aggressive erosion control measures to minimize soil loss and offsite deposition if they are disturbed.

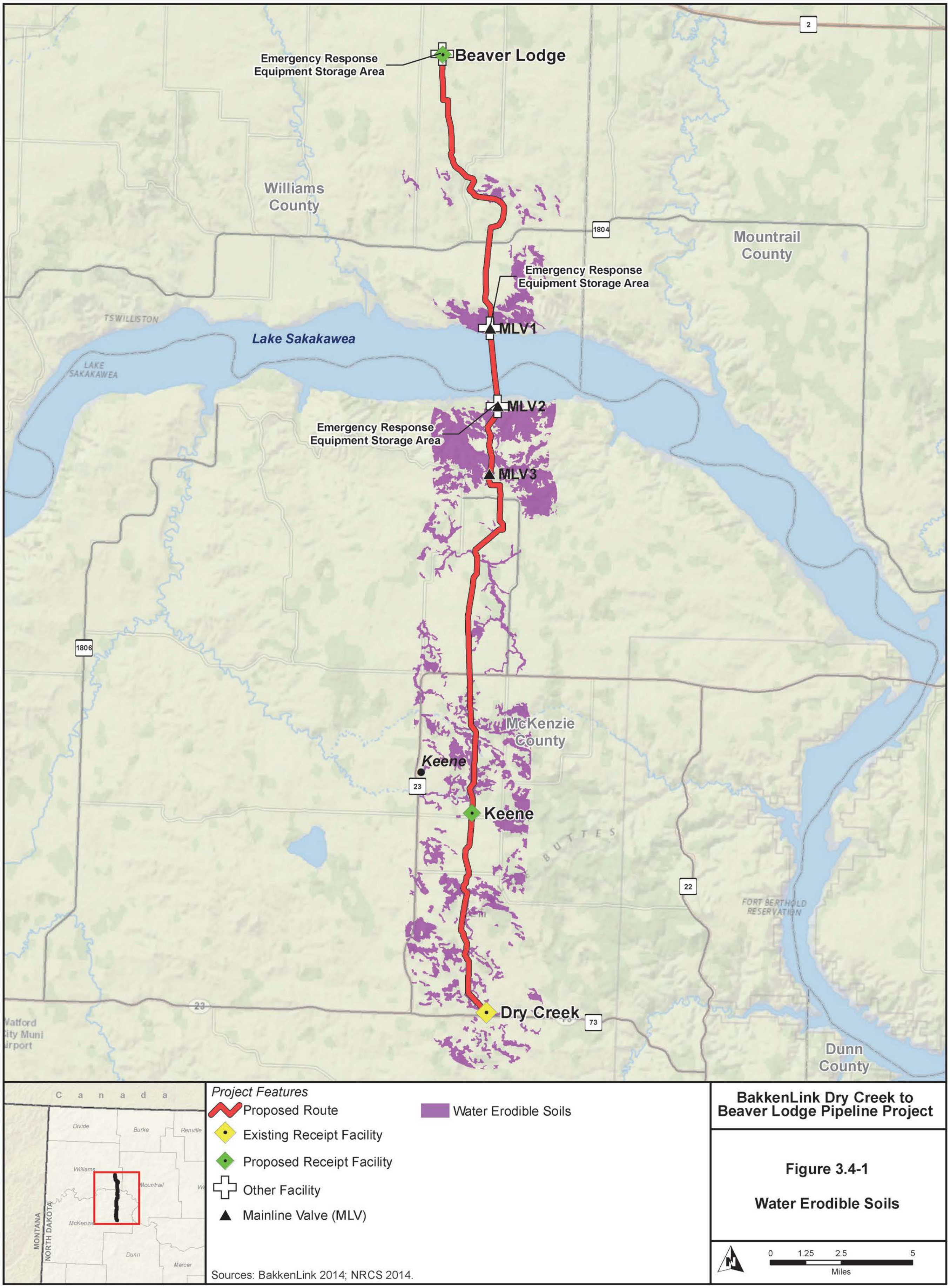
Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops and is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. These soils have the capability to be prime farmland, even if they have not yet been developed for agricultural uses. Farmland of statewide importance is land other than prime farmland that has a good combination of physical and chemical characteristics for the production of crops. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. The Farmland Protection Policy Act states that federal programs that contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses would be minimized and shall be administered in a manner that, as practicable, are compatible with state and local government and private programs and policies to protect farmland. Less than 1 percent of soils crossed by the proposed route are prime farmland and 22 percent of soils crossed are farmland of statewide importance. The occurrence of prime farmland and farmland of statewide importance is illustrated on **Figure 3.4-3**.

Soil compaction occurs when soil particles are pressed together and the pore spaces between them are reduced and bulk density is increased. Moist, fine-textured soils are most susceptible to severe compaction. One percent of the soils crossed by the proposed route are compaction prone. The occurrence of compaction prone soils is illustrated on **Figure 3.4-4**.

Soils that are droughty have physical characteristics that may limit plant growth due to low water holding capacity. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical characteristics of the soils. Approximately 2 percent of the soils crossed by the proposed route are considered droughty. The occurrence of droughty soils is illustrated on **Figure 3.4-5**.

Hydric soils are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. These soils are commonly associated with floodplains, lake plains, basin plains, riparian areas, wetlands, springs, and seeps. One percent of the soils crossed by the proposed route have at least one component of the map unit that is hydric. Smaller areas of hydric soils may exist but may not be captured due to the scale of mapping. The occurrence of hydric soils is illustrated on **Figure 3.4-6**.

Soils with a shallow depth to bedrock include soils that have lithic (hard) bedrock less than 60 inches from the soil surface. This can be an important consideration for trenching. Approximately 20 percent of the soils crossed by the proposed route have a shallow depth to bedrock. The occurrence of soils with a shallow depth to bedrock is illustrated on **Figure 3.4-7**.


Beaver Lodge
Emergency Response Equipment Storage Area
2
Williams County
1804
Mountrail County
Emergency Response Equipment Storage Area
TSWILLISTON
MLV1
Lake Sakakawea
LAKE SAKAKAWEA
MLV2
Emergency Response Equipment Storage Area
MLV3
1806
McKenzie County
Keene
23
Keene
BUTTES
22
FORT BERTHOLD RESERVATION
23
Dry Creek
73
Watford City Muni Airport
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Water Erodible Soils
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Sources: BakkenLink 2014; NRCS 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.4-1
Water Erodible Soils
0 1.25 2.5 5
Miles

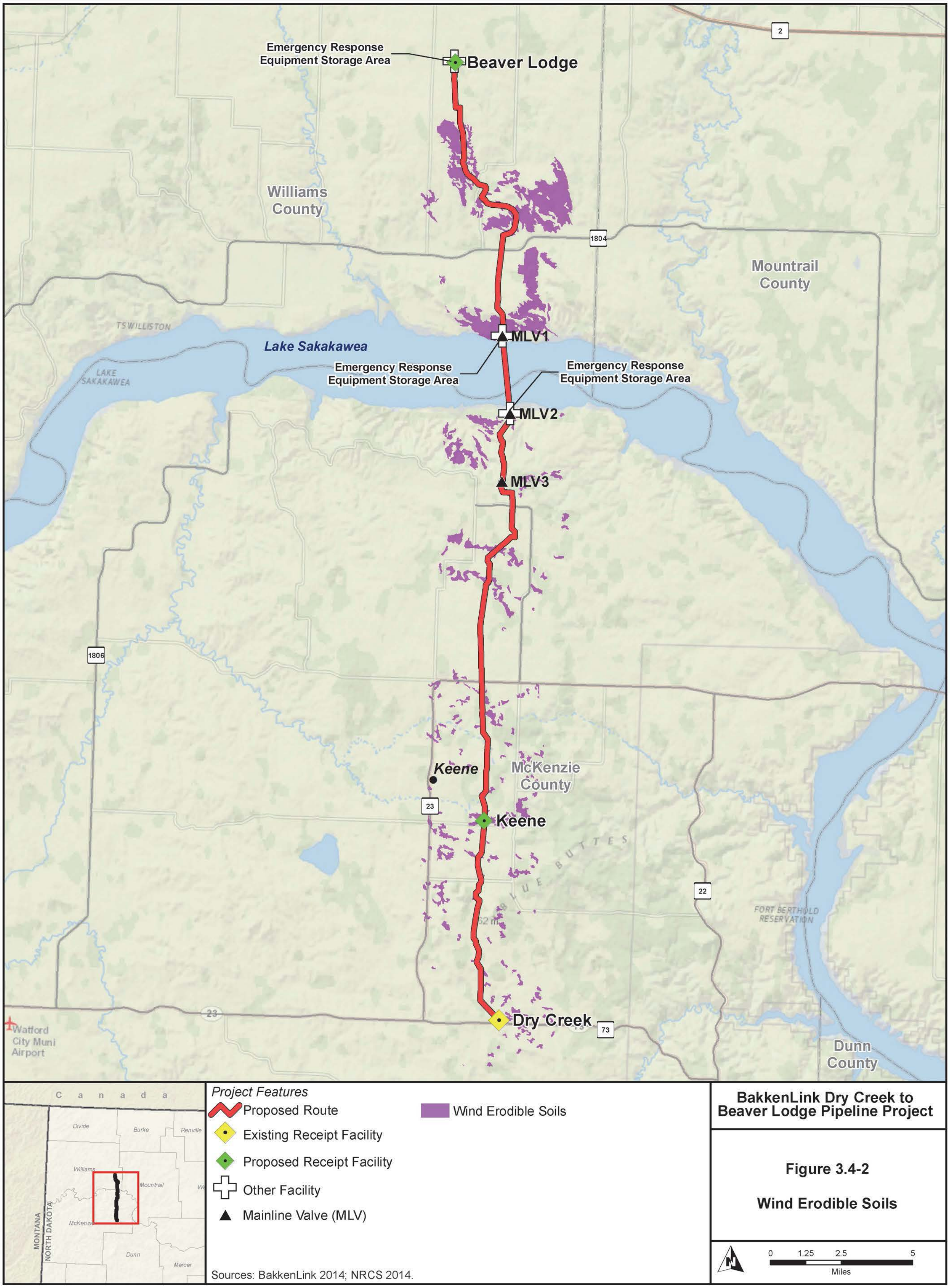
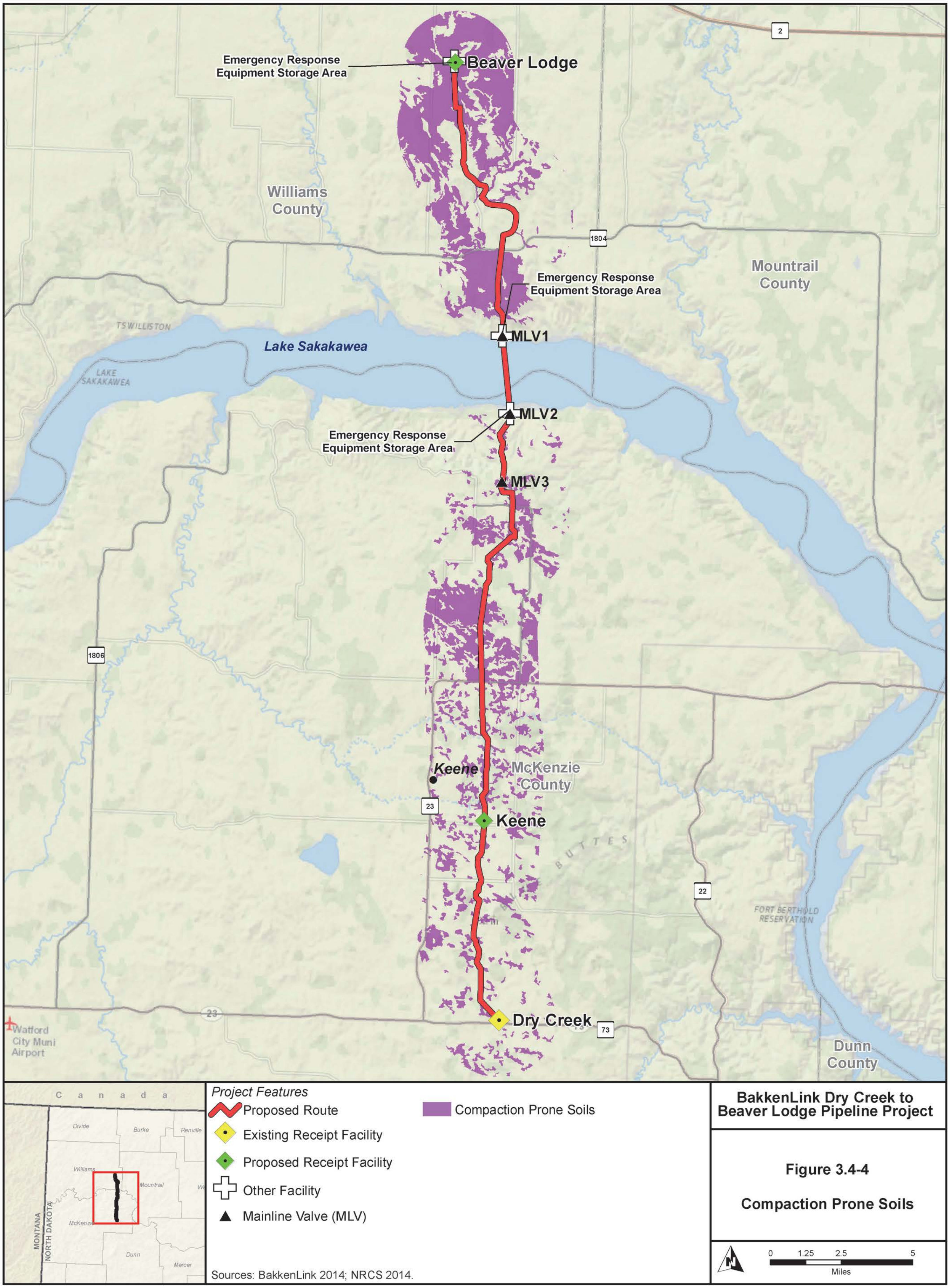


Figure 3.4-2

Wind Erodible Soils

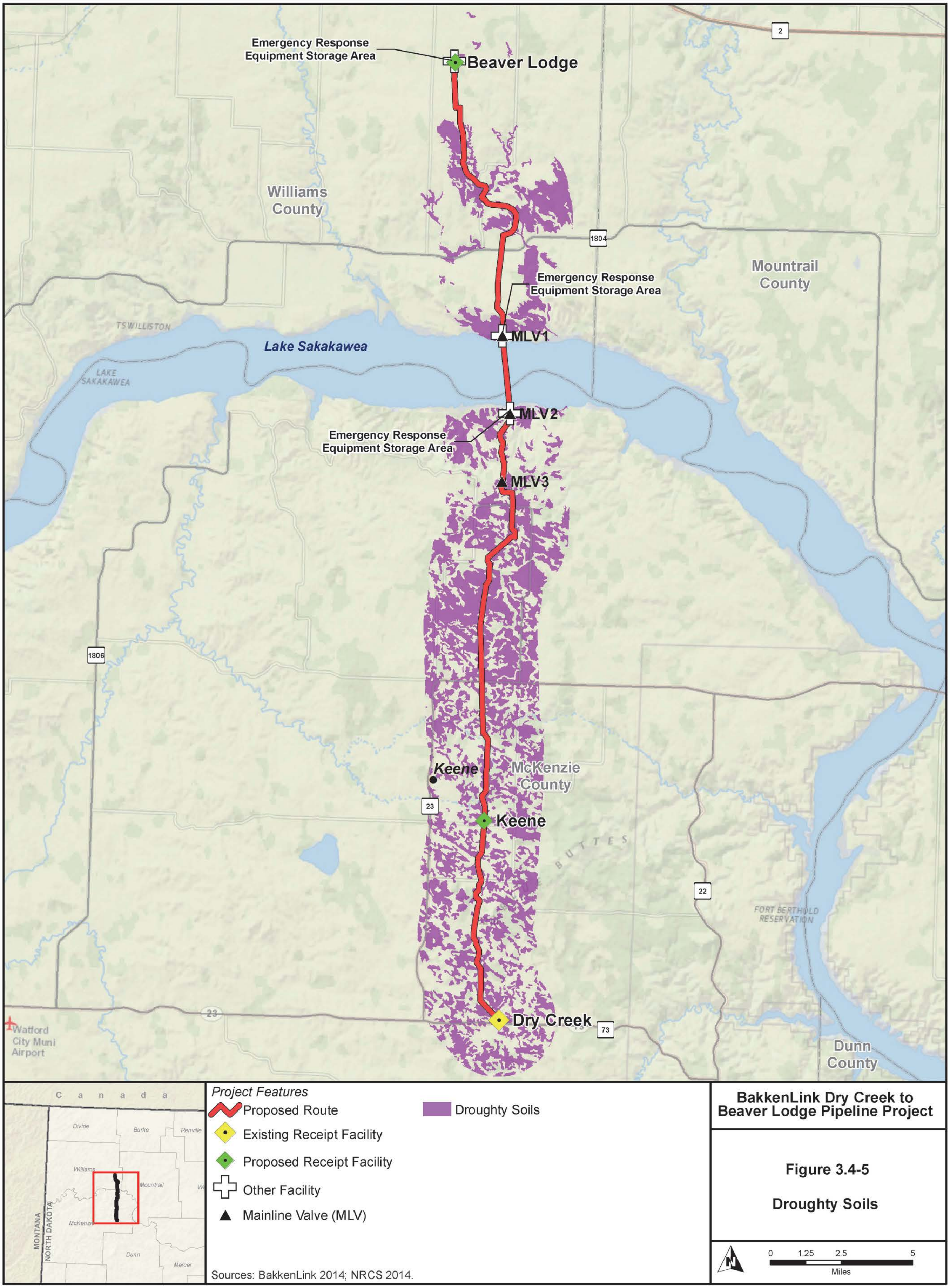
Beaver Lodge
Emergency Response Equipment Storage Area
2
Williams County
1804
Mountrail County
TS WILLISTON
Lake Sakakawea
LAKE SAKAKAWEA
MLV1
Emergency Response Equipment Storage Area
MLV2
Emergency Response Equipment Storage Area
MLV3
1806
Keene
McKenzie County
23
Keene
BLUE BUTTES
22
FORT BERTHOLD RESERVATION
23
Dry Creek
73
Watford City Muni Airport
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Farmland Classification
Prime Farmland
Farmland of Statewide Importance
Sources: BakkenLink 2014; NRCS 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.4-3
Prime Farmland and Farmland of Statewide Importance
N
0 1.25 2.5 5
Miles



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.4-4

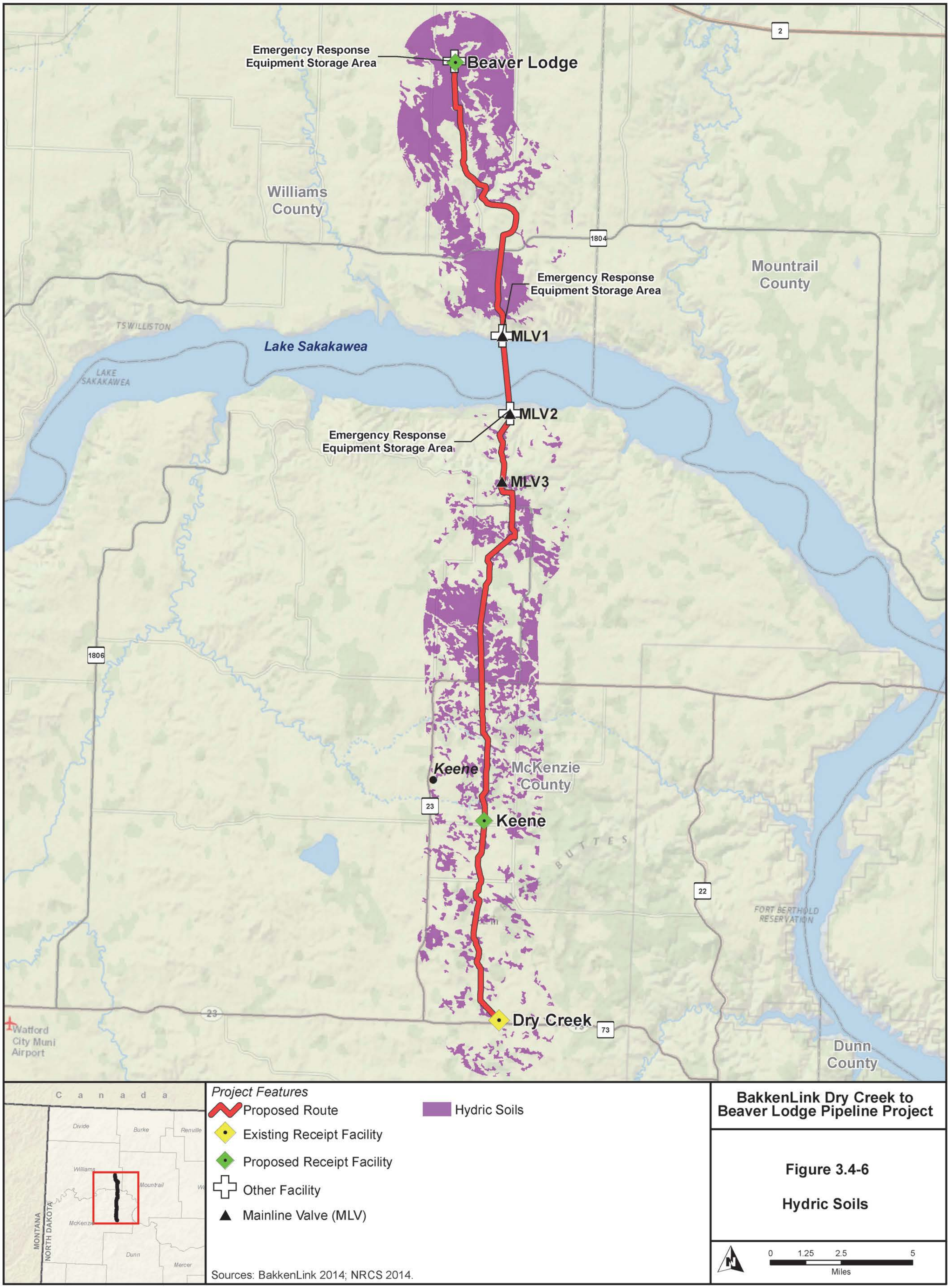
Compaction Prone Soils



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.4-5

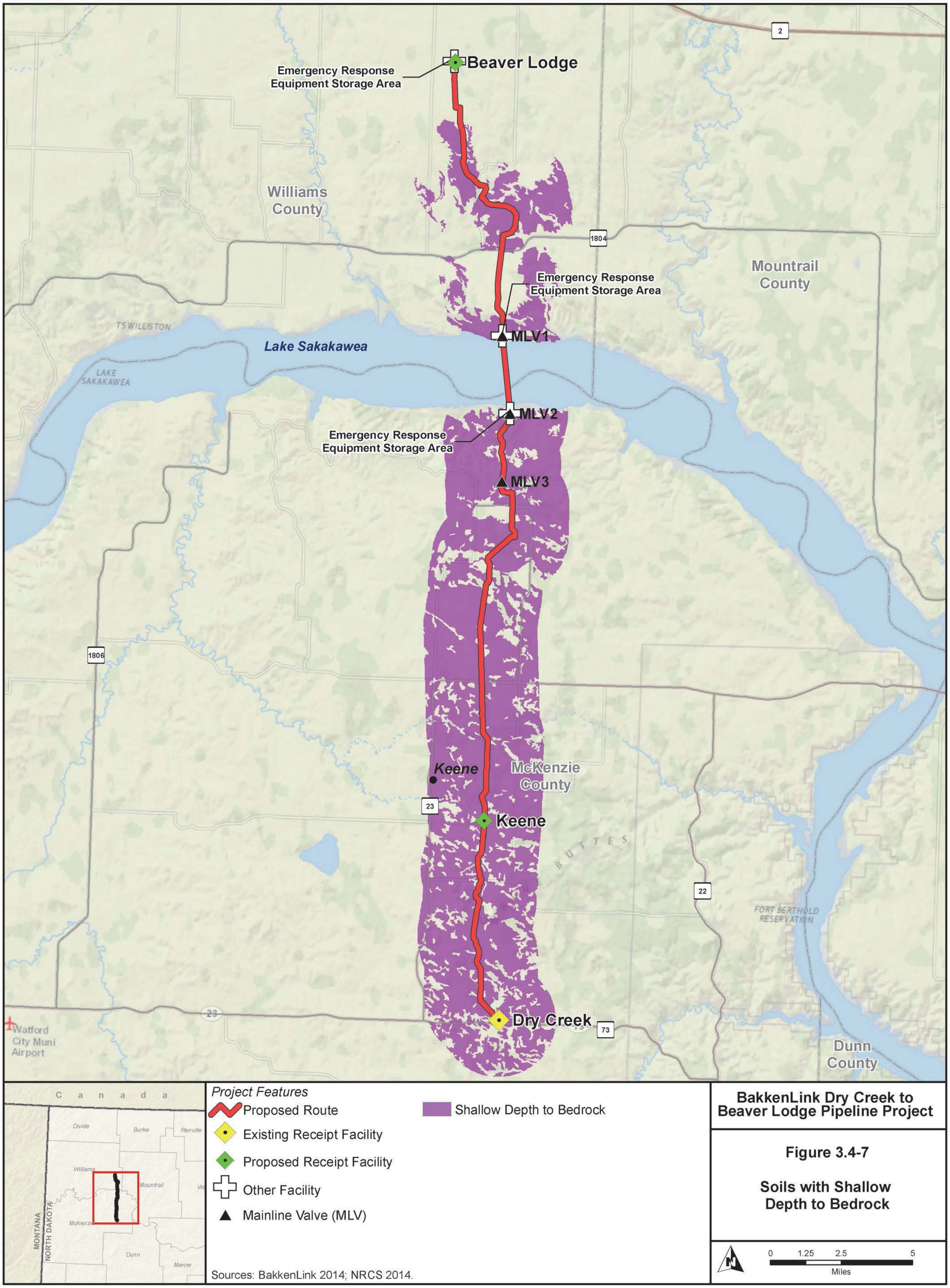
Droughty Soils



BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.4-6

Hydric Soils


Beaver Lodge
Emergency Response Equipment Storage Area
Williams County
1804
Emergency Response Equipment Storage Area
Mountrail County
TSWILLISTON
Lake Sakakawea
LAKE SAKAKAWEA
MLV1
MLV2
Emergency Response Equipment Storage Area
MLV3
1806
Keene
McKenzie County
23
Keene
22
FORT BERTHOLD RESERVATION
Watford City Muni Airport
23
Dry Creek
73
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Shallow Depth to Bedrock
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Sources: BakkenLink 2014; NRCS 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.4-7
Soils with Shallow Depth to Bedrock
0 1.25 2.5 5
Miles

3.5 Water Resources

3.5.1 Surface Water

The Project area lies within the Missouri Plateau portion of the Great Plains Province (Thornbury 1965). The proposed route is located within the glaciated section of the plateau. Topography within the Project area varies from comparatively level to rolling glaciated terrain. Evidence for immense regional flooding and stream capture from glacial meltwaters is thought to exist in the Project area (Clausen 2011a,b,c).

One primary watershed (Lake Sakakawea Hydrologic Unit Code10110101), as identified by the USGS, occurs along the proposed route (**Figure 3.5-1**). A number of waterbodies, which include the Missouri River (i.e., Lake Sakakawea) as well as intermittent streams, occur along the proposed route. In addition to these numerous water features, wetlands and floodplains also occur within the Project area, which are discussed in Sections 3.7 and 4.7.

Mean annual precipitation in the Project area is approximately 14 inches, with approximately 10.5 to 11 inches falling from April to September (USGS 2014). Streamflow in the Project area results from precipitation accompanied by groundwater discharge as influenced by evapotranspiration, soils, and topography. Although streamflows vary seasonally and from year to year, sustained flows and the largest volumes generally occur in spring and early summer as a result of snowmelt, rainfall on melting snow, or intense rainfall on saturated soils (McCain and Associates, Inc. 2011a). More localized, short-duration peak flows and flooding may result from thunderstorms. July is the peak month for thunderstorm activity, but thunderstorms also occur nearly as frequently in June or August. Precipitation events totaling more than 0.5 inch in depth over a 24-hour period occur on average approximately 8 days per year at Watford City (Jensen no date).

In addition to the Missouri River course through Lake Sakakawea, a number of named and unnamed intermittent streams also would be crossed by the proposed route. Stream crossings within the Project area are listed in **Table 3.5-1**.

For water quality purposes, the Missouri River (i.e., Lake Sakakawea) is designated a Class I stream (NDDH 2011). According to North Dakota Administrative Code 33-16-02.1-09, "the quality of the waters in this class shall be suitable for the propagation or protection, or both, of resident fish species and other aquatic biota and for swimming, boating, and other water recreation. The quality of the waters shall be suitable for irrigation, stock watering, and wildlife without injurious effects. After treatment consisting of coagulation, settling, filtration, and chlorination, or equivalent treatment processes, the water quality shall meet the bacteriological, physical, and chemical requirements of the department for municipal or domestic use."

All other tributaries along the proposed route are designated as Class III streams (NDDH 2011). The water quality for this class of use "shall be suitable for agricultural and industrial uses. Streams in this class generally have low average flows with prolonged periods of no flow. During periods of no flow, they are of limited value for recreation and fish and aquatic biota. The quality of these waters must be maintained to protect secondary contact recreation uses" (e.g., wading), fish and aquatic biota, and wildlife uses" (North Dakota Administrative Code 33-16-02.1-09).

In compliance with USEPA requirements promulgated through the CWA, the NDDH issues a bi-annual integrated report on surface water quality in the state. Under Section 303(b) of the act, waterbodies with known water quality characteristics that fail to support designated uses are listed as impaired. Along the proposed route, impaired waters and those with water quality characteristics that threaten the support of designated uses include Lake Sakakawea (due to methyl-mercury) (McCain and Associates, Inc. 2011a; NDDH 2010).

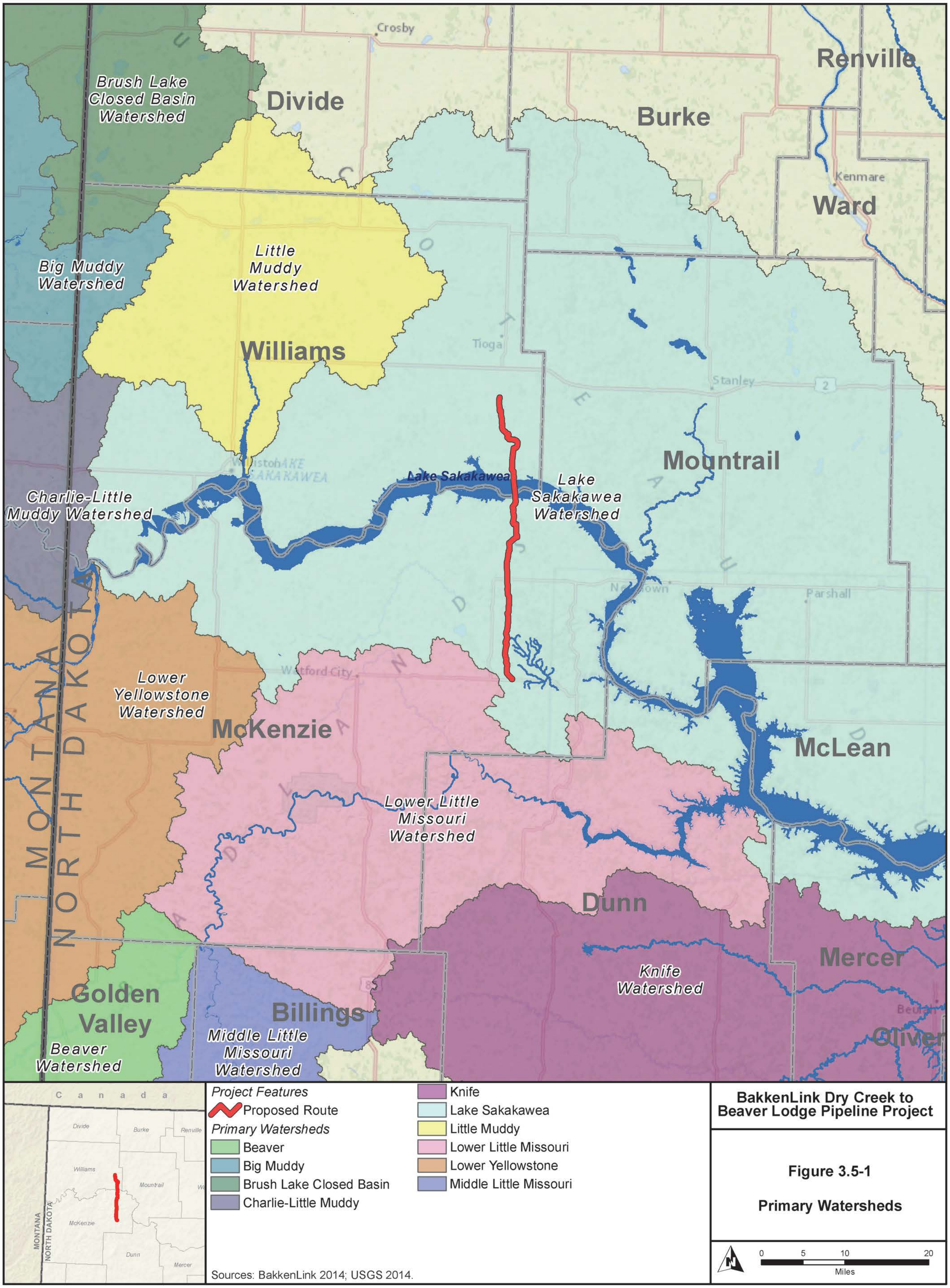


Figure 3.5-1

Primary Watersheds

Table 3.5-1 Streams Crossed by the Proposed Route

Stream Name	Approximate Milepost	Length (feet)	Flow Duration	County	Watershed
Unnamed Tributary to Dry Creek	0.1	0[1]	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	0.2	80	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	1.2	30	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	2.6	210	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	3.0	120	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	3.8	0[1]	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Dry Creek	3.9	0[1]	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	8.4	55	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	8.7	185	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	8.9	170	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	9.0	170	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	9.1	230	Intermittent	McKenzie	Lake Sakakawea
North Branch Clear Creek	10.4	20	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Clear Creek	11.4	175	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Sand Creek	13.4	35	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Sand Creek	16.0	0[1]	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Sand Creek	16.5	45	Intermittent	McKenzie	Lake Sakakawea
Sand Creek	16.7	0[1]	Intermittent	McKenzie	Lake Sakakawea
Sand Creek	16.8	114	Intermittent	McKenzie	Lake Sakakawea
Unnamed Tributary to Lake Sakakawea	20.9	10	Intermittent	McKenzie	Lake Sakakawea
Missouri River/Lake Sakakawea	23.2	12,100	Perennial	McKenzie, Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	27.2	35	Intermittent	Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	28.2	80	Intermittent	Williams	Lake Sakakawea
Dry Fork Creek	32.1	30	Intermittent	Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	32.7	20	Intermittent	Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	33.7	172	Intermittent	Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	34.3	190	Intermittent	Williams	Lake Sakakawea
Unnamed Tributary to Dry Fork Creek	36.8	60	Intermittent	Williams	Lake Sakakawea

[1]A length of zero is due to the stream being present within the Project area but not actually crossed by the pipeline centerline.

Source: BakkenLink 2014.

Watersheds containing areas of probable concern for sediment contamination have not been identified within the Project vicinity (USEPA 2004).

3.5.2 Groundwater

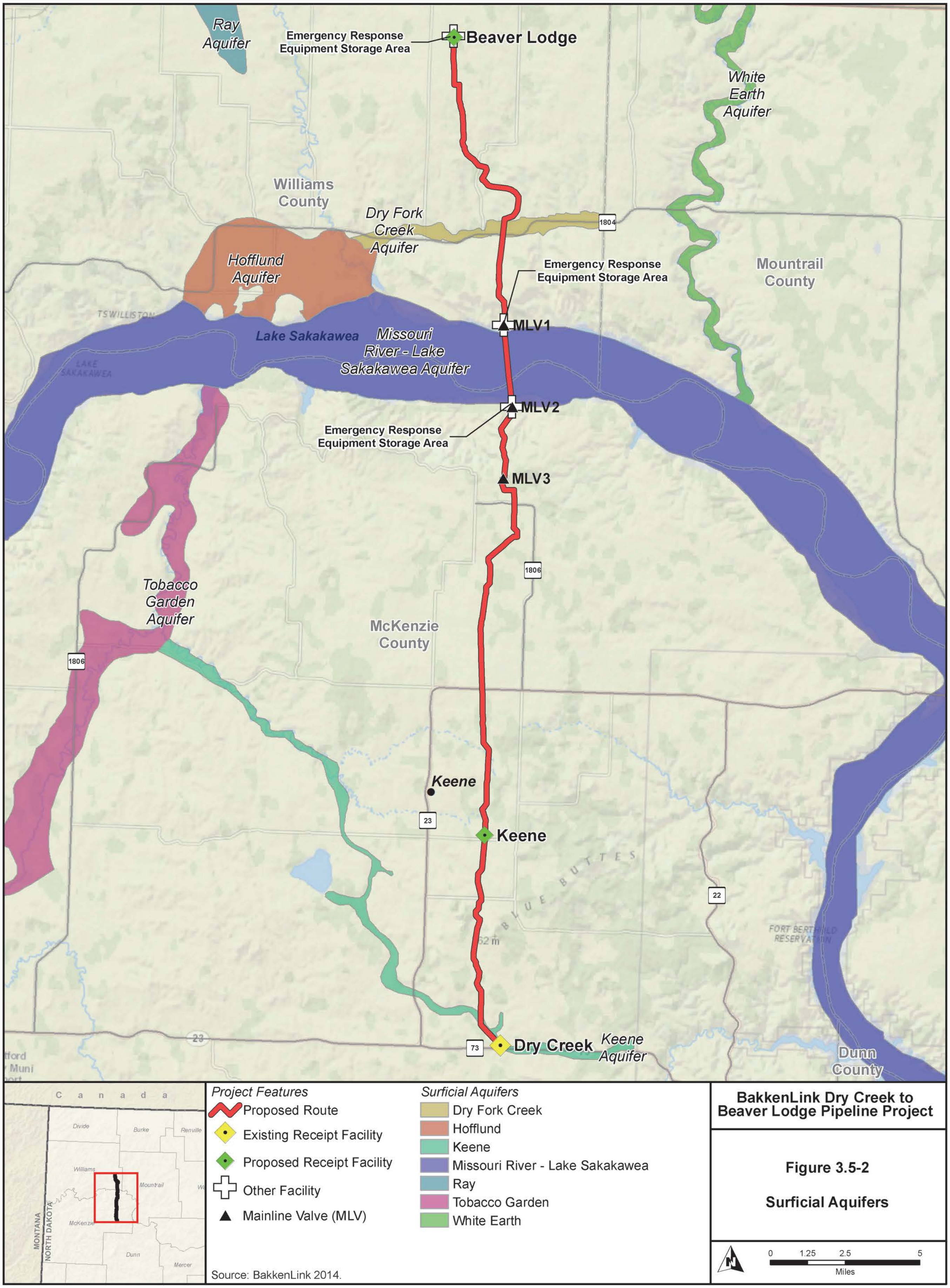
No sole-source aquifers have been designated in North Dakota. Aquifers in or near the Project area occur within unconsolidated glacial and alluvial deposits and porous sedimentary bedrock. Within the northernmost portion of the Project area, aquifers consist mainly of unconsolidated sand and gravel deposits. They supply the majority of water to wells in the extreme northern, glaciated portion of the proposed route. Glacial deposits essentially form a veneer 50 to 100 feet thick overlying bedrock from the northern end of the proposed route in Williams County, to a location generally near the community of Keene, in northern McKenzie County (Bluemle 1986). Southward from that locale, sand and gravel aquifers occur mainly within ancient buried alluvial or glacial outwash channels (Anna 1981; Armstrong 1969; Croft 1985; Klausing 1979; Radig 1997). Major ancient alluvial or glacial outwash aquifers crossed by the proposed route (or occurring near it) include the Hofflund Aquifer and Dry Fork Creek Aquifer in Williams County, Missouri River – Lake Sakakawea aquifer in Williams and McKenzie counties, and the eastern arm Keene aquifer in south-central McKenzie County. In addition to these features, less extensive surficial aquifer zones occur in recent alluvial deposits along the wider streams and rivers listed in **Table 3.5-1**. **Figure 3.5-2** indicates the extent of surficial aquifers in recent alluvium.

In Williams County, the Dry Fork Creek Aquifer is crossed by the Project near SH 1804. In addition, the Hofflund Aquifer is located generally 4 to 6 miles west of the proposed route (Armstrong 1969). These aquifers generally are considered to be covered by approximately 60 feet of loam, silt, and clay (Radig 1997). In the western parts of T155N and T156N, R95W, historically reported depths to water in wells range from about 15 to 775 feet below ground surface (bgs), with the majority of depths reported between about 65 to 220 feet bgs (Armstrong 1969). The greater depths (e.g., below 500 feet) are reported from bedrock wells. These are constructed in waterbearing zones of the Fort Union Formation. Water in the Fort Union Group consists of two types: a soft sodium bicarbonate type and a hard sodium sulfate bicarbonate type. Typically, the water from deeper portions of the Fort Union is too saline for human consumption or irrigation (Armstrong 1969). The quality of water differs greatly in shallower wells in the Fort Union Group. Scattered farm wells pump from the Fort Union Group, and these are reportedly completed in the uppermost saturated sand lens. The wells are equipped with cylinder pumps generally with capacities of only 2 to 4 gallons per minute (Armstrong 1969).

In McKenzie County, the proposed route crosses a narrow aquifer zone in the vicinity of Keene and the Dry Creek Terminal. This is the aforementioned portion of the Keene buried glacio-fluvial aquifer. The Keene Aquifer generally is considered to be approximately 44 feet deep under loamy soils underlain by silt and clay (Radig 1997). The waterbearing zone consists of sand and gravel. Samples collected from the Keene aquifer contained moderate amounts of dissolved solids. Sodium concentrations were high relative to other constituents, and bicarbonate and carbonate also dominated. Dissolved-solids concentrations ranged from 467 to 3,070 milligrams per liter (mg/L), and the median value was 947 mg/L (Croft 1985).

A community wellhead protection zone is located at Watford City approximately 10 miles generally west of the proposed route (**Figure 3.5-3**). Non-community public water supplies that use groundwater near the Project include:

- Johnson's Corner Christian Academy;
- Long X Saloon;
- Club 85 Bar;
- Four Corners Café; and
- Prairie Elementary School.



Source: BakkenLink 2014.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.5-2

Surficial Aquifers


Beaver Lodge
Emergency Response Equipment Storage Area
Williams County
Mountrail County
Emergency Response Equipment Storage Area
MLV1
Lake Sakakawea
MLV2
Emergency Response Equipment Storage Area
MLV3
McKenzie County
1804
1806
1806
Keene
23
Keene
22
Blue Buttes
Fort Berthold Reservation
Dry Creek
73
23
Dunn County
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
Montana
North Dakota
Project Features
Proposed Route
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Wellhead Protection Area (Non-Community)
Source: BakkenLink 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.5-3
Wellhead Protection Areas
0 1.25 2.5 5
Miles

Deeper bedrock aquifers in McKenzie County include the Late Cretaceous Fox Hills and basal Hell Creek system, which underlies all of McKenzie County and extends into adjoining counties. This aquifer system generally is 1,100 to 1,800 feet bgs. Water in the Fox Hills and basal Hell Creek aquifer system is a soft, sodium bicarbonate type. The water is not suited to irrigation use due to elevated sodium contents; however, it may be suitable for most domestic, livestock, and industrial uses (Croft 1985) for those willing to pump it 1,000 feet or more.

Shallower bedrock aquifers in McKenzie County include waterbearing subgroups of the Fort Union Formation. Water from the Ludlow system is at depths over 500 feet; the Tongue River and Sentinel Butte zones range in depth from about 150 to 500 feet bgs (Croft 1985). The Sentinel Butte system is present at the land surface in eastern McKenzie County (Klausing 1979).

3.6 Vegetation Resources

The Project area is located predominantly within the Northwestern Great Plains ecoregion encompassing the Missouri Plateau and River Breaks portions of the Great Plains of west-central North Dakota. In this portion, the landscape consists of a semi-arid rolling plain of shale, siltstone, and sandstone, punctuated by agriculture and rolling plains topography with isolated sandstone buttes and badland formations and minimal wetland basins (Bryce et al. 1996). The northern portion of the proposed route is within the Northwestern Glaciated Plains crossing the Missouri Coteau Slope. This area slopes up from the Missouri River with level to gently rolling topography. Vegetation cover types and characterizations were compiled using the National Gap Analysis Program (GAP) Land Cover data and descriptions (USGS 2013), and field surveys (Carlson McCain, Inc. 2014a,b). Six vegetation cover types occur within the Project area and include grassland, agriculture, shrubland, woodland, wetland/waterbody, and developed lands. Distribution and composition of each vegetation cover type varies based on landscape position, soil type, climatic conditions, moisture, elevation, aspect, and grazing and land management practices. Descriptions of the plant communities within each vegetation cover type are provided below. Species nomenclature is consistent with the NRCS Plants Database (NRCS 2014). **Table 3.6-1** summarizes the vegetation cover types and associated linear miles along the proposed route. **Figure 3.6-1** illustrates the vegetation cover types and sensitive ecological communities within the Project area.

Table 3.6-1 Vegetation Cover Types within the Project Area

Vegetation Cover Type	Linear Miles[1]	Percent of Proposed Route[1]
Grassland	18.0	48
Agriculture	14.4	39
Wetland/Waterbody	3.0	8
Developed	1.1	3
Woodland	0.9	2
Shrubland[2]	-	-
Total	**37.4**	**100**

[1] Total discrepancy due to rounding.

[2] Shrubland is found within the Project footprint, but is not directly crossed by the centerline.

Source: Carlson McCain, Inc. 2014.

Grassland

Grassland is the most prevalent vegetation cover type along the proposed route (18 miles, 48 percent) and is comprised of mixed-grass prairie; shortgrass prairie (including sand prairie); and introduced upland vegetation perennial grassland and forbland ecosystems occupying valley bottoms, plains, foothills, plateaus, and benches. This vegetation type consists of warm- and cool-season grasses and sedges. Common grass species include western wheatgrass (*Pascopyrum smithii)*, green needlegrass (*Nassella viridula*), little bluestem (*Schizachyrium scoparium*), prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*), needle-and-thread (*Hesperostipa comata*), threadleaf sedge (*Carex filifolia*), blue grama (*Bouteloua gracilis*), and plains muhly (*Muhlenbergia cuspidata*) (Carlson McCain, Inc. 2014a,b, 2011a).

Common forbs species include pasqueflower (*Pulsatilla* spp.), western wallflower (*Erysimum asperum*), prairie smoke (*Geum triflorum*), Missouri milkvetch (*Astragalus missouriensis*), lead plant (*Amorpha canescens*), Indian breadroot (*Pediomelum* spp.), purple prairie clover (*Dalea purpurea*), beeblossom (*Gaura* spp.), fringed sage (*Artemisia frigida*), purple coneflower (*Echinacea* spp.), yarrow (*Achillea* spp.), and several species of goldenrod (*Solidago* spp.) (Carlson McCain, Inc. 2014a,b, 2011a).

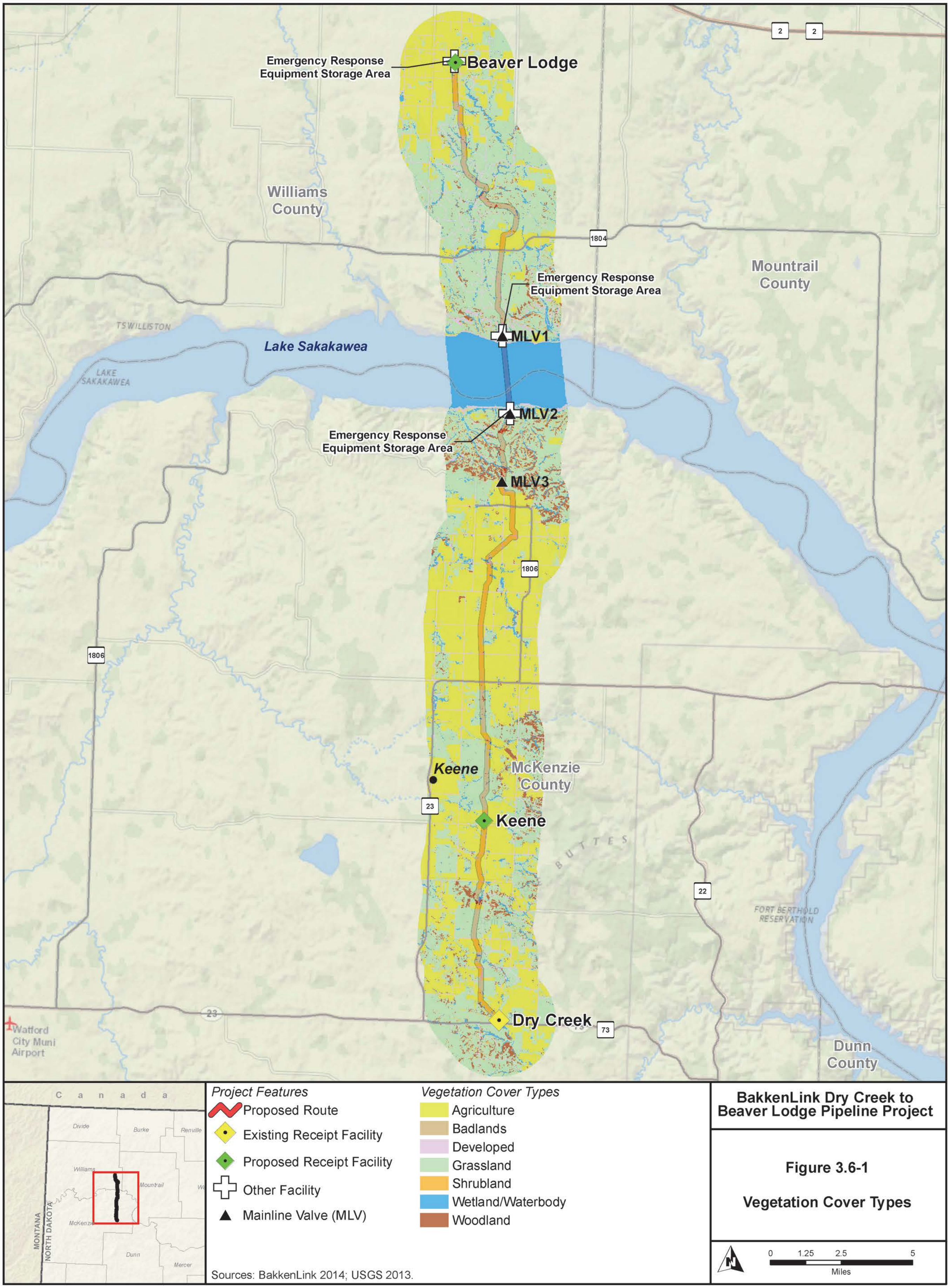


Figure 3.6-1

Vegetation Cover Types

Agriculture

Agriculture is the second most prevalent cover type along the proposed route (14.4 miles, 39 percent) and is comprised of cultivated cropland primarily used for the production of annual crops such as barley, wheat, oats, and corn. In addition, this vegetation cover type may consist of pasture and hay cropland including areas of grass, legumes, or grass-legume mixtures (i.e., planted herbaceous perennials) planted for livestock grazing or the production of seed or hay crops.

Wetland/Waterbody

Approximately 3.0 miles (8 percent) of the proposed route traverse the wetland/waterbody vegetation cover type, which is comprised of a mosaic of palustrine temporary, seasonal, semi-permanent wetlands, lacustrine, riverine, and open water systems. Dominant species observed during on-site wetland and waterbody delineations included prairie cordgrass (*Spartina pectinata*), cattails (*Typha* spp.), water smartweed (*Polygonum amphibium*), fowl bluegrass (*Poa palustris*), wooly sedge (*Carex lanuginosa*), baltic rush (*Juncus balticus*), foxtail barley (*Hordeum jubatum*), and curly doc (*Rumex crispus*) (Carlson McCain, Inc. 2014a,b, 2011a).

Developed

Approximately 1.1 miles (3 percent) of the proposed route would intersect previously disturbed land, which typically is characterized as high and low intensity residential development, commercial, industrial, and transportation.

Woodland

Approximately 0.9 mile (2 percent) of the proposed route traverses the woodland vegetation cover type. Forested habitats are found in only a few locations in North Dakota, and they do not cover large contiguous areas (Hagen et al. 2005). Woodlands that are present within the state are often restricted to planted windbreaks, shelter belts, and drainages. Within the Project area, woodlands are found in ravines and draws. Dominant deciduous woody vegetation typically includes green ash (*Fraxinus pennsylvanica*), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus aromatica*), boxelder (*Acer negundo*), juneberry (*Amelanchier alnifolia*), with an understory dominated by smooth brome grasse (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), and Sprengel's sedge (*Carex sprengelii*) (Carlson McCain, Inc. 2014a,b, 2011a).

Shrubland

The proposed route does not traverse the shrubland vegetation cover, however this community is found within the Project footprint. This vegetation cover type typically occurs on sites where available soil moisture is greater than that associated with grassland cover types and less than sites with woodland cover types. Sites include well-drained depressions and riparian areas, north and east facing slopes, and woodland edges. Common shrub species may include western snowberry (*Symphoricarpos occidentalis*) in upland depressions, mesic swales, and flood plains; and silver buffaloberry (*Shepherdia argentea*), chokecherry, serviceberry (*Amelanchier alnifolia*), and American plum (*Prunus americana*) in small, dense thickets in mesic swales and aspects, and the outer edges of floodplains and woodlands.

Sensitive Ecological Communities

No sensitive ecological communities occur along or adjacent to the proposed route.

Tree and Shrub Inventory

In accordance with the North Dakota PSC and POD, Appendices XXIII and XXIV, a tree and shrub inventory would be completed to document tree and shrub species, including direct stem counts within the construction ROW that would be impacted. The results of the tree and shrub inventory would be submitted to the North Dakota PSC prior to construction.

3.7 Wetlands and Floodplains

3.7.1 Waters of the U.S.

WUS are defined in 33 CFR 328.3 and include: all non-tidal waters that currently are used, or were used in the past, or may be susceptible to use in interstate commerce; all interstate waters including wetlands; all other waters such as interstate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, of which the use, degradation, or destruction could affect interstate commerce; and all impoundments of waters otherwise defined as WUS under this definition. In addition, tributaries of the previously listed waters, including arroyos and other intermittent drainages, and wetlands adjacent to the previously listed waters also are considered to be WUS.

Criteria used by the USACE to determine whether a drainage constitutes a WUS include presence of a defined bed (i.e., a linear bed in a topographic depression, which would transport surface water from a watershed); presence of defined banks (i.e., near vertical or steep-sided banks formed by erosion from flowing water); and evidence of an ordinary high water mark (i.e., indicator[s] [e.g., scoured bed, shelving, an absence of terrestrial vegetation, and recent alluvial or litter deposition] that the drainage is subject to surface water flows on an average annual basis).

WUS within the Project area may include, but are not limited to, the following: Missouri River (Lake Sakakawea), Dry Fork Creek, Dry Creek, North Branch Clear Creek, and Sand Creek. A detailed discussion of surface waters including a tabular summary of the surface water features within the Project area are presented in Section 3.5, Water Resources, and **Table 3.5-1**, respectively.

The proposed route crosses the Crosby Wetland Management District. The proposed route does not cross any USFWS land interests including wetland management easements within the Crosby Wetland Management District (Gallion 2014; Williams 2014).

3.7.2 Wetlands

As previously described, wetlands adjacent to WUS also are considered to be WUS. The term "wetland" is defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas (33 CFR 328.7[b])." The frequency and duration of saturation may vary by geographical region and is largely dependent upon local climatic conditions.

The USACE 1987 Wetland Delineation Manual requires a "three-parameter" approach for delineating USACE-defined wetlands (USACE 1987). Based on this approach, areas are identified as wetlands if they exhibit the following characteristics:

- The prevalence of vegetation consisting of hydrophytic species or plants that have the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels.
- The presence of soils that are classified as hydric or possessing characteristics that are associated with reducing soil conditions. Hydric soils are poorly drained and have a seasonal high water table within 6 inches of the surface.
- An area that is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation (usually 12.5 percent of the growing season) (USACE 1987; Wetland Training Institute, Inc. 1995). Within the Project area, an area would need to be saturated for a period of

approximately 16 days to support vegetation adapted to saturated soils based on the average number of days above 32°F (i.e., 127 days*0.125) (NRCS 2002).

The USACE Wetland Delineation Manual (USACE 1987), in conjunction with the Regional Supplement to the Manual: Great Plains Region (USACE 2008), requires that under normal circumstances, all three of these conditions be met for an area to be considered a wetland under the USACE's definition. Federal mandates governing regulatory enforcement in wetlands and other WUS include Section 10 of the Rivers and Harbors Appropriation Act of 1899, Sections 401 and 404 of the CWA, as amended (33 USC 1251 *et seq*.), and EO 11990, Protection of Wetlands (42 Federal Register 26961). The loss, dredging, or filling of WUS would be regulated by the USACE under CWA Section 404, and a USACE permit (NWP 12) would be required and obtained prior to construction. For NWP 12, the Project must not result in the loss of greater than 0.5 acre of WUS, and the Project must comply with all the terms and conditions of the permit. Final regulatory authority and delineation boundaries for wetlands and WUS within the Project area lie with the USACE.

Prior to field survey commencement, a desktop review of the National Wetland Inventory (NWI) database was completed to identify the spatial extent of hydrological features within the Project area. Based on this review, 4.8 linear miles of palustrine and lacustrine systems were identified. **Table 3.7-1** summarizes the NWI wetland data and associated linear miles of each system along the proposed route. **Figures 3.7-1** and **3.7-2** illustrate the NWI-identified wetlands within the Project area.

Table 3.7-1 NWI-identified Wetlands within the Project Area

Wetland Type	Linear Miles[1]
Palustrine Emergent Wetland (PEM)	0.3
Palustrine Aquatic Bed (PAB)	0.1
Lacustrine	4.4
Total	**4.8**

[1] Total discrepancies due to rounding.

Source: USFWS 2014.

On-the-ground wetland and waterbody delineations were conducted along the proposed route between June 24, and September 15, 2014, within the 200- to 250-foot-wide survey corridor centered along segments of the proposed route that were realigned. In total, the following wetland and waterbody features were identified along the proposed route: 9 PEM complexes and 5 unclassified complexes (totaling 0.4 linear mile); 19 intermittent (totaling 0.3 linear mile) and 1 perennial waterbody crossings (totaling 2.3 linear miles) (Carlson McCain, Inc. 2014). **Table 3.7-2** summarizes the on-the-ground wetland and waterbody delineations along the proposed route. **Figures 3.7-1** and **3.7-2** also illustrate the delineation results within the Project area. The associated Wetland Delineation and Waterbody Crossing Report (Carlson McCain, Inc. 2014) summarizes the scope of work, methodology, and survey results including figures, data forms, and photographs of the aforementioned features. A detailed waterbody crossing table is presented in Section 3.5, Water Resources, **Table 3.5-1**.


Emergency Response
Equipment Storage Area
Beaver Lodge
59th St NW
21
58th St NW
108th Ave NW
107th Ave NW
57th St NW
56th St NW
55th St NW
103rd Ave NW
102 Cave Ave NW
69 St NW
102c Ave NW
102b Ave NW
102a Ave
102nd Ave NW
CR-23
Mountrail
County
1804
105th Rd
52nd St NW
Emergency Response
Equipment Storage Area
MLV1
Lake
Sakakawea
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Waterbody
Wetlands
Sources: BakkenLink 2014; Carlson McCain Inc. 2014.
BakkenLink Dry Creek to
Beaver Lodge Pipeline Project
Figure 3.7-1
Wetlands and Waterbodies
North of Lake Sakakawea
0 0.375 0.75 1.5
Miles

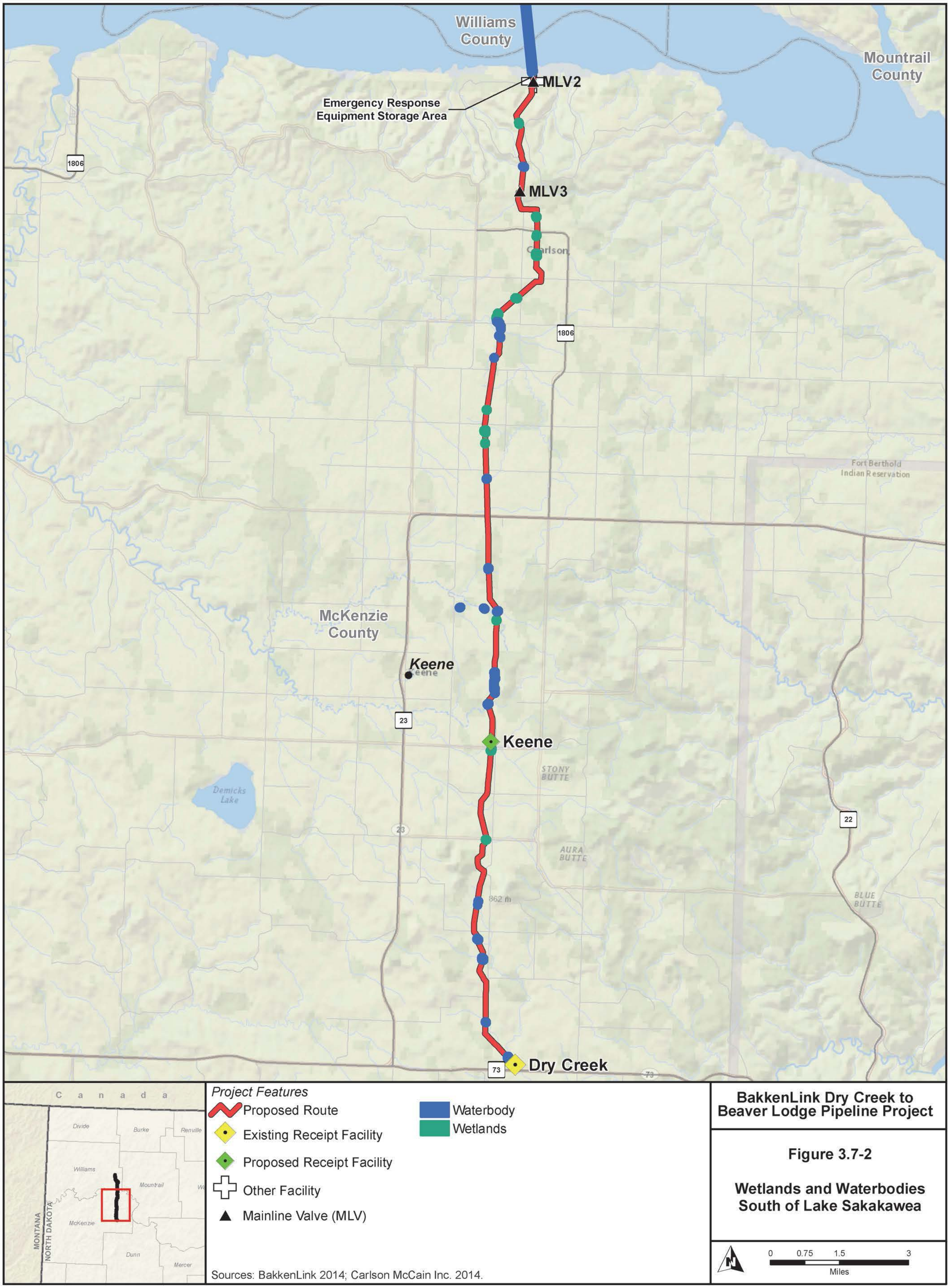

Williams County
Mountrail County
MLV2
Emergency Response Equipment Storage Area
1806
MLV3
Carlson
Fort Berthold Indian Reservation
McKenzie County
Keene
23
Keene
STONY BUTTE
Demicks Lake
22
AURA BUTTE
862 m
BLUE BUTTE
73
Dry Creek
Canada
Divide
Burke
Renville
Williams
Mountrail
MONTANA
NORTH DAKOTA
McKenzie
Dunn
Mercer
Project Features
Proposed Route
Existing Receipt Facility
Proposed Receipt Facility
Other Facility
Mainline Valve (MLV)
Waterbody
Wetlands
Sources: BakkenLink 2014; Carlson McCain Inc. 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 3.7-2
Wetlands and Waterbodies South of Lake Sakakawea
0 0.75 1.5 3
Miles

Table 3.7-2 Delineated Wetlands and Waterbodies Present within the Project Area

Wetland Type	Linear Miles
PEM	0.3
PAB	-
Unclassified	0.1
Lacustrine	-
Riverine (including perennial and intermittent waterbody crossings)	2.6
Total	**3.0**

Source: Carlson McCain, Inc. 2014.

3.7.3 Floodplains

From a geomorphic perspective, floodplains are relatively low, flat areas of land that surround waterbodies and hold overflows during flood events. Floodplains are often associated with rivers and streams, where they consist of sediments forming levels (or “terraces”) deposited at different times along the watercourse.

From a policy perspective, the Federal Emergency Management Agency (FEMA) defines a floodplain as being any land area susceptible to being inundated by waters from any source (FEMA 2005, 2001). Protection of floodplains and related resource values was established by EO 11988. Local, state, and federal agencies have additional roles and responsibilities under EO 11988 and the FEMA floodplain program, particularly with respect to potential impacts on flooding from proposed projects. In addition, regulatory programs provide rigorous guidance on the types, extent, and location of Project facilities that may be constructed within delineated floodplain boundaries. According to FEMA Flood Insurance Rate Maps, the Project area is unmapped (FEMA 2014).

However, Lake Sakakawea is located in the Missouri River floodplain. This area on either side of Lake Sakakawea frequently is flooded at high lake levels. The USACE acquired fee title to all land that potentially would flood if Lake Sakakawea was at full pool (USGS 2013).

3.8 Noxious Weeds and Invasive Species

An increasing concern on both public and private lands is the introduction, spread, and proliferation of noxious weed and invasive plant species. Pursuant to the NDCC § 4.1-47-02, a "noxious weed" is defined as "a plant propagated by either seed or vegetative parts and determined to be injurious to public health, crops, livestock, land, or other property as determined by the commissioner, county, or city weed board." The North Dakota Department of Agriculture currently lists 11 plant species as state-designated noxious weeds. In addition to the North Dakota state-designated species, management is required for seven additional county-specific species for McKenzie County. No additional species were listed for Williams County. The USFS has a list of invasive species of concern that include those designated by the state and counties, plus an additional 15 species. State and county-designated noxious weed species, and USFS-designated invasive species are listed in **Table 3.8-1**.

Table 3.8-1 Designated Noxious Weed and Invasive Species and Presence in the Project Area

Common Name	Scientific Name	State of North Dakota Designated Species	County Designated Species[1] (MK – McKenzie)	USFS Designated Species	Identified within Project Area[2,3]
Russian knapweed	*Acroptilon repens*	X	--	X	--
Crested wheatgrass	*Agropyron cristatum*	--	--	X	X
Tall wheatgrass	*Agropyron elongatum*	--	--	X	--
Intermediate wheatgrass	*Agropyron intermedium*	--	--	X	X
Quackgrass	*Agropyron repens*	--	--	X	--
Common burdock	*Arctium minus*	--	MK	X	X
Absinth wormwood	*Artemisia absinthium*	X	--	X	--
Smooth brome	*Bromus inermis*	--	--	X	X
Japanese brome	*Bromus japonicus*	--	--	X	X
Downy brome	*Bromus tectorum*	--	--	X	X
Hoary cress	*Cardaria draba*	--	--	X	--
Spiny plumeless thistle	*Carduus acanthoides*	--	--	X	--
Musk thistle	*Carduus nutans*	X	--	X	--
Diffuse knapweed	*Centaurea diffusa*	X	--	X	--
Spotted knapweed	*Centaurea maculosa*	X	--	X	--
Russian knapweed	*Centaurea repens*	X			
Yellow starthistle	*Centaurea solstitialis*	--	--	X	--
Canada thistle	*Cirsium arvense*	X	--	X	X
Field bindweed	*Convolvulus arvensis*	--	--	X	--
Houndstongue	*Cynoglossum officinale*	--	MK	X	--
Leafy spurge	*Euphorbia esula*	X	--	X	X
Baby's breath	*Gypsophila paniculata*	--	MK	X	--
Halogeton	*Halogeton glomeratus*	--	MK	X	--
Black henbane	*Hyoscyamus niger*	--	MK	X	--
Dalmation toadflax	*Linaria genistifolia*	X	--	X	--
Yellow toadflax	*Linaria vulgaris*	X	--	X	--
Purple loosestrife	*Lythrum salicaria, L. virgatum*	X	--	X	--

Table 3.8-1 Designated Noxious Weed and Invasive Species and Presence in the Project Area

Common Name	Scientific Name	State of North Dakota Designated Species	County Designated Species[1] (MK – McKenzie)	USFS Designated Species	Identified within Project Area[2,3]
Sweet clover	*Melilotus* spp.	--	--	X	X
Kentucky bluegrass	*Poa pratensis*	--	--	X	X
Canada bluegrass	*Poa compressa*	--	--	X	X
Sowthistle	*Sonchus* spp.	--	--	X	--
Saltcedar	*Tamarix chinensis, T. ramosissima*	X	--	--	--
Common mullein	*Verbascum thapsus*	--	--	X	--

[1] McKenzie and Williams counties both regulate the 11 state-listed noxious weed species. Each county can require enforcement for additional weed species in their jurisdiction. Williams County has not identified any additional species for enforcement (North Dakota Department of Agriculture 2013).

[2] Noxious weed surveys were completed within the 200- to 250-foot-wide survey corridor centered along the proposed route on all lands with access permission; invasive species surveys were completed only on federal lands. Additional noxious weed surveys would be completed in 2014 prior to construction upon property admission.

[2] Populations present within the 200- to 250-foot-wide survey corridor based on the proposed route centerlines during surveys conducted September 2011, May 20, June 24, and July 25, 2014.

Sources: Carlson McCain, Inc. 2014; North Dakota Department of Agriculture 2014, 2013; USFS 2014.

Noxious and invasive weed surveys were conducted in September 2011 along the proposed route. Subsequent noxious and invasive weed surveys were conducted on May 20, June 24, and July 25, 2014, along segments of the proposed route that were realigned. Populations were identified and mapped within the 200-foot-wide pipeline ROW corridor for the proposed route (**Figures 3.8-1** and **3.8-2**). The results of this survey effort are summarized in **Table 3.8-1**. The Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII) lists all aforementioned noxious weed species and further summarizes species distribution within the Project area based on known population records and field identified populations.

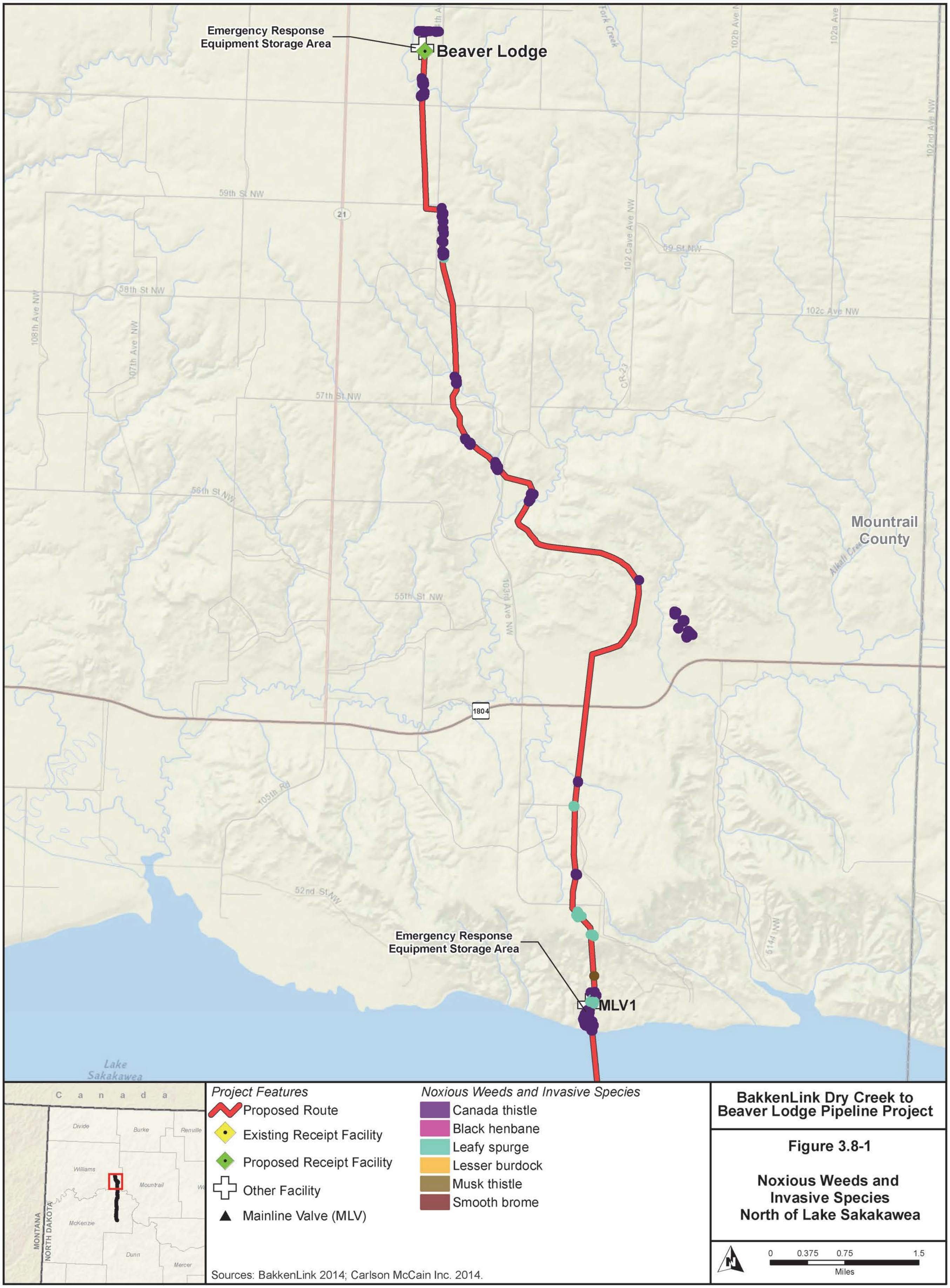


Figure 3.8-1

Noxious Weeds and Invasive Species North of Lake Sakakawea

Figure 3.8-2

Noxious Weeds and Invasive Species South of Lake Sakakawea

3.9 Wildlife and Fisheries

3.9.1 Wildlife

Recreationally and Economically Important Species and Nongame Wildlife

The Project area lies within the Great Plains-Palouse Dry Steppe Province and the Great Plains Steppe Province (Bailey et al. 1994). These regions are characterized by rolling plains, valleys, canyons, and buttes, with the more gently rolling plains found around the Missouri River and Lake Sakakawea. As discussed in Section 3.6, Vegetation, the proposed route would cross five habitat types, including grassland, shrubland, woodland, agricultural land, and wetland/waterbodies. Grassland is the most common habitat type found along the proposed route. A number of waterbodies, including a major river course (Missouri River/Lake Sakakawea) as well as intermittent and perennial streams, wetlands, and floodplains, occur along the proposed route (Section 3.7, Wetlands and Floodplains). Water sources, particularly those that maintain a reliable source of open water and provide a multi-story canopy, support a greater diversity and population density of wildlife species than other habitats in the region.

Information regarding wildlife species and habitat within the Project area was obtained from a review of existing published sources; site-specific surveys; USFS, NDGFD, and USFWS file information; as well as North Dakota Natural Heritage Inventory database information. Baseline descriptions of both resident and migratory wildlife include species that have either been documented along the proposed route, or those that may occur along the proposed route, based on habitat associations. Wildlife species that may occur along the majority of the proposed route are typical of the grassland, shrubland, woodland, and wetland communities of west-central North Dakota. A list of representative wildlife species for the Project area is found in **Appendix C**.

U.S. Forest Service Management Indicator Species

A MIS is a plant or animal species selected because its status is believed to: 1) be indicative of the status of a larger group of species; 2) be reflective of the status of a key habitat type; or 3) act as an early warning of an anticipated stressor to ecological integrity. The key characteristics of MIS are that its status and trend provide insights to the integrity of the larger ecological system to which it belongs. Species that have been selected for the LMNG include the sharp-tailed grouse, black-tailed prairie dog, and greater sage-grouse (USFS 2011a). Surveys completed in 2011 and 2012 did not identify any greater sage-grouse leks or black-tailed prairie dog colonies along the proposed route (Carlson McCain, Inc. 2013). Surveys completed in 2012, 2013, and 2014 identified one sharp-tailed grouse lek within 0.25 mile of the proposed route near MP 22.3 (Carlson McCain, Inc. 2014, 2013). The sharp-tailed grouse is presented in Section 3.9.1.2, Small Game Species.

3.9.1.1 Big Game Species

Big game species that occur in the Project region (**Appendix C**) include pronghorn, mule deer, white-tailed deer, elk, and mountain lion (Hagen et al. 2005). Population numbers for pronghorn, mule deer, white-tailed deer, and elk fluctuate slightly from year to year based on habitat conditions. Winter severity and amount of quality habitat are the limiting factors within the Project area. Forage quality, cover, and weather patterns typically determine the level of use and movement of big game species through the Project area. Winter use in the Project vicinity depends on snow cover and forage availability.

Pronghorn

Pronghorn inhabit grasslands and shrublands on flat to rolling topography, and browse on forbs and shrubs, especially sagebrush, throughout the year. During winter, pronghorn generally utilize areas of relatively high sagebrush densities and overall low snow accumulations, on south- and east-facing slopes (Armstrong et al. 2011). Pronghorn occur throughout the majority of the Project area but in relatively low numbers.

Mule Deer

Mule deer feed on a wide variety of plants including forbs, grasses, sedges, shrubs, and trees. Winter habitat for mule deer occurs in areas of relatively high sagebrush densities and overall low snow accumulation, on south- and east-facing slopes (Armstrong et al. 2011). Mule deer occur throughout the majority of the Project area, inhabiting virtually all vegetation types.

White-tailed Deer

White-tailed deer occur throughout the entire state, are considered widespread and common, inhabiting woodlands, riparian areas, and agricultural lands (NDGFD 2014a). White-tailed deer feed on cultivated crops, such as corn and wheat, native forbs and grasses, as well as mushrooms, fruits, and nuts. In winter, white-tailed deer congregate in woodland habitat (Armstrong et al. 2011).

Elk

Elk occur in a variety of habitats in the Project area including woodlands, shrublands, grasslands, and agricultural areas. Elk feed on grasses, forbs, and shrubs; the percentages vary seasonally. Elk have a considerable impact on aspen stands by browsing on twigs, bark, and seedlings (Armstrong et al. 2011). Elk that may occur in the Project area likely would be found south of Lake Sakakawea in McKenzie County.

Mountain Lion

The mountain lion occurs in the Project area in McKenzie County. Mountain lions inhabit a variety of ecosystems, but are most common in rocky foothills, canyons, woodlands, and shrublands. They feed primarily on deer, but also will take elk, Rocky Mountain bighorn sheep, smaller mammals, and livestock (Armstrong et al. 2011).

3.9.1.2 Small Game Species

Small game species that occur in the Project area include upland game birds, furbearers, waterfowl, and small mammals (**Appendix C**).

Upland Game Birds

Upland game birds that occur in the Project area include sharp-tailed grouse, gray (Hungarian) partridge, wild turkey, ring-necked pheasant, and mourning dove. Sharp-tailed grouse, gray partridge, ring-necked pheasant, and mourning dove occur in a variety of grassland, shrubland, riparian, and agricultural habitats. Wild turkeys occur throughout the Project area in woodland habitat (NDGFD 2014b; Stokes and Stokes 1996). The Project area is located within gray partridge, wild turkey, and ring-necked pheasant primary ranges. Mourning doves are considered widespread and common in the Project area but are only present during the spring, summer, and early fall (NDGFD 2014b).

The sharp-tailed grouse is a USFS MIS. Ground surveys were conducted for sharp-tailed grouse leks in May 2012, May 2013, as well as May 2014. **Table 3.9-1** presents a summary of active sharp-tailed grouse leks within 0.25 mile of the proposed route.

Furbearers

Furbearers that occur along the proposed route include beaver, raccoon, striped skunk, muskrat, mink, long-tailed weasel, short-tailed weasel, badger, bobcat, coyote, and red fox (NDGFD 2014a). These species have wide distributions in North Dakota and are found within all habitat types present in the Project area. Due to increased structural diversity and available food sources, a higher diversity of furbearers likely is present along the perennial and intermittent drainages and wetlands within the Project area.

Table 3.9-1 Sharp-tailed Grouse Leks

Species	Habitat Association	Potential for Occurrence Within the Project Area	Milepost	Distance to Centerline (feet)	Survey Year	Status	Land Ownership	County
Sharp-tailed grouse	Grassland and Shrubland	High. One active sharp-tailed grouse leks occur within 0.25 mile of the centerline.	22.3	28	2014, 2013, 2012	Active	USFS	McKenzie

Source: Carlson McCain, Inc. 2014, 2013.

Waterfowl

Numerous species of waterfowl nest in, and migrate through, the Project area, utilizing the wetland/waterbody habitats present there. Common waterfowl species in the Project area include Canada goose, mallard, green-winged teal, northern pintail, gadwall, and American wigeon. Other common summer residents include blue-winged teal, cinnamon teal, northern shoveler, redhead, and ring-necked duck (Stokes and Stokes 1996).

Small Game Mammals

Small game mammals likely to occur in the Project area include fox squirrel and eastern cottontail (NDGFD 2014b). Fox squirrels occur in riparian and woodland vegetation communities within the Project area. Eastern cottontails occur in a variety of habitat types, but are most common in brushy areas such as shelterbelts and old farmsteads (Armstrong et al. 2011).

3.9.1.3 Nongame Species

A diversity of nongame species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupies a variety of trophic levels and habitat types in the Project area (**Appendix C**). Common nongame wildlife species include small mammals, such as bats, voles, gophers, prairie dogs, woodrats, and mice. These small mammals provide a substantial prey base for predators in the Project area, including larger mammals (coyote, badger, bobcat), raptors (eagles, buteos, accipiters, owls), and reptiles (snakes). A number of bat species also occur in the Project area, including long-legged myotis, northern long-eared myotis, and western small-footed myotis (Hagen et al. 2005). The northern long-eared myotis is a federally proposed species and is discussed in Section 3.10, Special Status Species.

Raptors and Other Migratory Birds

Nongame birds encompass a variety of passerine and raptor species, including migratory bird species that are protected under the MBTA (16 U.S.C. 703-711), Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), and EO 13186 (66 Federal Register 3853) (**Appendix C**).

Raptor species that occur in the Project area as residents or migrants include eagles (bald and golden eagles); buteos (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk); falcons (e.g., prairie falcon, American kestrel); accipiters (e.g., Cooper's hawk, sharp-shinned hawk); owls (e.g., great-horned owl, burrowing owl, long-eared owl, short-eared owl); northern harrier, and turkey vulture (Stokes and Stokes 1996).

Aerial raptor nest surveys were conducted on May 19 and 20, 2014, to identify occupied territories or active nest sites. Records from the NDGFD, North Dakota Parks and Recreation Department Heritage Inventory, USFWS, and USFS were reviewed to determine the locations and status of previously observed and recorded raptor nests. Aerial surveys focused on cliff nesters (e.g., golden eagle, prairie falcon) and species that commonly nest in deciduous trees or on promontory points (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk, great-horned owl). The aerial surveys did not concentrate on cavity nesters (e.g., American kestrel), ground nesters (e.g., northern harrier), subterranean nesters (e.g., burrowing owl), or most conifer nesters (e.g., accipiters), based on visibility limitations from the aircraft.

Based on the results of the 2014 raptor nest surveys, a total of 9 active nest sites and 1 inactive nest site were identified within 1 mile of the proposed route. Of the active nests, five were occupied by red-tailed hawks, one by Swainson's hawks, two by great horned owls, and one by golden eagles (Carlson McCain, Inc. 2014). **Table 3.9-2** presents the survey results.

Table 3.9-2 2014 Raptor Nest Aerial Survey Results

Milepost	Species	Spring 2014 Status	Distance to Proposed Route (feet)	County
0.8	Red-tailed Hawk	Active	289	McKenzie
1.0	Great Horned Owl	Active	2,729	McKenzie
2.1	Red-tailed Hawk	Active	4,098	McKenzie
7.3	Great Horned Owl	Active	1,142	McKenzie
12.9	Red-tailed Hawk	Active	4,403	McKenzie
17.9	Swainson's Hawk	Active	2,220	McKenzie
25.9	Golden Eagle	Active	4,224	Williams
34.2	Red-tailed Hawk	Active	430	Williams
34.3	Unknown	Inactive	1,338	Williams
34.4	Red-tailed Hawk	Active	1,868	Williams

Source: Carlson McCain, Inc. 2014.

Migratory Birds

Nongame birds encompass a variety of passerine and raptor species including migratory bird species that are protected under the MBTA (16 U.S.C. 703-711) and EO 13186 (66 Federal Register 3853). Pursuant to EO 13186, a Memorandum of Understanding (MOU) between the BLM and USFWS outlines a collaborative approach to promote the conservation of migratory bird populations. The purpose of the MOU is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds in coordination with state, tribal, and local governments. This MOU identifies specific activities where cooperation between the BLM and USFWS would contribute to the conservation of migratory birds and their habitat.

Migratory birds are considered integral to natural communities and act as environmental indicators based on their sensitivity to environmental changes caused by human activities. A variety of passerines occur in the Project area throughout the year; however, they are most abundant during the spring/fall migration, as well as during the breeding season (February 1 through July 15). Representative bird species that occur in the Project area include killdeer, common nighthawk, eastern kingbird, western kingbird, eastern bluebird, common yellowthroat, clay-colored sparrow, vesper sparrow, lark sparrow, western meadowlark, Say's phoebe, horned lark, barn swallow, black-billed magpie, common raven, and lark bunting (Stokes and Stokes 1996).

Special status bird species that may occur in the Project area are discussed in Section 3.10, Special Status Species.

3.9.1.4 Reptiles

Representative reptile species that could occur within the Project area (**Appendix C**) include the short-horned lizard, common snapping turtle, common garter snake, bullsnake, prairie rattlesnake, and western hognose snake (USGS 2006b).

3.9.2 Fisheries

3.9.2.1 Habitat

Aquatic habitat in the Project area includes streams, wetlands, ponds, rivers, and lakes. Most of the habitat consists of intermittent and ephemeral streams, which provide water only during spring run-off and seasonal storm events. The only perennial waterbody crossed by the proposed route is the Missouri River course through Lake Sakakawea. Aquatic species found in the Project area (**Appendix C**) are typical of the perennial and intermittent waterbodies found in the wetland communities of west-central North Dakota.

3.9.2.2 Aquatic Communities

Aquatic communities are defined as fish and invertebrate communities that inhabit perennial streams and pond/lake environments. The description of aquatic communities focuses on important fisheries, which are defined as species with recreational or commercial value or threatened, endangered, or sensitive status (i.e., special status). This section describes recreationally or commercially important fisheries that occur at, or immediately downstream of, the proposed crossings. Special status aquatic species are discussed in Section 3.10, Special Status Species. The Project area for aquatic resources includes Lake Sakakawea, intermittent streams, and wetlands that would be crossed by the proposed route.

Invertebrate communities in waterbodies in the Project area include worms, immature and adult insect groups, shellfish, and other forms of aquatic life. The composition can vary depending on flowing or standing water and other physical characteristics of the waterbody. They represent important food sources for fish and also are used as indicators of water quality conditions. For the purpose of describing aquatic resources, it is assumed that invertebrates are present in all waterbodies crossed by the proposed route.

3.9.2.3 Fish

The proposed route would cross one perennial stream and numerous intermittent streams (Section 3.5, Water Resources). The perennial stream (Missouri River [Lake Sakakawea]) is classified as a valuable fishery.

Game fish include a variety of warm water and coolwater species such as walleye, perch, paddlefish, Chinook salmon, crappie, catfish, bluegill, sauger, northern pike, bass, sturgeon, and trout (NDGFD 2014c). Native non-game species include flathead chub and sturgeon chub (Hagen et al. 2005).

3.9.2.4 Amphibians

Potential habitat for amphibians includes Missouri River/Lake Sakakawea and intermittent stream reaches, wetlands, and ephemeral ponds. Common species found in the Project area (**Appendix C**) include the eastern plains spadefoot, Canadian toad, Great Plains Toad, Woodhouse's toad, northern leopard frog, western chorus frog, wood frog, and tiger salamander (USGS 2006b).

3.9.2.5 Aquatic Nuisance Species

A nuisance species is an introduced species (plant or animal) that threatens the diversity or abundance of native species or the ecological stability of infested waters. Aquatic nuisance species can be introduced accidentally or purposely. The NDGFD (2014d,e) identifies the following as aquatic nuisance species:

Plants:

- Eurasion water-milfoil
- Curly-leaf pondweed

Animals:

- Zebra mussel
- New Zealand mudsnail
- Common carp
- Silver carp
- Rudd
- Ruffle
- Goby
- Northern snakehead
- Spiny water flea
- Hooked-tail water flea

3.10 Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the ESA and species designated as sensitive by the USFS. In accordance with the ESA, as amended, the lead agency (BLM), in coordination with the USFWS and USFS, must ensure that any action that they authorize, fund, or carry out would not adversely affect a federally listed threatened or endangered species.

As stated in Special Status Species Management Policy 6840 (6840 Policy) (Rel. 6-125), it also is BLM policy "to conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA provisions are no longer needed for these species, and to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing of these species under the ESA." Additionally, as stated in the USFS Manual (FSM 2670.22), it is USFS policy "to develop and implement management practices to ensure that species do not become threatened or endangered because of USFS actions; maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands; and develop and implement management objectives for populations and/or habitat of sensitive species."

3.10.1 Special Status Wildlife Species

A total of 28 special status terrestrial and aquatic wildlife species were identified by the USFWS and USFS as potentially occurring within the Project vicinity (Hagen et al. 2005; USFS 2011; USFWS 2013). The potential for occurrence of special status wildlife species within the Project area was based on range, known distribution, and the presence of suitable habitat crossed by the proposed route. These species, their habitat associations, and their potential occurrence within the Project area are summarized in **Appendix D**. Occurrence potential for each species was based on habitat requirements and known distribution. Based on these evaluations, 12 wildlife species (black-footed ferret, gray wolf, Rocky Mountain bighorn sheep, bald eagle, greater prairie chicken, greater sage-grouse, Argos skipper, broad-winged skipper, Dion skipper, mulberry wing, powesheik skipperling, and northern redbelly dace) have been eliminated from detailed analysis. The remaining 16 species analyzed, including 8 federally listed, proposed, or candidate species (i.e., northern long-eared bat, interior least tern, piping plover [critical habitat shown on **Figure 3.10-1**], rufa red knot, whooping crane, Sprague's pipit, pallid sturgeon, and Dakota skipper) have the potential to occur within the Project area, as described in **Appendix D**.

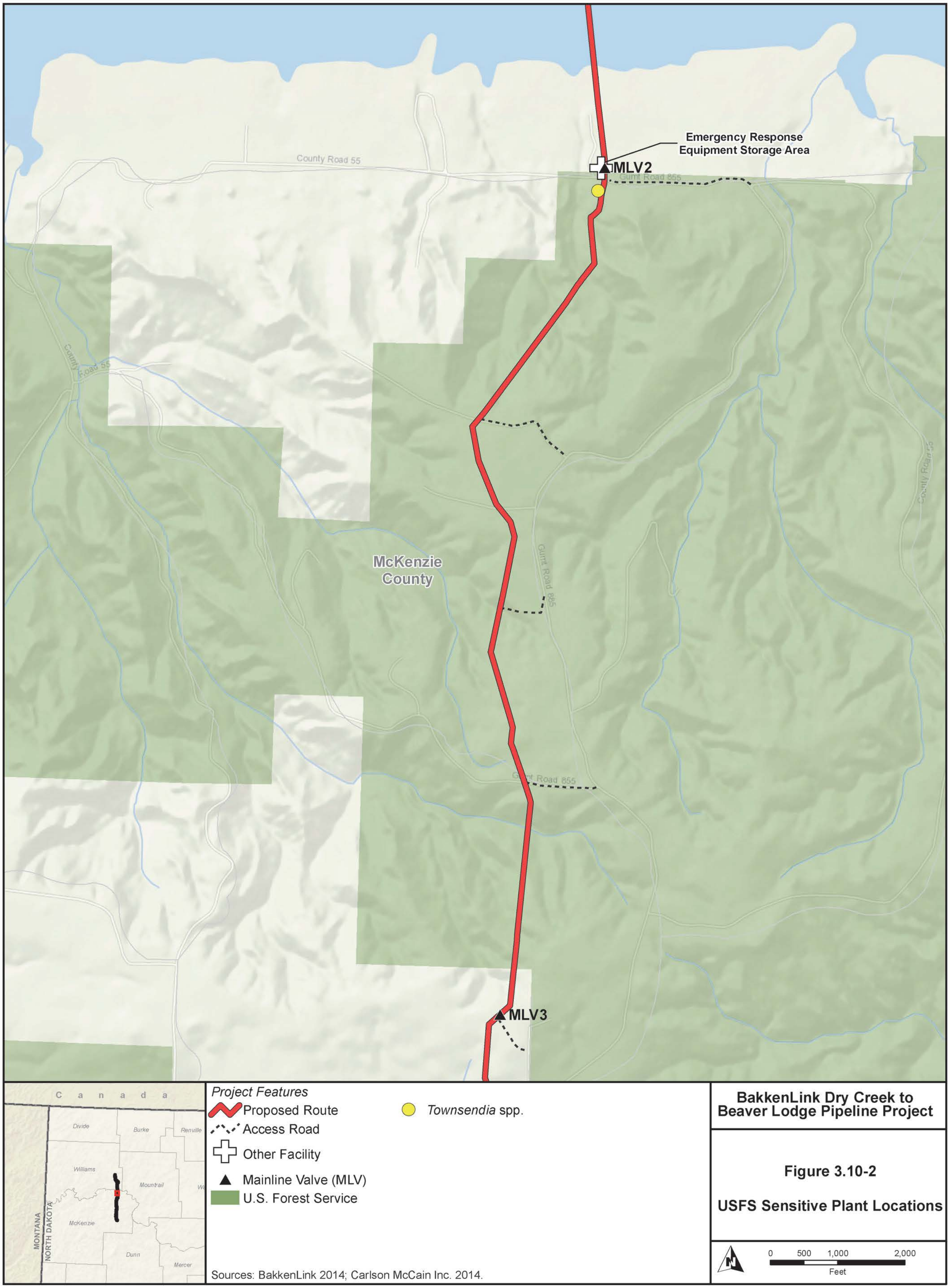
3.10.2 Special Status Plant Species

There are 14 USFS designated sensitive plant species on the LMNG (USFS 2011). No federally listed plant species were identified as potentially occurring within the Project area. The potential occurrence of special status plant species within the Project area was based on range, known distribution, and the presence of suitable habitat crossed by the proposed route (**Appendix D**). Of the 14 species, 6 species (Alkali sacaton, lance-leaf cottonwood, limber pine, nodding wild buckwheat, smooth goosefoot, and Torrey's cryptantha) were eliminated from detailed analysis; the remaining 8 species have the potential to occur within the Project area, as described in **Appendix D**.

Species-specific surveys were conducted in August and September 2011, and May, June, and July 2014, in accordance with USFS-approved survey protocol for all aforementioned 14 plant species. Presence/absence surveys were conducted within an extended 200- to 250-foot-wide survey corridor centered on the proposed route on federal property. Subsequent surveys were conducted on May 16, May 24, and in July 2012; and in May and July 2014, along proposed route realignment areas. Survey results indicate the presence of one sensitive species (*Townsendia* spp.), consisting of four populations within the survey area as illustrated in **Figure 3.10-2** (Carlson McCain, Inc. 2014). Based on the timeframe of the species-specific survey and lack of a flower head, *Townsendia* individuals were verified only to the genus level. This analysis assumes presence, and subsequent management, of the four *Townsendia* populations, based on the diagnostic characteristics and suitable habitat parameters present during identification.

Figure 3.10-1

Piping Plover Critical Habitat


Emergency Response
Equipment Storage Area
MLV2
County Road 55
Gunt Road 865
McKenzie
County
County Road 55
MLV3
Canada
Divide
Burke
Renville
Williams
Mountrail
McKenzie
Dunn
Mercer
MONTANA
NORTH DAKOTA
Project Features
Proposed Route
Access Road
Other Facility
Mainline Valve (MLV)
U.S. Forest Service
Townsendia spp.
Sources: BakkenLink 2014; Carlson McCain Inc. 2014.
BakkenLink Dry Creek to
Beaver Lodge Pipeline Project
Figure 3.10-2
USFS Sensitive Plant Locations
0
500
1,000
2,000
Feet

3.11 Land Use

Existing land use along the proposed route varies from cropland to grassland. Land uses within the Project area are listed by vegetation cover type in **Table 3.6-1**. Agriculture (14.2 percent) and livestock grazing (18 percent) are the primary land uses within the Project area. Other undeveloped areas are used for recreation activities such as hunting, fishing, and boating. Developed land supports commercial areas, family housing units, parks, golf courses, and facilities. Oil and gas development began in the area in the 1950s. Production of oil has increased drastically in McKenzie and Williams counties since 2004 (North Dakota Department of Mineral Resources 2014).

The proposed route traverses lands under the regulatory and management control of the USACE, USFS, North Dakota State Land (NDSL), and private land, which is regulated by county land use plans and ordinances. The land ownership crossed by the Project is illustrated on **Figure 3.11-1**. Land ownership is detailed in **Table 3.11-1**.

Table 3.11-1 Land Ownership[1]

Ownership	Miles	Percent of Proposed Route
NDSL	3.1	8.3
USFS	2.4	6.4
USACE	2.8	7.5
Private Land	29.1	77.8
Total	37.4	100

[1] Represents Project centerline ownership.

Source: USGS 2005.

Within USFS-managed areas, there are approximately 2.4 miles of national grassland crossed by the proposed route. National grasslands were established to ensure sustainable ecosystems, multiple benefits to people, scientific and technical assistance, and effective public service. In order to maintain these goals, the national grassland guidelines require special use permits for changes in land use. Guidelines allow that utility companies may construct facilities in new corridors, unless prohibited by management directions. Pipelines must be buried and other precautions must be made to minimize impacts to the environment, such as using existing corridors and disturbed areas as much as possible (USFS 2001).

The USACE acknowledges an existing utility corridor across their lands at and adjacent to the Missouri River/Lake Sakakawea crossing as describe in the Garrison Dam/Lake Sakakawea Master Plan and EA (USACE 2007). However, this corridor has not been formally designated by the USACE and is not shown in the Garrison Dam/Lake Sakakawea Master Plan and EA (USACE 2007).

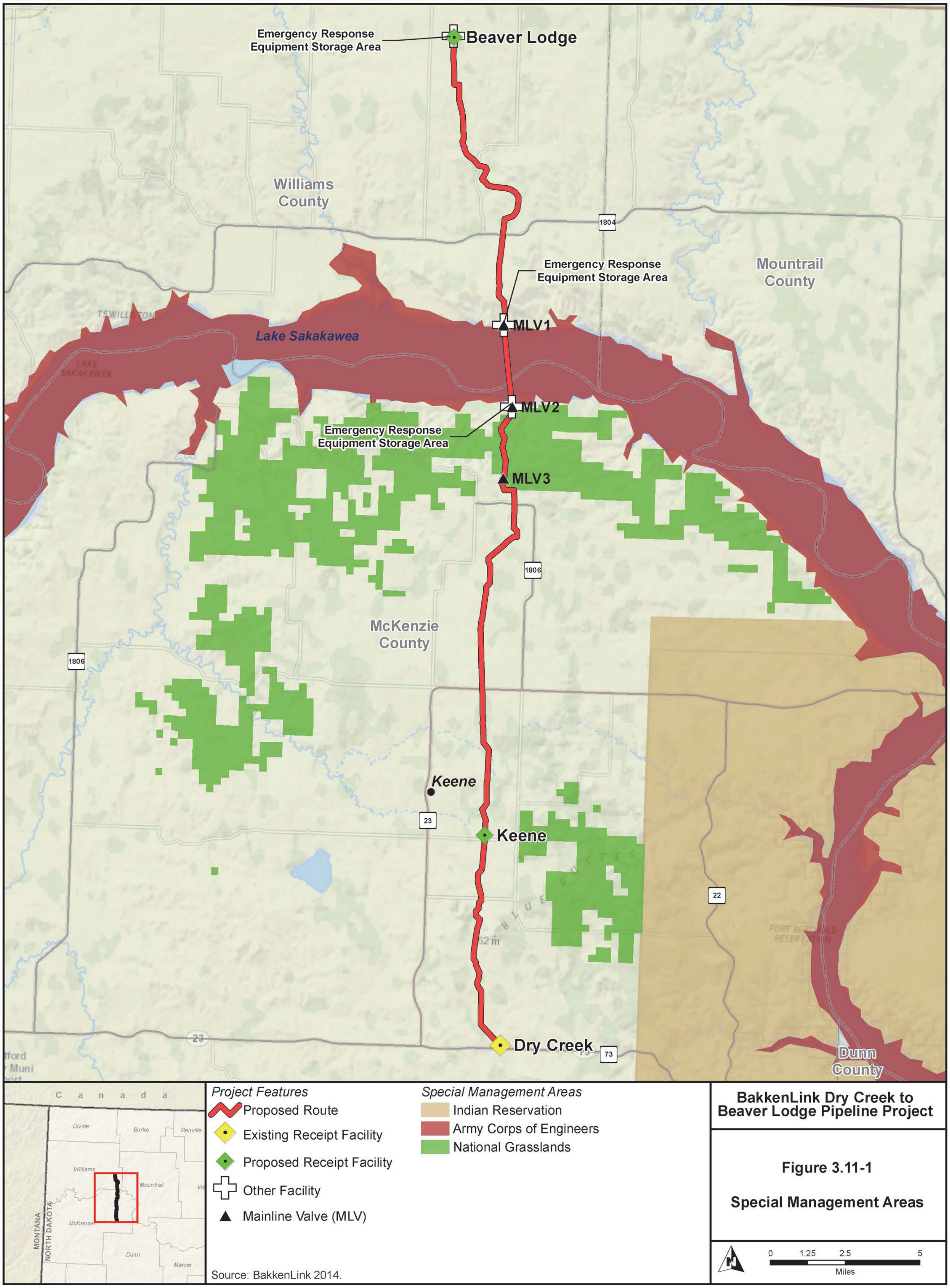


Figure 3.11-1

Special Management Areas

3.12 Recreation

Recreational opportunities in the Project vicinity include hunting, hiking, camping, and snowmobiling. Lake Sakakawea, a reservoir on the Missouri River, provides unique recreational opportunities in the central portion of the Project area. These activities include swimming, boating, fishing, hunting, bird watching, and other nature observations.

Hunting season in the Project area typically begins in late summer and ends in early winter, although there is a spring light goose conservation season normally lasting from mid-February to early May. White-tailed deer gun season for 2013 began November 8 and ended November 24. The general season for waterfowl in 2013 began September 21 for residents and September 28 for non-residents, and ended December 21 (NDGFD 2013a,b). Recreational opportunities on Lake Sakakawea are most prevalent during the summer; however, ice fishing is a popular winter activity on Lake Sakakawea. The NDGFD regulates fishing on the lake, but access is regulated by the USACE (NDGFD 2013c).

Big game hunting is a common activity in the Project area and is regulated by the NDGFD. The Project area is desirable for big game species such as white-tailed deer, pronghorn, mule deer, and, to a lesser extent, elk.

Small game species hunted in the Project area include sharp-tailed grouse, gray (Hungarian) partridge, wild turkey, ring-necked pheasant, and mourning dove. Many of these species are hunted in WMAs. These parcels of public land owned or leased by the NDGFD are managed to promote public hunting, fishing, and trapping. Many WMAs also are ideal for nature study, hiking, and primitive camping. **Table 3.12-1** details the WMAs in the Project vicinity as well as specific recreational activities for each WMA. Deer hunting is the most common hunting activity, followed by waterfowl and pheasant hunting.

Table 3.12-1 Wildlife Management Areas

WMA Location	WMA	Size (acres)	Recreational Use
McKenzie County	Antelope Creek	738	Deer, waterfowl, pheasant, sharp-tailed grouse, Hungarian partridge, fishing
	Lewis and Clark LS	8,138	Deer, waterfowl, pheasant, fishing
	Neus Point	500	Deer, turkey, pheasant
	Ochs Point	1,000	Deer, turkey, pheasant
	Overlook Point	32	Deer
	Sullivan	265	Deer, turkey, pheasant
	Tobacco Garden	392	Deer, waterfowl, pheasant, sharp-tailed grouse, Hungarian partridge
Williams County	Blacktail Dam	46	Fishing
	Blue Ridge	80	Sharp-tailed grouse, waterfowl
	Hofflund LS	1,558	Deer, waterfowl, pheasant, sharp-tailed grouse, Hungarian partridge, fishing
	McGregor Dam	191	Fishing, waterfowl, Hungarian partridge
	Trenton LS	2,647	Deer, waterfowl, pheasants, fishing

Source: NDGFD 2014d.

Lake Sakakawea provides waterfowl hunting opportunities for Canada goose, mallard, green-winged teal, northern pintail, and numerous other species. Fishing for walleye and northern pike on Lake Sakakawea also is a common recreational activity. Fishing opportunities also are available at a number of WMAs in the Project vicinity. Lewis and Clark, Hofflund, and Trenton WMAs are located on the banks of Lake Sakakawea and offer big game, waterfowl, and upland bird hunting opportunities, in addition to fishing. Ice fishing also is a popular wintertime activity on Lake Sakakawea. The NDGFD does not track WMA visitation.

Hunting and fishing opportunities also are provided by a collaborative relationship between the state of North Dakota and private land owners known as PLOTS. One of the primary objectives of PLOTS is to provide the public with opportunities to access fish and wildlife resources on private land, as well as the conservation of habitats for fish and wildlife populations. There are numerous private landowners near the Project area that take part in the program, and three that are adjacent to the proposed route in McKenzie County.

The proposed route traverses approximately 2.4 miles of the USFS LMNG in McKenzie County. Most of the recreational use is highly dispersed and includes camping, picnicking, hiking, hunting, fishing, and motorized vehicle use, where allowed. The proposed route does not pass through any USFS LMNG Recreation Management Areas or privately developed recreation areas.

3.13 Wilderness

In 1964, Congress established the National Wilderness Preservation System under the Wilderness Act. Federal lands qualifying as wilderness must be designated by Congress through legislation. Management agencies are charged with preserving the natural condition of these lands and providing opportunities for primitive and unconfined wilderness experiences (National Atlas 2004).

The nearest designated wilderness area to the Project area is the Theodore Roosevelt Wilderness, approximately 22 miles southwest of the Project area in McKenzie County (**Figure 3.1-1**). Theodore Roosevelt Wilderness was established in 1978 and totals 29,920 acres. Attractions in the wilderness area include wildlife viewing, a petrified forest, unique geology, and mixed-grass prairie. Wildlife viewing includes bison, elk, mule deer, white-tailed deer, pronghorn, and bighorn sheep. This wilderness area lies within the boundary of Theodore Roosevelt National Park and is managed by the NPS. The presence of the national park makes this a highly visited wilderness area. Theodore Roosevelt National Park welcomed 545,090 recreation visitors in 2013, down from 623,748 visitors in 2010 (NPS 2014). Backcountry camper use was up 15 percent over the same period, however, from 732 in 2010 to 841 in 2013 (NPS 2014).

3.14 Visual Resources

Scenic quality is the measure of the visual appeal of a unit of land. Section 102 (a) of the FLPMA states that "...the public lands are to be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values." Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed. Section 201(a) states that "the Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including scenic values)..." Section 505(a) requires that "each ROW shall contain terms and conditions which will...minimize damage to the scenic and esthetic values..."

Section 101 (b) of the NEPA requires that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

Under the FLPMA, the USFS developed standard visual assessment methodologies, known as the Scenery Management System (SMS), to inventory and manage scenic values on lands under their jurisdictions. Guidelines for applying the SMS system on USFS-administered lands are described in USFS Handbook 701. The Project crosses approximately 2.4 miles of USFS-administered lands.

SIOs establish limits of acceptable human alteration in form, line, color, and texture as the landscape moves toward a landscape character goal. SIOs are assigned for all USFS-administered lands through the national forest planning process and are described in **Table 3.14-1**. These objectives are based on visual inventories and management decisions made in forest plans, which must take into consideration the value of scenery. **Figure 3.14-1** illustrates the SIO units crossed by the Project.

Table 3.14-1 USFS Scenic Integrity Objectives

Very High (Unaltered-Preservation Visual Quality Objectives [VQO])	Very high scenic integrity refers to landscapes where the valued landscape character "is" intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.
High (Appears Unaltered-Retention VQO)	High scenic integrity refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.
Moderate (Slightly Altered-Partial Retention VQO)	Moderate scenic integrity refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
Low (Moderately Altered-Modification VQO)	Low scenic integrity refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but also compatible or complimentary to the character within.

Table 3.14-1 USFS Scenic Integrity Objectives

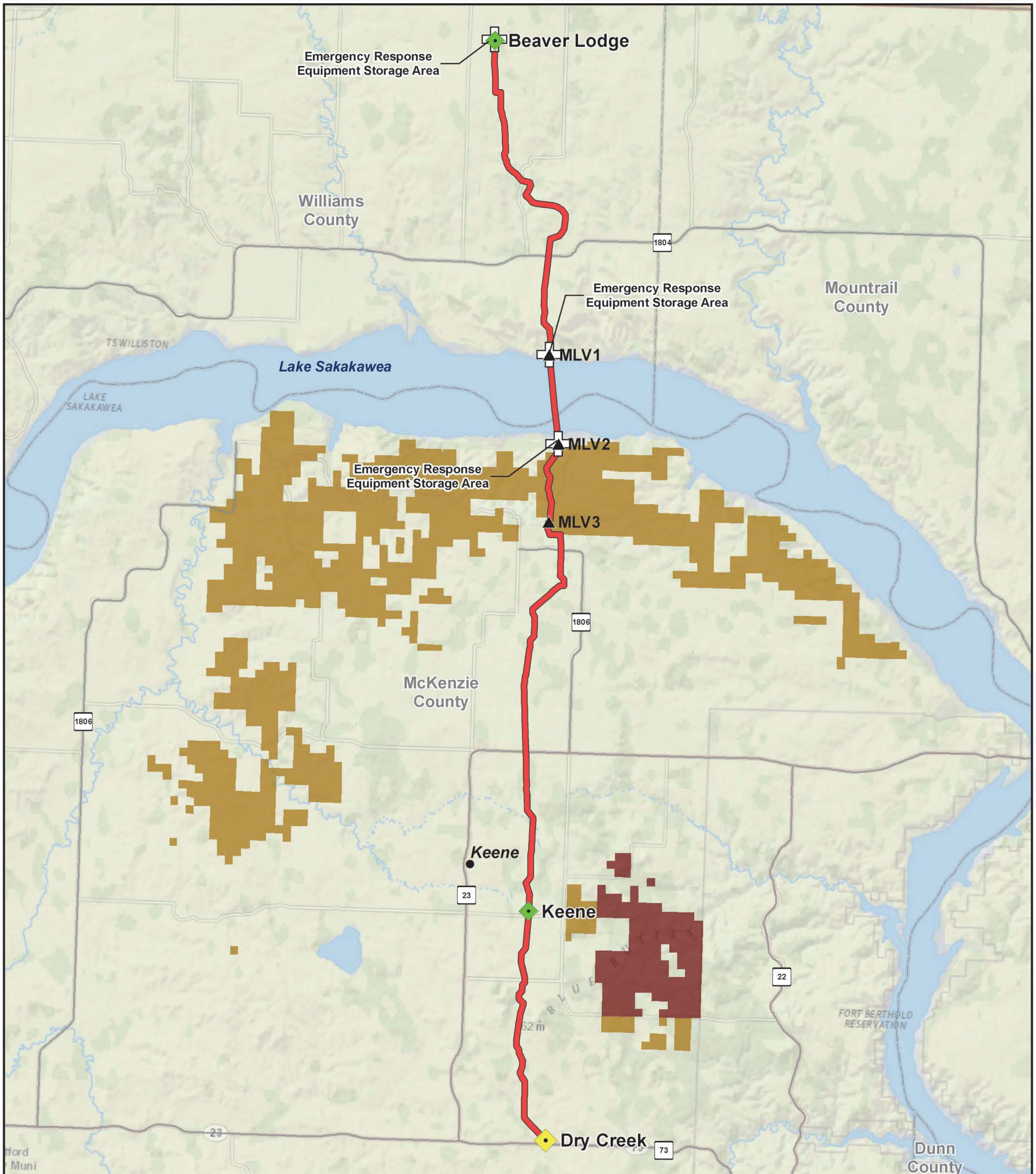
Very Low (Highly Altered-Maximum Modification VQO)	Very low scenic integrity refers to landscapes where the valued lands appear heavily altered. Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

Source: USFS 1995.

The Project crosses 2.4 miles of designated Low Scenic Integrity areas (**Figure 3.14-1**). The Project would closely parallel existing landscape modifications for the majority of its length.

The characteristic landscape of the Project area is contained within a variety of landforms, including the river valleys, plains, and topographically varied landscapes of the Missouri Plateau Region (glaciated sections) within the Great Plains physiographic province (Fenneman 1931). In general, the shales and clays are gray to brown, and the sandstones tend to appear yellowish orange to buff and tan. The Project crosses a mix of grassland and agricultural fields. Rangeland vegetation is dominated by mixed-prairie species. **Figures 3.14-2** through **3.14-4** illustrate four characteristic views of the Project area landscape. Human modifications to the natural landscape are sparsely scattered, but consist mostly of roads with occasional clusters of ranch buildings and fences. There are few populated settlements.

The U.S. and state highways that afford public viewing opportunities of the Project include SH 23, SH 73, SH 1806, and SH 1804. The Project also is visible from less-traveled roads and homes within its viewsheds. The Project is visible from towns and villages and from designated recreation areas, including boating areas of Lake Sakakawea.



Project Features

- Proposed Route
- Existing Receipt Facility
- Proposed Receipt Facility
- Other Facility
- Mainline Valve (MLV)

Scenic Integrity Objectives

- High
- Low

Sources: BakkenLink 2014; USFS 2014.

BakkenLink Dry Creek to Beaver Lodge Pipeline Project

Figure 3.14-1

Scenic Inventory Objectives

0 1.25 2.5 5
Miles

Figure 3.14-2 Typical View of Lake Sakakawea Shore Areas Crossed by the Pipeline ROW

Figure 3.14-3 Typical View of the Grassland Crossed by the Pipeline ROW

Figure 3.14-4 Typical View of the Agricultural Cropland Crossed by the Pipeline ROW

3.15 Noise

Sound intensity is measured by the dB. Audible sounds range from 0 dB (“threshold of hearing”) to about 140 dB (“threshold of pain”), and the normal audible frequency range is approximately 20 Hz to 20 kHz. The A-weighted scale is used in most noise ordinances and standards, and approximates the range of human hearing by filtering out lower frequency noises, which are not as damaging as higher frequency noises. Breathing has a decibel level of 11 dBA; conversational speech is 60 dBA; and aircraft takeoff is 150 dBA (McCain and Associates, Inc. 2011). **Table 3.15-1** displays the OSHA permissible time limits at different sound levels.

Table 3.15-1 OSHA Noise Exposure Time Limits

dB	Exposure Time
85 dB	8 hours
88 dB	4 hours
91 dB	2 hours
94 dB	1 hour
97 dB	30 minutes
100 dB	15 minutes

Source: McCain and Associates, Inc. 2011.

The Project would be constructed entirely through rural areas where the nearest residences would be at least 500 feet from the ROW. Existing noise sources in rural areas are predominantly natural (i.e., wind, birds). Other sources of noise in rural and agricultural areas are roadway traffic and farm equipment on a seasonal basis. Portions of the Project area are located along highways and truck routes, such as SH 23, SH 1804, and SH 1806, as well as railroads. Generally, background noise levels in rural areas vary between 40 and 50 dBA (McCain and Associates, Inc. 2011). The background level can be affected by atmospheric conditions, wind levels, topography, vegetation, time of day, birds, and human activity.

3.16 Socioeconomics

This section summarizes historical and current socioeconomic conditions in the two North Dakota counties (McKenzie and Williams) that would be affected by the Project. The largest city in the two-county socioeconomic Project area is Williston, which is approximately 30 miles west of the proposed route. Elements reviewed include population, economic conditions, income, employment, housing, local government facilities and services, and local government fiscal conditions.

3.16.1 Population

The Project area is predominantly rural and sparsely populated. The largest city in the Project region is Williston, with a 2010 population of 14,716 and an estimated 2012 population of 18,532. Williston has experienced a marked increase in population, with a growth of 18 percent from 2000 to 2010 and an estimated additional 26 percent by 2012. As shown in **Table 3.16-1**, the population in McKenzie and Williams counties has increased from 2000 to 2010; especially from 2010 to 2012, which was at a pace much greater than that of the state.

Table 3.16-1 Local Population

	Population			Average Annual Percent Change	
	2000	2010	2012	2000 to 2010	2010 to 2012
North Dakota	642,195	672,591	699,628	0.5	2.0
McKenzie County	5,737	6,360	7,987	1.0	12.1
Williams County	19,761	22,398	26,697	1.3	9.2

Source: U.S. Census Bureau 2014.

This unusually rapid increase in population can have substantial community resource effects, especially on housing and law enforcement, when it occurs over a short timeframe. Somewhat surprisingly, considering the character of the oil field “boom,” both McKenzie and Williams counties have higher percentages of family households – as distinguished from non-family households – than the state as a whole. Both counties have moderately higher percentages of households with 3 and 4 or more persons per household than does the state.

3.16.2 Economic Conditions

A primary industry for the two affected counties within the Project area is agriculture. The most common crop produced is wheat, followed by lentils, barley, oats, dry edible beans and peas, and sugar beets (McCain and Associates, Inc. 2011). Livestock also is a prominent industry within the Project area, primarily producing beef cattle and hogs. Although oil and gas exploration has been occurring in the Project area since 1951, the industry has played a significantly increased role in the local economy in recent years with discovery of the increased potential of the Bakken Field using improved drilling technology. Oil and gas production is concentrated in western North Dakota; however, the secondary effects (refining and transporting) significantly benefit the entire state’s economy (McCain and Associates, Inc. 2011). North Dakota has risen to become the second largest producer of crude oil in the U.S., at a rate approaching 1 million barrels a day (North Dakota Petroleum Council 2014).

The most significant provider of services in the Project region is Williston. Colleges and universities often serve as local hubs of economic development. Higher education is available in Williston through Williston State College, a 2-year university under the jurisdiction of the North Dakota State Board of Higher Education. Dickinson State University in Dickinson, approximately 60 miles south of the Project, is the nearest 4-year college. Air service in Williston is provided out of the Sloulin Field International Airport. A new terminal opened in 2005. Commercial service in Dickinson is provided out of the Theodore Roosevelt Regional Airport. The airport has two runways. Commercial air service to both Williston and Dickinson is provided by Delta, United Airlines, and their regional affiliates.

Hunting and fishing provide a large recreational draw that has a sizeable economic ripple effect in the Project region, although the economic impact has not been quantified. Hunting in the area includes big game and small game prospects on private, state, and federal lands, as well as waterfowl on Lake Sakakawea. Hunting opportunities include white-tailed deer, mule deer, pronghorn, and elk, as well as pheasant, sharp-tailed grouse, and waterfowl (McCain and Associates, Inc. 2011). Fishing for walleye and northern pike in nearby Lake Sakakawea attract many visitors to the area.

3.16.3 Income

Table 3.16-2 details median household and per capita incomes for McKenzie and Williams counties. Both counties show sizeable increases in income from 1999 to 2012. The largest increase occurred in Williams County at an average of over 6 percent per year; however, both counties' rates of increase were larger than experienced by North Dakota as a whole during the same timeframe.

Table 3.16-2 Income Characteristics

	Median Household Income			Per Capita Income		
	1999	2012	Average Annual % Change	1999	2012	Average Annual % Change
North Dakota	$34,604	$51,641	3.1	$17,769	$28,700	3.8
McKenzie County	$29,342	$61,893	5.9	$14,732	$33,574	6.5
Williams County	$31,491	$69,617	6.3	$16,763	$35,824	6.0

Source: U.S. Census Bureau 2014.

Table 3.16-3 presents employment and wage data for McKenzie and Williams counties. The occupations selected consist of those most directly affected by the Project or that may play a vital role in the regional economy. Average weekly wages in the mining/oil and gas extraction, construction, and transportation and warehousing sectors have increased dramatically from 1999 to 2012. Wage rates in all selected sectors have increased through the period. Mining/oil and gas extraction is one of the highest paying sectors for wage and salary employment.

Table 3.16-3 Annual Employment and Wage Data

	Average Weekly Wage			Average Employment		
Occupation	2005	2012	% Change	2005	2012	% Change
Region 1 (Williams and McKenzie counties)						
Mining, Quarrying, and Oil and Gas Extraction	$1,110	$1,902	71.4%	1,527	14,062	820.9%
Construction	$754	$1,495	98.3%	549	5,133	835.0%
Transportation and Warehousing	$843	$1,577	87.1%	438	4,116	839.7%
Agriculture, Forestry, Fishing, and Hunting	--*	$881	NA	--*	123	NA
Healthcare and Social Assistance	$519	$805	55.1%	1,931	1,824	-5.5%

* Denotes non-disclosable data.

Source: North Dakota Workforce Intelligence Network 2014.

3.16.4 Employment

Despite the economic downturn in the rest of the country, total employment in the Project area has increased dramatically from 2001 through 2013 (**Table 3.16-4**). Unemployment rates in the Project area have been consistently low relative to other parts of the country, but current rates are at or below 1 percent, which is indicative of the extremely limited local labor market. As shown in **Table 3.16-3**, the mining/oil and gas extraction sector, as well as supporting sectors such as construction and transportation and warehousing, were among the largest in terms of average employment in the Project area, registering substantial increases from 2005 to 2012. Healthcare and social assistance and public administration also are notable occupations in terms of annual employment in the Project area.

Table 3.16-4 Socioeconomic Project Area Labor Force Statistics

	2001	2005	August 2011	November 2013	Change 2001-2013 (%)
McKenzie County					
Labor Force	2,708	2,694	4,540	8,034	196.7%
Employment	2,637	2,593	4,474	7,950	201.5%
Unemployment	71	101	66	84	--
Unemployment Rate	2.6%	3.7%	1.5%	1.0%	--
Williams County					
Labor Force	10,939	11,715	23,881	47,468	333.9%
Employment	10,692	11,443	23,640	47,180	341.3%
Unemployment	247	272	241	288	--
Unemployment Rate	2.3%	2.3%	1.0%	0.6%	--

Source: North Dakota Workforce Intelligence Network 2014.

3.16.5 Housing

The dramatic surge in oil and gas development in northwestern North Dakota has stressed the housing markets in the Project area and surrounding counties. Workforce-related housing during construction could be an important concern with any substantial project development. Status of the housing market and availability of various types of housing are constantly changing in this market environment. The 2010 Census counted 3,090 housing units in McKenzie County and 10,464 units in Williams County (**Table 3.16-5**). At that time, the vacancy rates in owner units were extremely low: 0.5 percent in McKenzie County and 0.6 percent in Williams County. The commensurate vacancy rates for rental units were notably higher at 8.5 percent and 4.2 percent, respectively. However, rental units made up only slightly over one-quarter of all housing units in both counties so the vacant rental units represented just 2.3 percent of all housing units in McKenzie County and an even lower 1.2 percent of all housing units in Williams County. By 2012, just 2 years after the census, the total number of housing units in McKenzie County had increased by 7.6 percent and the total in Williams County had increased by 19.4 percent. Despite the increases in housing supply, vacancy rates had shrunken further in the face of booming demand. For McKenzie and Williams counties, the homeowner vacancy rates had fallen to 0.8 percent and 0.2 percent, respectively, and the rental vacancy rates had fallen to zero percent and 1.2 percent, respectively. With the demand for housing continuing to grow much faster than supply, the oil and gas developers and some support industries have brought in temporary worker housing ranging from ad hoc RV sites to full-blown man camps to accommodate single status workers. There currently are more than 30 such camps with bed capacity estimated at over 10,000 workers.

Table 3.16-5 Housing Occupancy 2010

	McKenzie County	Williams County	Fort Berthold Indian Reservation*	North Dakota
Total Housing Units (2010)	3,090	10,464	442	317,498
Occupied	2,410	9,293	394	281,192
Vacant	680	1,171	48	36,306
Owner Units Vacancy Rate (%)	0.5	0.6	NA	1.5
Rental Vacancy Rate (%)	8.5	4.2	0	7.1

* Includes only the portion of the Reservation in McKenzie County.
Source: U.S. Census Bureau 2014.

3.16.6 Local Government Facilities and Services

McKenzie and Williams county governments provide an array of governmental services including general county government, law enforcement, fire protection, road and bridge infrastructure, solid waste disposal, and education. Fire protection typically is provided by rural volunteer fire departments. The larger cities, such as Williston, also are mostly served by volunteer fire departments. Medical care also can be found in Dickinson and Williston.

The proposed route would traverse portions of two school districts: McKenzie County District #1, serving much of McKenzie County, and Tioga District #15 in the southeast corner of Williams County. McKenzie County District #1 has one K through 5 elementary school and one 6 through 12 junior-senior high school, both located in Watford City. Tioga District # 15 has one K through 6 elementary and one 7 through 12 high school located in Tioga. As noted in **Table 3.16-6**, both districts experienced declining enrollments prior to 2010, but both have seen dramatic increases since the 2009-2010 school year. The Tioga District has had particularly large enrollment increases in the elementary grades and passed a bond issue in early 2014 to support expansion of its elementary school and other improvements (Johnston 2014). The district also has experienced challenges in staffing to accommodate the enrollment growth, resorting to providing subsidized housing in the face of significant increases in rents in recent years (Johnston 2014). The McKenzie County district added on to its elementary school in 2013, but has seen the added capacity nearly used up by enrollment growth. The district has scheduled a bond issue election in the spring of 2014, hoping to be able to build a new high school. Staffing for the growth has challenged the district, leading to a joint effort with Watford City to provide affordable housing for some public employees (Holen 2014).

Table 3.16-6 School District Enrollments

School District	School Year Total Enrollment			Percent Change	
	1999-2000	2009-2010	2013-2014	1999-2000 to 2009-2010	2009-2010 to 2013-2014
McKenzie County #1	669	544	1,025	-18.7	88.4
Tioga #15	346	291	476	-15.9	63.6

Source: North Dakota Department of Public Instruction 2014, 2010, 2000.

Public facilities and services in the Project region have been stressed by the dramatic influx of new workers into the local population. As evidenced by the housing market activity and the presence of man camps, local governments have faced substantial challenges in providing sufficient facilities and services to the rapidly growing population. All fire protection services in the Project region are provided by volunteer departments located in communities throughout the two counties. The nearest departments are located in Ray and Tioga in Williams County and in Watford City in McKenzie County. Fire calls in recent years have increased three to four fold from a variety of sources, ranging from grass fires caused by private generators and gas flares to motor vehicle accidents (Hallesy 2014).

Except in Williston and Watford City, where ambulance services have some paid staff, ambulance services also are staffed by volunteers; the departments nearest the Project area in Williams County are located in Tioga and Ray. McKenzie County Ambulance Service is based in Watford City. Medical care in the Project region is provided by a combination of 24- and 25-bed critical access hospitals in Williston, Watford City, and Tioga, and rural health clinics in Watford City and Tioga. McKenzie County Health Care System is planning to start construction in 2014 on a new hospital, clinic, and nursing home in Watford City.

The City of Williston is served by a municipal police department with 21 sworn officers. The growth of the local population in recent years has resulted in a tripling of the call volume for the Williston Police Department. Calls outside the city limits are answered by county sheriffs or the state patrol. The Williams County sheriff's office added 15 deputies in 2013, effectively doubling the staff of sworn officers to approximately 28 individuals. The McKenzie County sheriff has tripled staff in recent years to approximately 15 sworn officers and plans to add 3 more in 2014 (Lass 2014).

3.16.7 Local Fiscal Conditions

The State of North Dakota levies a 5 percent tax on sales and use of most goods. Neither of the counties in the Project region levies a sales tax. The cities of Ray, Tioga, Watford City, and Williston levy both sales and use taxes and lodging taxes. The rates range from 1.0 percent in Watford City to 2.5 percent in Tioga for sales and use taxes. The lodging tax is 1.0 percent in Ray and 2.0 percent in the other communities.

The "true and full value" of pipelines is determined by the state. This value is halved to determine the assessed value; the taxable value is 10 percent of the assessed value. County mill rates are applied to the taxable value to determine the amount of property tax that is owed. Property taxes are a major source of county and school district revenue. Tax revenues are allocated to county funds, school districts, special districts, and municipalities. **Table 3.16-7** illustrates the total property tax revenue for each county in the Project region and the portion that is attributable to pipelines. As shown, pipelines in McKenzie County contribute between one-quarter and one-third of the county's total property tax revenue. Williams County has a much larger base of assessed valuation than McKenzie County. As a result, although the tax revenue from pipelines is fairly similar in both counties, the percentage of total property tax revenue in Williams County is much smaller, ranging from 4.8 percent in 2005 to 9.5 percent in 2012.

Table 3.16-7 Property Tax Summary

County	Taxes Levied on Pipelines ($)			Total Ad Valorem Property Taxes and Special Assessments ($)		
	2005	2010	2012	2005	2010	2012
McKenzie County	1,144,329	1,068,321	2,231,083	4,546,665	4,604,562	6,835,766
Williams County	831,112	1,426,198	2,672,424	17,266,076	20,228,934	28,075,639

Source: North Dakota Office of State Tax Commissioner 2012, 2010, 2005.

3.17 Environmental Justice

Since publication of EO 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations* in the Federal Register on February 11, 1994 (59 Federal Register 7629), federal agencies have been developing a strategy for implementing the EO. Currently, the federal agencies rely on the *Environmental Justice Guidance* under the NEPA prepared by the CEQ (CEQ 1997) in addressing EO 12898 in NEPA documents.

Pursuant to EO 12898 on Environmental Justice, federal agencies shall make the achievement of environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Indian tribes, and allowing all portions of the population an opportunity to participate in the development of, compliance with, and enforcement of federal laws, regulations, and policies affecting human health or the environment regardless of race, color, national origin, or income. EO 12898 requires identifying whether an area potentially affected by a proposed federal action may include minority populations and/or low-income populations and seek input accordingly. For the purpose of this EA analysis, the "affected area" is defined as McKenzie and Williams counties, the two counties that the proposed route crosses.

3.17.1 Minority Populations

A description of the racial and ethnic population groups residing in the counties that would be crossed by the proposed route is presented in **Table 3.17-1**.

Table 3.17-1 Race and Poverty Characteristics of Affected Counties in the Project Area

State/County	Race as a Percent of Total Population (estimated)[1]						Population at or Below Poverty Level, 2012 (%)	Median Household Income, 2012
	White	Black or African American	American Indian and Alaska Native	Asian	Two or More Races	Hispanic or Latino Origin[1]		
North Dakota	90.1	1.5	5.5	1.1	1.8	2.5	12.1	$51,641
McKenzie County	79.2	0.4	18.4	0.4	1.6	3.5	13.2	$61,893
Williams County	92.1	0.8	3.9	0.5	2.7	3.1	8.1	$69,617

[1] People who identify their origin as Hispanic or Latino may be of any race. Thus, the percent Hispanic or Latino should not be added to the race as percentage of population categories.

Source: U.S. Census Bureau 2014.

The *Environmental Justice Guidance* states that "a minority population may be present if the minority population percentage of the affected area is 'meaningfully greater' than the minority population percentage in the general population or other 'appropriate unit of geographic analysis' (CEQ 1997)."

The proposed route would pass through McKenzie and Williams counties. Most of the Project area is sparsely populated; it is dotted with numerous oil well pads and is home to sprawling cattle ranches. According to U.S. Census statistics, the populations of both counties are primarily white. The largest minority population in the state and in both counties is American Indian, followed by those of Hispanic or Latino origin. McKenzie County recorded an American Indian population of 18.4 percent, well above the North Dakota state average. This large American Indian population can be attributed to the Fort Berthold Indian Reservation, a portion of which is in McKenzie County. The Project is not located within the Reservation boundaries. At its closest, the Reservation is approximately 5 miles east of the proposed route. Nevertheless, the American Indian population in McKenzie County would be considered meaningfully greater than for the state as a whole and, as such, would be considered an identified minority population for purposes of environmental justice review.

The Hispanic or Latino is the second largest minority group in both counties and in the state. However, the county populations are not sufficiently larger than the state population to be considered “meaningfully greater” for purposes of this analysis.

3.17.2 Low-income Populations

The EO guidance recommends that low-income populations in an affected area be identified using the annual statistical poverty thresholds from the U.S. Census Bureau. In identifying low-income populations, agencies may consider a community as either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure.

The proposed route would pass through sparsely populated rural areas. Median household incomes for both McKenzie and Williams counties were substantially above the state median income (**Table 3.17-1**). The 2012 median household income for both counties indicates a general level of income that was well above the poverty threshold. However, the percentages of persons below the poverty level represent 13.2 percent of the population in McKenzie County, slightly above the state’s 12.1 percent. Williams County has just 8.1 percent below the poverty level. The Fort Berthold Indian Reservation has a poverty rate of 38.0 percent, well above the rates for the state and both counties. Although the total numbers are small, the unusually high level of poverty on the Reservation is likely a significant factor in McKenzie County’s level exceeding the state level. According to the CEQ guidance, the exceptionally high percentage of the Reservation population living below the poverty threshold would classify that as a low-income population for purposes of environmental justice analysis.

3.18 Transportation

The proposed route occurs in the vicinity of four major roads. **Table 3.18-1** lists these roads and highways near the proposed route, together with traffic volumes for selected years. SH 23 is a two-lane paved ”state corridor” highway that runs east from U.S. Highway 85 to Johnson’s Corner where it turns north, intersects SH 1806, and continues east toward New Town. SH 1804 is designated a “district corridor” on the state performance classification system; SH 1806 is designated a “district collector.” SH 1804 and SH 1806 are both paved two-lane highways. SH 73 is a two-lane paved major road that continues east once SH 23 turns north until it meets the floodplain of Lake Sakakawea. Areas between the major highways are served by an irregular network of mostly unpaved roads ranging from unmaintained 4-wheel drive trails to gravel-surfaced county roads. As **Table 3.18-1** illustrates, traffic volumes have increased dramatically over the past decade as a result of oil and gas development in the Bakken Formation.

Table 3.18-1 Traffic Levels for Major Highways Near the Proposed Route

		Traffic Counts (AADT[1])							
		2001		2006		2011		2013	
Highway	Location	Total Traffic	Trucks	Total Traffic	Trucks	Total Traffic	Trucks	Total Traffic	Trucks
SH 23	West of SH 23/SH 73 intersection	750	210	850	140	3,255	1,355	6,490	3,075
SH 23	East-west segment near SH 1806 intersection	460	90	575	130	2,715	1,575	3,745	1,665
SH 73	East of SH 23/SH 73 intersection	300	55	230	35	1,045	500	4,050	2,065
SH 1804	West of the Mountrail County line	350	65	410	130	1,420	625	1,700	1,000
SH 1806	East-west segment east of CR 55 intersection	90	25	50	15	200	150	140	55

[1] Annual Average Daily Traffic.

[2] Extrapolated from AADT.

Sources: North Dakota Department of Transportation 2014, 2012, 2007, 2002.

In addition to the highway system, Sloulin Field International Airport in Williston, the Watford City Municipal Airport in Watford City, and Theodore Roosevelt Regional Airport in Dickinson provide for air travel to northwestern North Dakota and the Project region. The Burlington Northern Santa Fe operates a rail line in Section 10, T139N, R100W at the northern portion of the proposed route near the proposed Beaver Lodge Receipt Facility (McCain and Associates, Inc. 2011).

3.19 Public Safety

The primary concern for public health and safety in the Project area is the increased traffic and potential traffic incidences related to oil and gas production in the Bakken Formation.

The presence of heavy traffic was acknowledged by the Theodore Roosevelt Expressway Association to be an escalating problem. Presently, the North Dakota Department of Transportation is in the process of researching traffic reliever routes for the impacted cities of Williston, Alexander, Dickinson, and potentially Watford City and New Town. Traffic signals for the bypass loop and the North Dakota U.S. Highway 85 west turn at Watford City also have been installed recently and now meet federal code.

Traffic levels for interstate and U.S. highways and state routes are described in Section 3.18, Transportation. Additional truck traffic on narrow state collector highways also warrants expanding narrow lanes and shoulders to ensure the safety of highway travelers (North Dakota State University [NDSU] 2010). Increased traffic also exposes the public to more ambient dust. The most impacted areas are employing dust suppressants to mitigate against dust-related health and safety impacts (NDSU 2010).

3.20 Hazardous Materials and Solid Waste

3.20.1 Hazardous Materials

3.20.1.1 Regulatory Framework

"Hazardous materials," which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and the environment when not properly managed. The term hazardous materials include the following materials that may be utilized or disposed of during construction and operation:

- Substances covered under OSHA Hazard Communication Standards (29 CFR 1910.1200 and 30 CFR 42): The types of materials that may be used in pipeline construction and operational activities and that would be subject to these regulations would include almost all of the materials listed in **Table 3.20-1**.

Table 3.20-1 Hazardous Materials Typically Used in Pipeline Construction and Operation

Canned spray paint
Compressed gases (flammable and nonflammable)
Diesel deicer
Drilling fluid
Fire extinguishers
Gasoline treatment
Glycols (ethylene glycol, propylene glycol, triethylene glycol)
Herbicides
Lead acid batteries
Methanol
Penetrating oil
Pesticides
Petroleum-based lubricants and fluids (motor oil, grease, hydraulic fluid, transmission oil)
Petroleum fuels (gasoline, diesel)
Pipe coating resin
Solvents/solvent containing products
Starter fluid

Sources: BLM 2005; Folga 2007; Pharris and Kolpa 2007.

- "Hazardous materials" as defined under USDOT regulations at 49 CFR 170-177: The types of materials that may be used in construction and operational activities and that would be subject to these regulations would include sodium cyanide, explosives, cement, fuels, some paints and coatings, and other chemical products.
- "Hazardous substances" as defined by Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and listed in 40 CFR Table 302.4: The types of materials that may contain hazardous substances that would be subject to these requirements would include solvent-containing materials (e.g., paints, coatings, degreasers), acids, and other chemical products.
- "Hazardous wastes" as defined in the Resource Conservation and Recovery Act (RCRA): Procedures in 40 CFR 262 are used to determine whether a waste is a hazardous waste. Hazardous wastes are regulated under Subtitle C of RCRA.

- Any “hazardous substances” and "extremely hazardous substances" as well as petroleum products such as gasoline, diesel, or propane, that are subject to reporting requirements if volumes on-hand exceed threshold planning quantities under Sections 311 and 312 of SARA: The types of materials that may be used in construction and operational activities and that could be subject to these requirements would include fuels, coolants, acids, and solvent-containing products such as paints and coatings.
- Petroleum products defined as "oil" in the Oil Pollution Act of 1990: The types of materials that would be subject to these requirements include fuels, lubricants, hydraulic oil, and transmission fluids.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- The Superfund Amendments and Reauthorization Act Title III List of Lists or the Consolidated List of Chemicals Subject to Emergency Planning and Community Right-to-Know Act and Section 112(r) of the CAA.
- The USDOT listing of hazardous materials in 49 CFR 172.101.

Certain types of materials, while they may contain potentially hazardous constituents, are specifically exempt from regulation as hazardous wastes. Used oil, for example, may contain toxic metals, but would not be considered a hazardous waste unless it meets certain criteria. Other wastes that might otherwise be classified as hazardous are managed as “universal wastes” and are exempted from hazardous waste regulation as long as those materials are handled in ways specifically defined by regulation. An example of a material that could be managed as a universal waste is lead-acid batteries. As long as lead-acid batteries are recycled appropriately, requirements for hazardous waste do not apply.

3.20.1.2 Hazardous Materials Use

A number of hazardous substances are used in the construction, operation, and maintenance of pipelines. **Table 3.20-1** lists common types of hazardous materials that could be used, but it is not a comprehensive list.

3.20.2 Solid Waste

3.20.2.1 Regulatory Definition of Solid Waste

Solid waste consists of a broad range of materials that include garbage, refuse, wastewater treatment plant sludge, non-hazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances) resulting from industrial, commercial, mining, agricultural, and community activities (USEPA 2006). Solid wastes are regulated under different subtitles of RCRA and include hazardous waste (discussed in the previous section) and non-hazardous waste. Non-hazardous wastes are regulated under RCRA Subtitle D.

3.20.2.2 Solid Waste Generation

Solid waste generated from pipeline construction is minimal when compared to other types of industrial and commercial construction projects. Solid waste generated from construction and operation of the proposed pipeline and associated facilities generally would consist of construction rubble (e.g., excess or off-spec concrete, soil, and rock), paper, cardboard and packing material, brush, other vegetation, scrap metal, discarded food, trash, garbage, general refuse, equipment maintenance waste (filters, used oil), and regulation-defined empty containers. The generation of hazardous waste during construction is not anticipated and most likely would occur as result of spill cleanup and remediation.

Pipeline operations may generate solid wastes similar to construction activities, but maintenance of the pipeline has the potential to produce waste in the form of sludge and other liquid (including hydrostatic test water) or solid waste generated during cleaning and repair of the pipeline and pumping facilities. These materials may be hazardous wastes depending upon the outcome of analytical testing or knowledge of process generating the materials.

3.20.2.3 Contaminated Sites

In spite of the generally rural areas crossed by the proposed route, there is always the potential that contaminated sites are present, given that proposed routes often parallel or are within existing utility and transportation corridors. Contaminated sites can result from industrial activities (e.g., mineral extraction, mineral processing, and manufacturing) or from commercial activities (e.g., fuel storage for retail outlets, vehicle maintenance). Active or closed landfills or unauthorized dumps also may present potential contamination concerns.

3.21 Cultural Resources

3.21.1 Types of Cultural Resources

A cultural resource is a definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence (BLM 2004). Cultural resources generally must be at least 50 years old and encompass a diverse array of property types including buildings, structures (e.g., bridges, canals, railroads), sites, objects, and districts. In addition, certain cultural resources may be defined as cultural landscapes, which are classified either as historic sites, historic designed landscapes, historic vernacular landscapes, or ethnographic landscapes (NPS 1998). Finally, certain areas that are associated with the cultural practices or beliefs of a living community or cultural group may qualify for consideration as traditional cultural properties (Parker and King 1998).

3.21.2 Applicable Federal Laws and Regulations

Federal historic preservation laws provide a mandate and procedures for the identification, documentation, evaluation, and protection of cultural resources that may be affected by federal undertakings, which can include private undertakings operating under federal license or on federally managed lands. The NEPA requires federal agencies involved in undertakings to consider the potential effects to the "human environment"—an all-encompassing term that has been interpreted to include historical and archaeological resources.

The NHPA requires federal agencies to consider an undertaking's effects on "historic properties," which are defined as cultural resources listed or determined eligible for listing on the NRHP. Section 106 of the NHPA and accompanying implementing regulations specified in 36 CFR 800 ("Protection of Historic Properties") establish a collaborative consultation/review process and specific sequential procedures that enable federal agencies to identify historic properties that may be directly or indirectly affected by a proposed federal undertaking.

In addition to the NHPA, there are other regulations, statutes, and authorities enacted for the protection of historic properties, as well as sites of tribal importance and human remains. These include, but are not limited to:

- The Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470aa-mm) was enacted ..."to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals" (Sec. 2(4)(b)). The ARPA makes it illegal to excavate or remove from federal or Indian lands any archaeological resources without a permit from the land manager. Major penalties for violating the law include both fines and imprisonment.
- The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 U.S.C. 3001-3013) established a means for Native Americans, including Indian Tribes, to request the return of human remains and funerary objects, sacred objects, or objects of cultural patrimony held by federal agencies or federally assisted museums or institutions. NAGPRA also contains provisions regarding the intentional excavation and removal of, inadvertent discovery of, and illegal trafficking in Native American human remains and sensitive cultural items on federal lands.
- NDCC 23-06-27 protects unmarked human burials and NDCC 55-02-07 protects historic and prehistoric sites located on land owned by the state of North Dakota.

3.21.3 The NRHP Eligibility Criteria

The NRHP, maintained by the NPS on behalf of the U.S. Secretary of the Interior, is the nation's inventory of historic properties. Resources determined officially NRHP-eligible through consultation, as well as those already listed on the NRHP, warrant impact assessment under Section 106 of the NHPA. There are three main standards that a cultural resource must meet to qualify for listing on the NRHP: age, integrity, and significance. To meet the age criteria, the resource generally must be at least 50 years old. To meet the integrity criteria, the resource must possess the applicable aspects of integrity, which may include: location, design, setting, materials, workmanship, feeling, and association. Finally, the resource must be significant according to one or more of the following criteria:

Criterion A: Be associated with events that have made a significant contribution to the broad patterns of our history;

Criterion B: Be associated with the lives of persons significant in our past;

Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

Criterion D: Have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 800.4).

3.21.4 Area of Potential Effects

The area of potential effects (APE) is defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

The APE should include the following:

- All alternative locations for all elements of the Project;
- All locations potentially subject to ground disturbance resulting from construction activities;
- All locations from which elements of the Project (e.g., aboveground facilities; a pipeline trench scar on the landscape) might be visible;
- All locations in which the Project might cause permanent changes to traffic patterns, land use, and public access.

The Project APE for cultural resources encompasses the 50- to 100-foot-wide construction ROW, authorized ATWS, the proposed oil receipt facilities, construction equipment and pipe storage yards, and access roads created or upgraded for pipeline construction and maintenance. Where applicable, the APE for visual impacts includes those aboveground ancillary facilities or other Project elements that are visible from historic properties in which setting contributes to their NRHP-eligibility.

3.21.5 Culture History

The south end of the Project APE lies within the Northwestern Plains. As it traverses north, the APE crosses through the Middle Missouri subarea and ultimately ends in the Northeastern Plains. Prehistory of the northern Plains is broken into chronological periods or traditions consisting of Paleo-Indian, Plains Archaic, Plains Woodland, Plains Village, Equestrian Nomad, and Euro-American Settlement. The following brief overview of the prehistory and history of the area encompassing the Project was extrapolated from Metcalf Archaeological Consultants, Inc. (Metcalf) (2014).

3.21.5.1 Paleo-Indian Tradition (11,500 – 7,500 years Before Present [BP])

The earliest evidence of human occupation in North Dakota (and North America) is referred to as the Paleo-Indian period. This period is separated into four major complexes based on the variation in projectile points, tool kits, and radiocarbon dates. The four complexes are Clovis, Goshen, Folsom, and Late Paleo-Indian; the Clovis complex being the earliest of the four. Clovis toolkits consisted of basally fluted projectile points and highly developed bone and ivory technology. Early Paleo-Indians were nomadic and followed the movement of extinct megafauna such as mammoth, mastodon, bison, and camel. In addition to hunting, these nomadic people exploited flora and fauna as they moved through different ecosystems. Paleo-Indian sites become more common throughout North Dakota during the Late Paleo-Indian period; however, no Paleo-Indian sites have been documented in the Project area.

3.21.5.2 Plains Archaic Tradition (7,500 – 2,400 years BP)

The Plains Archaic is divided into three periods (Early, Middle, and Late) which are based on changes in material culture. During the Plains Archaic, the climate warmed, glacial ice sheets retreated, and many of the large mammals disappeared, leading to a shift in subsistence patterns that included hunting of smaller mammals and an increased reliance on wild plant foods. Early Archaic sites are more common compared to the earlier Paleo-Indian sites, but still relatively rare compared to subsequent periods. Projectile points of the Early Archaic include the small Simonson Side-Notched and large Hawken and Mummy Cave Side-Notched. The Middle Archaic projectile points include the McKean, Duncan, and Hanna complexes, while Pelican Lake points are associated with the Late Archaic.

3.21.5.3 Plains Woodland Tradition (2,400 years BP – 1000 Anno Domino [AD])

The Plains Woodland typically is divided into the Early, Middle, and Late periods. Technological advancements during this period include the replacement of the atlatl and dart by the bow and arrow and the development of ceramics. Artifacts and lifeways of the Early Woodland period are similar to those of the Late Archaic. Ceramics of the Early Woodland are generally thick-walled conoidal forms with grit temper, and projectile points are precursors of the Besant Side-notched points associated with the Besant complex of the Middle Woodland. The Sonota complex (which is known for burial mounds) and the Besant complex are hallmarks of the Middle Woodland period. During the Middle Woodland, ceramics are conoidal in shape with cord-roughening along the rims, occasionally smoothed, and with decorative bosses or punctuates along the rims. Projectile points are Besant Side-notched, small Samantha Side-notched, and corner-notched points similar to Pelican Lake points. During the Late Woodland, fortified villages and gardening become more common, as well as side-notched arrowheads. Ceramics are more conical in shape and often net-impressed, although cord-roughened pottery remains dominant. The appearance of trade items (e.g., obsidian, native copper, shells) indicates a broader connection with other populations across the Plains and Midwest during this period.

3.21.5.4 Plains Village (1000 – 1780 AD)

The Plains Village tradition is represented by semi-sedentary hunter-gatherer-horticulturists, some of whom lived in permanent villages for at least part of the year. Inhabitants of these villages practiced subsistence strategies such as gardening of maize, sunflowers, and tobacco, bison hunting, and general hunting and foraging. Many of the larger villages were situated along the Missouri River, but other villages have been recorded along the James and Sheyenne rivers. Tool kits include Plains and Prairie side-notched projective points along with unnotched triangular points, bifacially flaked end scrapers, and heavy-duty bifacial cutting tools. Pottery included globular jars with straight, out curved, or braced rims and grit, sand or shell temper. A number of late Plains Village earthlodge villages have been documented south and east of the APE, especially around the confluence of the Knife and Missouri rivers.

3.21.5.5 Equestrian Period (1780 – 1880 AD)

The Equestrian Period, sometimes referred to as the Fur Trade Period, is a time of great change among Native American people as Euro-Americans continued their westward movement and encroachment onto native lands. Introduction of the horse marks the beginning of the period, while the forcing of Native Americans onto reservations marks the end of the period. Within the Project boundaries, a variety of Native American tribes were present at various times, including the MHAN, Crow, and Sioux (Dakota, Lakota, and Nakota). Several trading posts and forts (e.g., Fort Union, Fort Buford) were situated in the vicinity of the Project, which may account for the presence of these tribes.

Evidence for the presence of these tribes is based largely on ethnographic accounts and archaeological remains; although, it is difficult to identify (with certainty) the cultural affiliation of artifacts found at Equestrian period sites. Typically, Equestrian period sites are identified through the presence of Euro-American trade goods; however, many of these trade goods become weathered and eventually rust away (e.g., metal objects) or are missed during field surveys because of their small size (e.g., trade beads).

Several sites/features associated with tribal presence in and near the Project APE have been identified and documented as a result of tribal and cultural resources surveys. However, no villages are known to exist within the Project APE near the lake crossing or submerged by the lake according to historical sources such as SHPO files and records, G.K. Warren's 1855-1856 maps, 1879 and 1894 Missouri River Commission maps, Smithsonian Institution River Basin Surveys maps, and General Land Office (1897).

3.21.5.6 Euro-American/Settlement

There was limited Euro-American exploration in North Dakota. From 1742-1744, Pierre La Verendrye and his son traveled through the Red River area along parts of the Souris and Missouri rivers. In 1779, trappers and traders working for the Northwest and Hudson Bay companies first appeared along the Red River. Most notably, Lewis and Clark traveled up the Missouri River in 1804-1806 as part of the Corps of Discovery Expedition to explore and map the newly acquired territory and find a practical route across the Western half of the continent. In the early 1870s, railroads brought in the first substantial wave of settlers into eastern North Dakota. Settlers acquired land from the railroads or through the Homestead and Timber Culture acts of the 1870s. By 1883, almost all arable land in central and eastern North Dakota had been claimed, and from 1898 to 1915, the railroad industry boom led to the rise of small towns across the state. Agriculture has been the mainstay of the North Dakota economy even through the "bust" years of the Great Depression in the 1930s, WWI (1914-1918), and WWII (1939-1945). Since 2000, North Dakota has experience rapid growth, largely due to the oil boom in oil-rich Bakken shale.

3.21.6 Cultural Resources Investigations

From 2011 to 2014, Class I and Class III investigations of the APE were completed by Metcalf to identify and evaluate the NRHP-eligibility of all cultural resources that could be subject to impacts associated with Project construction. The Class I file search involved a review of site files and survey reports maintained by the SHPO for a 2-mile-wide corridor centered on the proposed pipeline centerline. The file search revealed a total of 159 previously recorded cultural resources, including 122 prehistoric sites, 36 historic sites, and 1 multi-component site containing both prehistoric and historic sites (Metcalf 2014).

The Class III investigations involved an intensive pedestrian survey of the proposed pipeline construction ROW, access roads, receipt facilities, and extra workspace locations, all of which constitute the APE. A large block of land at the upper edge of the Missouri River Valley also was inventoried to allow for flexibility in routing the pipeline through an archaeologically and culturally sensitive area. The survey corridor along the pipeline ROW measured 200 feet and was centered on the proposed route centerline. A total of 62 cultural resources were documented during the Class III inventory (Metcalf 2014). These include 47 prehistoric sites, 3 historic sites, 1 multi-component site containing prehistoric and historic components, and 11 isolated finds. The majority of isolated finds consisted of 1 to 3 prehistoric flakes. By definition isolated finds are not eligible for the NRHP and are not discussed further in the cultural resources summary.

Of the cultural resources located during the inventory, 19 prehistoric sites, 2 historic sites, and 1 multi-component site are within the APE. The historic sites consist of historic farmsteads, the prehistoric sites consist of stone features and/or cultural material scatter, and the multi-component site consists of a prehistoric cultural material scatter and modern rock pile (**Table 3.21-1**). Of the sites, 2 are recommended as eligible for listing on the NRHP, 2 are recommended as not eligible, and the eligibility of the remaining sites is undetermined.

Table 3.21-1 Cultural Resources Located Within the APE

Site Number	Site Type	Site Description	Land Status	NRHP Evaluation
32MZ1151	Prehistoric	Stone features, CMS[1]	USFS	Recommended Eligible
32MZx1423	Prehistoric	CMS	Private	Undetermined
32MZ2695	Prehistoric	CMS	Private	Undetermined
32MZ2696	Prehistoric	Stone features	Private	Undetermined
32MZ2718	Historic	Farmstead	Private	Not eligible
32MZ2741	Prehistoric	CMS	Private	Undetermined
32MZ2753	Prehistoric	CMS	Private	Undetermined
32MZ2760	Historic	Farmstead	Private	Undetermined
32MZ2761	Prehistoric	Stone features	USFS	Undetermined
32MZ2762	Prehistoric	Stone features	USFS	Undetermined
32MZ2763	Prehistoric	CMS	Private	Undetermined
32MZ2766	Prehistoric/Historic	CMS, modern rock pile	Private	Not eligible
32MZ2767	Prehistoric	Stone features	Private	Undetermined
32MZ2773	Prehistoric	Stone features	Private	Undetermined
32WI1124	Prehistoric	CMS	USACE	Eligible
32WI1209	Prehistoric	Stone features	Private	Undetermined
32WI1488	Prehistoric	Stone features	Private	Undetermined
32WI1491	Prehistoric	Stone features	Private	Undetermined
32WI1492	Prehistoric	Stone features	State	Undetermined
32WI1506	Prehistoric	CMS	Private	Undetermined
32WI1513	Prehistoric	Stone features	Private	Undetermined
32WI1514	Prehistoric	Stone features	Private	Undetermined

[1] CMS = Cultural Material Scatter

Source: Metcalf 2014.

Site 32MZ1151 (stone feature and CMS) is recommended eligible for listing on the NRHP and is part of the Elm Tree Archaeological District which has been nominated for listing on the NRHP. The District covers 152 acres and consists of 12 sites, 6 of which have undergone evaluative testing and were found eligible for inclusion on the NRHP. Rock features were found at all 12 sites; activity areas and datable features additionally were found at the 6 tested sites. The area encompassing the District functioned as a natural travel corridor and the identified sites reflect short-term camps where stone tool production, stone tool maintenance, and bison processing were performed. Approximately 225 feet separates the western boundary of the District and the pipeline centerline.

Results of the cultural resources inventory were documented in a Class III inventory report that was submitted to the BLM for review. The report contains the cultural and historical overview of the Project area; the location, type, and significance of identified cultural resources; archaeological field methods; artifact analysis; eligibility recommendations for each identified site; and recommended mitigation for NRHP-eligible sites potentially affected by the Project. Following their review, the BLM submitted the Class III inventory report to the SHPO at the State Historical Society of North Dakota on December 31, 2014, for their 30-day review and concurrence. The BLM also sent copies of the archaeological monitoring plan and *Unanticipated Discoveries Plan (*POD, Appendix XV*)* to the SHPO for review.

3.22 Tribal Treaty Rights and Interests

The federal government has a unique and distinctive relationship with federally recognized American Indian tribes as set forth in the Constitution of the U.S., and various treaties, statutes, EOs, judicial decisions, and agreements. This relationship is different from the federal government's relationship with state and local governments or other entities as the U.S. recognizes American Indian tribes as distinct sovereign nations. The U.S. government has a trust responsibility to federally recognized American Indian tribes that covers lands, resources, money, or other assets held by the federal government in trust and the ability of those tribes to exercise their tribal rights.

Indian treaties are negotiated contracts made pursuant to the Constitution of the U.S. and are considered the "supreme law of the land." They take precedence over any conflicting state laws because of the supremacy clause of the Constitution (Article 6, Clause 2). Treaty rights are not gifts or grants from the U.S., but are bargained for concessions. These rights are grants-of-rights from the tribes rather than to the tribes. The reciprocal obligations assumed by the federal government and Indian tribes constitute the chief source of present-day federal Indian law.

The BLM, and represented federal agencies, have the responsibility to identify and consider potential impacts of the proposed action and project alternatives on tribal trust resources. Tribal trust resources are those natural resources either on or off Indian lands, retained by, or reserved by or for Indian tribes through treaties, statutes, judicial decisions, and EOs. Examples of trust resources are lands, minerals, hunting and fishing rights, and water rights. The BLM, as lead federal agency, also has the responsibility to ensure that meaningful consultation and coordination concerning the impacts of the Project on tribal treaty rights and trust resources are conducted on a government-to-government basis with federally recognized tribes.

During the 1850s and 1860s, the U.S. negotiated treaties with some tribes in order to acquire Indian lands for homesteading. Tribes with traditional or cultural affiliation within the Project area have the right to conduct traditional cultural activities on federal lands crossed by the Project. Tribes also have treaty rights which enable them to hunt, fish, and gather on unoccupied federal lands within the Project area. Treaties which apply to the Project area include the *Treaty with the Mandan Tribe of 1825, Fort Laramie Treaty of 1851, Treaty with the Sioux—Sisseton and Wahpeton Bands of 1851*, and the *McCumber Agreement of 1892/Turtle Mountain*.

The *Handbook of North American Indians*, published by the Smithsonian Institution, is intended to be the most up-to-date and comprehensive encyclopedic summary of what is known about the prehistory, history, and cultures of the aboriginal peoples of North America. Volume 13 (Parts 1 and 2) is devoted exclusively to the cultures of the Plains Indians (DeMallie 2001). According to DeMallie (2001), the area of the Project is located within the somewhat overlapping aboriginal territories of the Mandan, Hidatsa, Arikara, and Assiniboine (Nakota) peoples. The area also was known to have been traditionally utilized by the Lakota and Dakota Sioux groups primarily for hunting and gathering activities.

Since 1936, the "Three Affiliated Tribes of Fort Berthold Indian Reservation" has been the official name of the Mandan, Hidatsa, and Arikara (DeMallie 2001). These three culturally and linguistically different tribes once lived in earthlodge villages on or near the Missouri River. Archaeological evidence suggests that the centrality of the Missouri River in Mandan and Hidatsa culture and lilfeways extends back to at least 1,000 A.D. when the Plains Village traditional lifestyle based on horticulture, bison hunting, and riverine settlement emerged in the Northern Plains (Murray et al. 2011). The Arikara migrated north from Kansas and Nebraska sometime after the 14th Century, intermittently settling along tributaries of the Missouri River. Around 1845, the Mandan and Hidatsa established Like-a-Fishhook village; the Arikara later joined the Mandan and Hidatsa in Like-a-Fishhook village in 1862 (DeMallie 2001). The historical location of Like-a-Fishhook village is approximately 105 miles from the Project area.

In the 1950s, the Garrison Dam turned the Missouri River into Lake Sakakawea, flooding the bottomland communities and changing the geography of the reservation. As a result of the flooding, the tribes lost approximately 95 percent of its farming land, as well as entire towns, educational and medical facilities, road systems, timber sources, plant and animal habitats, and cultural places (Murray et al. 2011). Although many present-day tribal members view the construction of the dam as a negative transformational event in their lives, it also is viewed as a repository of intact yet unreachable cultural sites and objects. There is a belief among the Three Affiliated Tribes that the lake contains the sacred waters and places traditionally associated with the Missouri River (Murray et al. 2011). Sites located either beneath the water's surface or along its shores that still figure predominately in the tribe's community history and identity include inundated shrines, significant reservation-era sites, locations of past healing events, familial trapping areas, and structures (Murray et al. 2011). Cultural sites potentially buried beneath the lake's surface were among the concerns expressed by the tribes participating in the government-to-government consultation efforts for the Project.

No archaeological features were identified on or below the lake bottom by applying several remote sensing technologies, which included depth sounding of the lake bottom, sub-bottom profiling, side scan sonar, magnetometer survey, and video recording of the lake bottom. In addition, several historical sources such as SHPO files and records, G.K. Warren's 1855-1856 maps, 1879 and 1894 Missouri River Commission maps, Smithsonian Institution River Basin Surveys maps, and General Land Office (1897) maps were examined to identify any sites or features that may have been located at the lake crossing prior to creation of the lake. As a result of the records and maps review, no prehistoric or contact-era cultural resources were identified in or near the vicinity of the proposed lake crossing.

3.22.1 Government-to-Government Consultation

Tribal consultation by federal agencies is required by EO 13175, which states, "Each agency shall have a process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." The BLM has engaged and would continue to engage with the appropriate tribal governments in official government-to-government consultation, in accordance with all applicable mandates, including, but not limited to Section 101[d][6] of the NHPA, the American Indian Religious Freedom Act (AIRFA), EO 13007 (Indian Sacred Sites), EO 13175 (Consultation and Coordination with Indian Tribal Governments), Presidential Memorandum on Government to Government Consultation with Native American Tribal Governments (April 29, 1994), and Presidential Memorandum on Tribal Consultation issued on November 5, 2009. The purpose of these consultations is to ensure meaningful and timely input by tribal officials and representatives in the environmental and cultural analyses for the Project, as well as determine if the Project would have an effect on any known traditional cultural properties, sacred sites, or other sites of religious or cultural importance.

On April 18, 2013, the BLM sent letters initiating government-to-government consultation with 17 tribes who have tribal treaty interests in, and/or traditional connections to, western North Dakota. These tribes include the Fort Belknap Gros Ventre and Assiniboine Tribes, Santee Sioux Tribe, Lower Sioux Tribe, Lower Brule Sioux Tribe, Northern Cheyenne Tribe, Fort Peck Assiniboine and Sioux Tribes, Sisseton-Wahpeton Oyate Tribe, Three Affiliated Tribes: MHAN, Flandreau Santee Sioux Tribe, Yankton Sioux Tribe, Spirit Lake Tribe, Oglala Sioux Tribe, Cheyenne River Sioux Tribe, Rosebud Sioux Tribe, Crow Creek Sioux Tribe, Standing Rock Sioux Tribe, and the Turtle Mountain Band of Chippewa.

On May 29, 2014, the Chairman of the MHAN sent a letter to the USACE regarding the Project. In the letter, the Chairman expressed concern with potential impacts to plants and animals in and around Lake Sakakawea, construction of the pipeline across the lake, and potential groundwater contamination during construction and operation of the pipeline (Hall 2014). On June 23, 2014, the USACE sent a response letter to the Chairman in which they explained the role of the BLM as the lead federal agency for the Project and, as such, have forwarded the Chairman's letter to the BLM Project Manager (Cross 2014). From late June to mid-September 2014, the BLM attempted several times via phone and email communication to set up a face-to-face meeting with the Chairman. On September 23, 2014, the BLM sent a letter to the Chairman requesting a face-to-face meeting to discuss his concerns about the Project (Rymerson 2014). On

September 29, 2014, the BLM sent an email to the Chairman as a follow up to the letter; the letter was attached to the email. No response from the Chairman has been received as of this date.

To date, tribal consultation for the Project has included over 50 telephone conversations and 25 emails with the THPOs and other tribal representatives, several formal letters, and two face-to-face meetings (with teleconferencing capabilities provided for those unable to attend in person). The first face-to-face tribal consultation meeting was held on May 29, 2014 in Mandan, North Dakota, to formally present the Project and preliminary results of the resource studies, as well as provide the opportunity for the tribes to ask questions and provide comments. THPOs and/or other tribal representatives from Crow Creek Sioux, Fort Peck Assiniboine and Sioux Tribes, Northern Cheyenne, Spirit Lake Sioux, MHAN, and Turtle Mountain Band of Chippewa were present at the meeting; the Cheyenne River Sioux participated via phone.

Concerns expressed by the tribes participating in the first face-to-face meeting included pipeline spill frequencies and volumes, potential causes of spills, emergency response measures, potential impacts to the water supplies/intakes, spill clean-up responsibilities, natural resources damage assessments, impacts to Dakota Skipper populations, cultural resources investigations conducted prior to the creation of the lake, and unanticipated discoveries of cultural sites that may be buried below the lakebed. For information on spill frequencies and volumes, potential causes of spills, emergency response measures, spill clean-up responsibilities, and natural resources damage assessments, the reader is referred to **Appendix A**. Unanticipated discoveries of cultural sites that may be buried below the lakebed would be handled as outlined in the *Unanticipated Discoveries Plan* (POD, Appendix XV). All of the other listed concerns are covered in the environmental consequences sections of this EA (see Section 4.5, Water Resources, for impacts to water supplies/intakes and Section 4.10, Special Status Wildlife Species, for impacts to Dakota Skipper populations).

A second face-to-face tribal consultation meeting was held on August 5, 2014, in Bismarck, North Dakota, to update the tribes on the Project, discuss responses to the tribal concerns expressed during the first meeting, and provide results of the tribal surveys. Responses to the tribal concerns were drafted by specialists in the fields of risk assessment, emergency response, archaeology, natural resources, engineering, and wildlife biology, and were sent to the tribes prior to the meeting for their review. Also included in the responses were the results of depth sounding of the lake bottom, sub-bottom profiling, side scan sonar, magnetometer survey, and video recording, all of which were conducted along the lake bottom at the location of the proposed crossing. Results of the tribal surveys, including the number and types of sites/features, were presented to the tribes. The tribes were informed of BakkenLink's plan to avoid all of the sites/features identified by the tribes either by rerouting the pipeline or a neckdown of the construction ROW. THPOs and/or other tribal representatives from Northern Cheyenne, Cheyenne River Sioux, Spirit Lake Sioux, Crow Creek Sioux, MHAN, and Turtle Mountain Band of Chippewa, were present at the meeting.

From June 24 to July 2 and July 8 to July 11, 2014, cultural resources field surveys were conducted along the proposed route by 18 tribal members representing 7 of the consulted tribes. These 7 tribes included the Cheyenne River Sioux, Northern Cheyenne, Crow Creek Sioux, Fort Peck and Assiniboine Sioux Tribes, Spirit Lake, MHAN, and Turtle Mountain Band of Chippewa. THPOs from Crow Creek Sioux, Spirit Lake, and Turtle Mountain Band of Chippewa participated in the field survey kick-off meeting on June 24; the THPO from the Turtle Mountain Band of the Chippewa was present during the entire survey and visited the features/sites identified during the survey. On July 13, Crow Creek Sioux and Spirit Lake THPOs visited many of the features/sites identified during the survey. The survey resulted in the identification of 21 features/sites. All of the 21 features/sites would be avoided by the Project either by a realignment, neckdown of the construction ROW, or proposed use of the HDD construction method.

Results of the tribal survey were included in an appendix to the Class III cultural resources inventory report. On November 20, 2014, the BLM sent copies of the Class III cultural resources inventory report to all consulting tribes requesting review and comment on the report. To date, the BLM has not received any comments from the consulting tribes.

4.0 Environmental Consequences

This chapter describes the anticipated direct and indirect impacts of the Proposed Action and the alternatives. The analysis of potential impacts from the Proposed Action assumed implementation of the applicant-committed environmental protection measures (Section 2.2.2) associated with the Project. Potential monitoring and mitigation developed in response to anticipated impacts are recommended for individual resources, and are discussed at the end of each resource section. This chapter also identifies residual impacts, which are impacts that would remain after mitigation measures have been implemented.

As stated in Chapter 3.0, there are eight USACE Authorized Project Purposes for Garrison Dam/Lake Sakakawea. Four Purposes (i.e., municipal and industrial water supply, fish and wildlife, recreation, and water quality) may be impacted by the Project and four Purposes (i.e., flood control, navigation, irrigation, and hydropower) would not be impacted by the Project. The Purposes that may be impacted by the Project and resource sections in which these are addressed include the following:

- Municipal and industrial water supply – Section 4.5, Water Resources;
- Fish and wildlife – Sections 4.9, Wildlife and 4.10, Special Status Species;
- Recreation – Section 4.12, Recreation; and
- Water quality – Section 4.5, Water Resources.

Flood control, navigation, irrigation, and hydropower would not be impacted by the Project.

4.1 Air Quality

4.1.1 Proposed Action

Construction

Construction equipment would emit gaseous criteria pollutants and particulates as a result of tailpipe emissions. Construction equipment also would cause fugitive dust emissions from disturbed areas and along paved and unpaved roads. However, construction would progress continuously through a given area, leading to negligible temporary and localized air quality impacts.

CO_2 emissions result from the combustion of diesel fuel in engines powering trucks, tractors, and other mobile equipment such as dozers, backhoes, and trenchers. CO_2 emissions are expected to be far below the 25,000 tpy USEPA threshold, which would be seen as a significant level of emissions. To reach this level of concern, the fuel usage would have to be on the order of 2,200,000 gallons of diesel fuel. The CO_2 emitted from construction equipment is expected to be only a small fraction of this amount and a minor contribution to national and statewide CO_2 emissions. Therefore, negligible impacts to air quality resulting from the operation of heavy construction equipment are expected. Additionally, combustion emissions from vehicle travel are not subject to air quality permitting.

Operation

Two receipt facilities would be constructed along the mainline and would be used for the delivery or receipt of crude oil during pipeline operation. The two proposed receipt facilities (Beaver Lodge and Keene receipt facilities) would each include truck unloading and storage tanks. At the Beaver Lodge Receipt Facility, truck unloading would occur with twelve 400-barrel tanks, which would flow into a 100,000-barrel storage tank that would be connected to the pipeline. At the Keene Receipt Facility, truck unloading also would occur using twelve 400-barrel tanks; however, the storage tank at the facility would have a 30,000-barrel capacity.

Daily throughput for each of the storage tanks was assumed to be 20,000 bpd. VOC emissions due to flashing and working/breathing losses were estimated using the USEPA TANKS 4.09D software and estimated tank characteristics. It is assumed the large storage tanks would maintain a relatively constant liquid level and only be completely emptied for maintenance and inspection purposes. Therefore, the TANKS 4.09D default value of four turnovers per year was used when estimating turnover losses. In addition to the permanent external roof, the storage tanks also would contain an internal floating roof. The 400-barrel tanks are assumed to be vertical fixed roof tanks. Results from TANKS 4.09D are provided in **Table 4.1-1**.

Table 4.1-1 Estimated VOC Emissions from all Receipt Facility Storage Tanks

Total Losses for All Onsite Tanks							
Tank	**Working Losses**	**Breathing Losses**	**Rim Seal Losses**	**Withdrawal Losses**	**Deck Fitting Losses**	**Deck Seam Losses**	**Total VOC Emissions**
30,000-barrel (Keene)	NA	NA	374	6,472.12	209.66	0	7,055.78
12 400-barrel (Keene)	9,894.84	4,644.96	NA	NA	NA	NA	14,539.80
12 400-barrel (Beaver Lodge)	16,536.48	4,644.72	NA	NA	NA	NA	21,181.20
100,000-barrel (Beaver Lodge)	NA	NA	696.05	11,392	407.76	0	12,495.81

Source: USEPA 2005.

As shown in **Table 4.1-1**, total VOC emissions would be 55,272.59 lbs/year, or 27.64 tpy of VOC emissions from all onsite storage tanks at all facilities.

VOC emissions also include emissions of HAPs, such as benzene, toluene, and formaldehyde, which are known to cause health problems and death at higher concentrations. The major source limit for any individual HAP is 10 tpy and 25 tpy for all HAPs combined. Given that all HAPs emitted would be only a small fraction of VOC emissions, the emissions would not approach major source limits; therefore, negligible impacts to air quality would be expected.

It is expected that operation of the Project would significantly reduce the distance traveled by up to 500 oil tanker trucks hauling oil each day. Using the conservative assumptions that each truck hauls 200 barrels, a pipeline capacity of 100,000 bpd, and an average roundtrip of 80 miles, approximately 40,000 truck miles per day would be eliminated from western North Dakota roads. This would be expected to provide positive benefits in terms of both traffic congestion and air quality. **Table 4.1-2** provides the estimated pollutant reductions expected on a per truck basis, daily basis, and annual basis.

Table 4.1-2 Total Combustion Emissions Reductions Expected from Diesel-fired Heavy Duty Haul Trucks Being Taken Off the Road

Pollutants	Emissions Reductions		
	(tons/truck-day)	(tons/day)	(tons/year)
NO_X	9.55E-04	2.87E-01	104.60
CO	2.90E-03	8.68E-01	317.03
SO_2	1.93E-06	5.82E-04	0.22
VOC	6.90E-04	2.07E-01	75.63
Benzene	1.41E-05	4.22E-03	1.53
Toluene	1.03E-05	3.10E-03	1.13
Ethylbenzene	2.13E-06	6.42E-04	0.23
Xylene	7.32E-06	2.20E-03	0.80
Formaldehyde	8.17E-05	2.45E-02	8.93
n-Hexane	1.10E-06	3.30E-04	0.12
CO_2	2.22E-01	6.65E+01	24,252.73
CH_4	9.12E-06	2.73E-03	1.00
N_2O	1.82E-06	5.47E-04	0.20
CO_2e	2.22E-01	6.67E+01	24,335.52

4.1.1.1 Climate Change

Existing climate change models can predict climate change impacts with a high degree of certainty over global or continental scales. However, these same models find it difficult to simulate climate change on a smaller scale. In the small scale environment, climate variations occur frequently, which make it difficult to distinguish if temperature changes are due to external forces (i.e., local construction, drilling, or production activities) or naturally occurring events.

While the effects of GHG emissions are well-documented on the global level, science does not yet have the ability to determine what effect GHG emissions from particular activities and projects might have on the environment. Although it is not possible to predict the effects on climate change due to the Project, **Table 4.1-2** demonstrates that upon Project completion, yearly GHG emissions would be greatly reduced as a result of decreased truck traffic on the North Dakota arterial highway system.

The Project is likely to have a minor effect on overall combustion of oil that is transported. The Project would only impact the transport methodology and the direct result of which would be to reduce transportation emissions.

4.1.2 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and there would be no effect on current air quality in the area. The beneficial effects to traffic congestion and air quality by greatly reducing the miles driven by up to 500 trucks per day from western North Dakota roads would not occur.

4.1.3 Mitigation

No additional mitigation measures for air quality have been proposed.

4.1.4 Residual Impacts

Assuming applicable environmental protection measures are effectively implemented, and given the short duration and localized nature of the construction activities, the residual impacts of the Proposed Action on air quality are projected to be minimal and temporary in nature. Permanent impacts to air quality are not anticipated.

4.2 Geology and Minerals

4.2.1 Proposed Action

4.2.1.1 Geology

Construction

Construction activities would include disturbances to the topography along the proposed route and at associated aboveground facilities due to grading and trenching that may result in slope instability. The proposed route crosses steep terrain on USFS land and landslide prone areas on either side of the Lake Sakakawea crossing (**Figures 2-11** through **2-13**). However, BakkenLink has committed to using the HDD construction method for pipeline segments in steep terrain on USFS land and landslide prone areas on the north and south sides of Lake Sakakawea thereby avoiding impacts to these sensitive areas.

Blasting is not anticipated for the Project. If hard bedrock is encountered, it can be disaggregated by using rippers, trenchers, or other equipment.

Operation

As previously identified, landslide areas would be crossed by the proposed route. Pre-construction geotechnical investigations have helped identify site-specific engineering design that would lessen the risk and potential impact of landslide and ground instability concerns (i.e., HDD). Therefore, operation of the Project would not alter the geological and physiographic conditions.

Because there are no identified active faults along the proposed route, no impacts are expected as a result of ground deformation due to fault movement. The Project is in an area not likely to experience strong ground motion during a maximum credible earthquake; therefore, impacts due to ground motion are not anticipated.

4.2.1.2 Minerals

Construction

As described in Section 3.2, the proposed route crosses numerous oil and gas fields. In addition, the proposed route may cross aggregate resources (e.g., gravel, sand) in alluvial valleys and river terraces. Nevertheless, construction would have very minor and temporary impacts on current mineral extraction activities due to the temporary and localized nature of pipeline construction activities. Construction of the Project is not expected to impact gravel mining operations.

It is possible that oil and gas wells may be close to the proposed route and surface facilities. Construction activities potentially could damage wells and associated underground fluid lines and pipelines, and disrupt normal operations and routine maintenance. Also, should damage to oil and gas facilities occur, it could present severe health and safety and contamination hazards. Abandoned wells also could be impacted because construction potentially could remove existing abandoned well markers and damage near-surface cement plugs. Because oil and gas are produced at depths considerably deeper than the excavation depth, construction of the Project would not be expected to affect the oil and natural gas producing formations. Rather, any construction-related impacts would be limited to surface or near-surface components of the wells and gathering systems, which would temporarily disrupt production until repairs are made.

Operation

The primary issues of concern regarding mineral resources and operation of the proposed pipeline are the potential for reduced access to underlying minerals and interference with future mineral extraction operations.

Long-term operation of a pipeline has the potential to preclude access to mineral resources. Overall, the Project does not pose a hindrance for accessing oil and gas resources. With the current propensity to drill horizontal laterals or directionally drill wells to access oil and gas resources, the proposed pipeline would not restrict access to those resources. Although the Project is within an area of coal resources, no current plans to mine such resources along the proposed route were identified.

Additionally, impacts on future mineral development would not constitute a substantial loss of mineral resource or mineral availability because of the narrow, linear nature of the pipeline ROW relative to the expanse of areas with mineral resource potential. The pipeline trench would be backfilled with materials derived from the trench excavation, and it might be necessary to obtain some construction sand and gravel from local, existing commercial sources for use as pipe padding, road base, or surface facility pads. These demands for sand and gravel would not affect the long-term availability of construction materials in the area.

4.2.2 No Action Alternative

Impacts to geologic materials and minerals in the Project area would be avoided because the Project would not be implemented.

4.2.3 Mitigation

No additional mitigation measures for geology and minerals have been proposed.

4.2.4 Residual Effects

A very small risk of facility damage would remain after implementation of geologic hazard avoidance or geotechnical engineering design protection measures for slope instability.

4.3 Paleontological Resources

4.3.1 Proposed Action

Construction

The issue of concern with regard to paleontological resources is the potential damage and loss of scientifically important fossils from ROW clearing, grading, trench excavation, and construction of other pipeline facilities. Potential impacts to fossil localities during construction would be both direct and indirect. Direct impacts to or destruction of fossils would occur from trenching or facility construction activities conducted through significant fossil beds. Indirect impacts during construction would include erosion of fossil beds due to slope re-grading and vegetation clearing or the unauthorized collection of scientifically important fossils by construction workers or the public due to increased access to fossils along the ROW.

The proposed pipeline ROW is within areas where the Tongue River/Bullion Creek and Sentinel Butte formations are the primary bedrock strata. BLM has ranked these Paleocene formations as Class 4 (PFYC) formations due to the high potential of these formations to consistently and predictably produce paleontologically significant vertebrate fossils or scientifically significant invertebrate and plant fossils. In August 2014, a pedestrian survey of exposed bedrock outcrops was conducted within a 200-foot-wide corridor centered on the proposed pipeline centerline. No new scientifically significant paleontological resources were discovered during the survey. Although no new paleontological resources were discovered during the survey, data provided by the NDGS and University of North Dakota show numerous paleontological resource localities within proximity of the proposed route, which suggest that ground-disturbing Project activities through areas underlain by these bedrock units could uncover paleontological resources. Therefore, monitoring for paleontological resources during ground-disturbing activities in areas identified with PFYC Class I bedrock may be warranted. If paleontological resources are discovered during Project-related construction activities, all construction activity would cease within 100 feet of the discovery and would be reported to the construction supervisor and a qualified BLM-permitted paleontologist for assessment and recommended actions. The discovery would be handled as stipulated in the *Unanticipated Discoveries Plan for Paleontological Resources* (POD, Appendix XXVIII). Construction activities would not resume until the BLM Project Manager has issued a Notice to Proceed.

Operation

The primary impact for paleontological resources during pipeline operation is potential damage and loss of scientifically important fossils from maintenance activities. Any potential effects to fossils from maintenance activities would be isolated due to the probable dispersed nature of those activities.

Normal operation of the Project is not expected to disturb important paleontological resources. If there are maintenance activities that would result in surface disturbance, it would occur within previously disturbed ROW and would not be likely to affect paleontological resources. Therefore, there would be no impacts to paleontological resources during operation of the Project.

4.3.2 No Action Alternative

Impacts to paleontological resources in the Project area would be avoided because the Project would not be implemented.

4.3.3 Mitigation

No mitigation measures are proposed. Protection measures for paleontological resources that may be discovered during Project-related ground-disturbing activities are included in the Unanticipated Discoveries Plan (POD, Appendix XXVIII).

4.3.4 Residual Effects

Even if construction monitoring is implemented, some scientifically valuable fossils may be disturbed and lost during excavation and grading over areas that are expected to be disturbed. As a consequence, there would be a small incremental loss of fossil material that would be offset by the material that is recovered and preserved for scientific study purposes.

4.4 Soils

4.4.1 Proposed Action

Potential impacts to soil resources were investigated by examining soil types, their extent, and their physical and chemical characteristics in relation to the Project area, which was completed using the Project description and the NRCS soil survey data as discussed in Section 3.4.

Construction

The Project construction would create surface disturbance to soils associated with:

- ROW clearing and grading;
- Construction of receipt facilities, Emergency Response Equipment Storage areas, and MLV sites;
- Upgrading and maintenance of access roads; and
- Surface disturbance associated with ATWSs.

Land disturbance would result in:

- Vegetation removal;
- Compaction of soil by construction equipment;
- Accelerated runoff and erosion due to a reduction in pore space and infiltration associated with soil compaction;
- Alteration of the soil profile within the excavated trench area of the pipeline, on hillside cuts in steep-sloping areas, and in borrow areas for roads;
- A potential reduction in soil stability on steep side hill areas; and
- A temporary reduction in soil productivity and quality.

The Project would have surface disturbing activities that would result in temporary and permanent impacts. Temporary impacts are those impacts to soil resources that are related to initial construction and installation of the pipeline. Surface disturbance areas would be reclaimed and soils would be returned to a condition that currently exists within approximately 5 years following installation of the Project. Permanent impacts are those impacts associated with features used for operations and maintenance of the Project that would not be reclaimed until after the Project is decommissioned at the end of the Project's life. The acreage of sensitive soils impacted by the Project was estimated to assess the overall impacts to soil resources. The acreage of sensitive soils within disturbance areas is listed in **Table 4.4-1**.

A small percentage of prime farmland would be impacted during construction of the pipeline. With proper topsoil handling techniques, impacts to prime farmland are expected to be temporary. No permanent facilities would be constructed on prime farmland. Two receipt facilities would impact farmland of statewide importance. Soil quality and long-term productivity would be impacted permanently at these locations.

Accelerated wind and water erosion would occur where land has been disturbed. Reclamation and erosion control would be difficult on soils that occur on steeper sloping areas (15 percent or more), particularly those steeper sloping areas over shallow soils (60 inches or less to bedrock). Soils with unfavorable properties, including thin topsoil layers, moderate to strong salinity and alkalinity, clayey or sandy surface and subsoils, and shallow depths over bedrock are common and would present problems for erosion control and revegetation.

Table 4.4-1 Soil Characteristics within Disturbance Areas[1] (Acres)

Disturbance Type	Droughty	Compaction Prone	Farmland of Statewide Importance	Prime Farmland	Hydric	Wind Erodible	Water Erodible	Shallow Depth to Bedrock
Mainline	9	4	86	--	4	3	16	74
Access Roads	<1	<1	<1	--	<1	<1	<1	2
Pipe Storage Yards	<1	--	--	--	--	<1	--	8
ATWSs	<1	<1	9	--	<1	<1	1	3
MLVs	<1	<1	--	--	<1	--	<1	<1
Emergency Response Equipment Storage Areas	<1	--	--	--	--	--	--	<1
Keene Receipt Facility	13	--	8	--	--	5	--	9
Beaver Lodge Receipt Facility	<1	1	37	--	2	--	--	--

[1] Disturbance acres include permanent and temporary impacts. Acreage for each column does not equal the total amount of surface disturbance because some soils have more than one limitation (leading to an overestimate) and some do not have any rating in the soil survey (leading to an underestimate).

Source: NRCS 2014.

Soil compaction and rutting likely would result from the movement of heavy construction vehicles along the construction ROW, facilities, ATWSs, Emergency Response Equipment Storage areas, receipt and delivery points, and on temporary access roads. The degree of compaction would depend on the moisture content and texture of the soil at the time of construction. Compaction would be most severe where heavy equipment operates on moist to wet soils with high clay contents. Detrimental compaction also can occur on soils of various textures and moisture contents if multiple passes are made by equipment. If soils are moist or wet where topsoil removal has occurred, topsoil likely would adhere to tires and/or tracked vehicles and be carried away.

Typically, soils that are compaction prone also are prone to rutting or displacement when saturated. Rutting occurs when the soil strength is not sufficient to support the applied load from vehicle traffic. Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs 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, thereby causing accelerated erosion and gullying. Rutting is most likely to occur on moist or wet fine-textured soils, but also may occur on dry sandy soils due to low soil strength.

BakkenLink plans to minimize or mitigate potential impacts to soils by implementing the soil protection measures identified in **Table 2-4**; the SWPPP; and the CMRP. The CMRP, SWPPP, and Summary of Protection Measures (POD, Appendices XVII, XIII, and XVII, respectively), would provide an effective program that would ensure successful erosion control and reclamation of all land disturbance. BakkenLink would follow the CMRP when operating on USFS and state lands, and would comply with soil protection and land use goals identified by the landowners on private lands.

Most of the impacts to soil resources would be temporary, since all disturbed areas not needed for operations would be reclaimed within 1 year of construction. Most reclamation would be completed within a few months of disturbance. However, soil impacts may occur if revegetation is not successful or adverse weather conditions (mainly heavy rainstorms) occurred during construction or before reclamation and erosion control measures could be implemented.

Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion measures were implemented (generally measures would be implemented within 20 days of backfilling the trench). In addition to the sensitive soils described in **Table 4.4-1**, a few small unquantifiable areas (mainly abrupt steep slopes and localized areas with soil containing unfavorable physical and chemical properties) would be subject to accelerated erosion and require intensive and continuing follow-up erosion control measures.

With effective use of erosion control/revegetation procedures, herbaceous vegetation on sites without soil limitations is expected to return to near pre-construction conditions within 5 years after construction. Problem areas may require replanting and/or use of special revegetation techniques if revegetation does not respond in one to two growing seasons. In areas of limited precipitation or drought (less than 9 inches), and where there are shallow soils and/or low permeability soils, reclamation techniques that enhance permeability and conserve moisture would increase the potential for successful revegetation. Impacts to overstory vegetation would be long-term with shrubs and trees taking several years to become re-established (e.g., 10 to 20 years for shrubs and 50 to 75 years for tree species).

Potential effects of fuel spills on soils would include contamination at the spill site and possible removal of soils at discrete locations. Contaminant practices incorporated into the SPCC Plan (POD, Appendix XVI) would be implemented to minimize fuel spills.

Operation

As previously described, some soil loss would result from wind and water erosion until erosion control measures begin to take effect. Very small-scale, isolated surface disturbance impacts, resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation, could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. However, if they do occur, they would be limited to small areas where certain pipeline maintenance activities occur.

4.4.2 No Action Alternative

Implementation of this alternative would avoid impacts to soils since surface disturbance associated with the Project would not occur.

4.4.3 Mitigation

S-1: During reclamation, compacted areas (typically any area that received repeated traffic or three or more passes by heavy equipment) will be decompacted, to the depth of compaction, by subsoiling or ripping to the depth of compaction. This will help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Scarification will only be used on shallow soils.

S-2: Salvaged topsoil will be protected from wind and water erosion at all times. To ensure proper erosion control of topsoil piles, all sediment and erosion control measures will be inspected after large rain events and repairs will be performed as needed.

4.4.4 Residual Effects

Residual effects to soils would include the permanent loss of 79 acres of soils and soil productivity from the construction and operation of aboveground facilities (e.g., receipt facilities, MLVs, Emergency Response Equipment Storage areas).

4.5 Water Resources

4.5.1 Proposed Action

4.5.1.1 Surface Water

Construction

Potential construction impacts to surface water would depend on the construction techniques employed and the physical characteristics of the streams and watersheds crossed by the proposed route. Construction of the Project could affect surface water in several ways. Clearing, grading, trenching, and soil stockpiling activities could temporarily alter overland flow. Surface soil compaction caused by the operation of heavy equipment could reduce the soil's ability to absorb water, which could increase surface runoff and the potential for ponding. These impacts would be localized and temporary. Other temporary impacts, mainly in the form of erosion and sedimentation effects on surface water quality, generally would be expected from land disturbance during construction.

The potential for these impacts would be minimized with the implementation of the Project CMRP. In addition, the SPCC Plan would address preventive and mitigation measures that would be used to avoid or minimize the potential impact of hazardous material spills during construction. Areas of disturbance adjacent to and directly upslope of intermittent streams might contribute to temporary impacts of surface water through increased rates of erosion that contribute sediment to the intermittent streams during storm runoff events. **Table 2-4** summarizes environmental protection measures for the Proposed Action. In addition, measures contained in the SWPPP, typical construction practices indicated in the POD (Appendix III), and committed measures set forth in the CMRP (POD, Appendix XIII) would be utilized during construction and reclamation to minimize impacts. Pipeline crossings would be scheduled at times when there is minimal or no flow. This would minimize the risks of debris, stockpiled soil, and other sources of sediment from being washed into waterbodies or wetlands. Temporary erosion and sediment control measures would be installed across the entire width of the construction ROW after clearing and before ground surface disturbance. No silty/turbid discharge water from the trench dewatering operations would be allowed to enter any waterbody or wetland.

The Project would be designed and constructed so it would not impede the flow of any waterway. The pipeline would be installed below the bed of the waterway, at a level so the channel bed gradient does not change. Intermittent and ephemeral streams that do not exhibit surface flow and/or saturate soil conditions at the time of construction would be crossed by open-cut methods. Temporary impacts would be most likely to occur during open-cut construction of intermittent creeks. Trench excavation at intermittent creeks would result in increases of sediment available for transport by the water if a precipitation event occurred during construction. This would temporarily result in elevated levels of total suspended sediment (TSS) and increases in turbidity at and downstream from the creek crossing. TSS and turbidity levels would be expected to recover within several days of the precipitation event.

Similar impacts are anticipated to occur at the Lake Sakakawea crossing, where HDD is not proposed. Possible impacts to Lake Sakakawea include temporary increased turbidity during construction and disturbance of sediments containing certain potentially hazardous substances. A pipeline-pull method is BakkenLink's proposed crossing method. Any construction method would have to be approved and permitted by the USACE prior to construction. The NDDH is a cooperating agency with the USACE through the CWA Section 401 Water Quality certification program as administered by the State. Sediment sampling of the lake sediments at the crossing location has been performed and analytical testing completed to determine the chemical composition of these sediments.

As described in the POD, Appendix X, Lake Sakakawea Pipeline Crossing Report, consultation with the NDDH and USACE resulted in sampling and analysis of lake sediments relative to maintaining water quality during lake crossing construction. Six soil boring sites and their spacing across the lake were determined in consultation with the NDDH. Composite samples were collected to represent two depth increments (0 to 4 feet, 6 to 10 feet). The total sampling depth of 10 feet represents typical pipeline installation depth. Laboratory results were reported as total constituent concentrations based on elutriate testing. Most numeric water quality standards are based on dissolved concentrations and default values use an assumed water hardness value of 100 mg/L (NDDH 2014). Because the dissolved fraction is less than or equal to the total concentrations, the site analyses are somewhat conservative. In addition, historical hardness values at NDDH sampling site 382050 on Lake Sakakawea upstream near the proposed crossing location range from 149 to 254 mg/L, with a geometric mean of approximately 193 mg/L. Under site-specific conditions, this may increase the concentrations of water quality standards for metals. For example, using the geometric mean hardness, the specific acute standard for lead would be 0.189 mg/L, for cadmium it would be 0.0042 mg/L, and for zinc would be 0.209 mg/L. Of the 12 samples, 4 samples had total zinc concentrations above the default acute standard; one of these was a slight exceedence that is likely within statistical reporting error (POD, Appendix X, Lake Sakakawea Pipeline Crossing Report). Two of the samples would exceed zinc concentrations for a calculated hardness-based standard value. Lead and cadmium concentrations exceeded default water quality standards in one of the same samples. Lead concentrations would all be within a calculated hardness-based standard value, but the one cadmium exceedence would remain.

In general, there may be minor zinc and cadmium exceedences within the lake floor sediments at the proposed crossing location. Due to the limited occurrence of these concentrations, they are not anticipated to create water quality impacts during or after construction. However, adverse turbidity and siltation effects would occur from proposed trenching. These impacts would occur as relatively temporary exceedences of narrative water quality standards. The Project would deploy turbidity monitoring instrumentation at agreed-upon locations, with STOP authority in case the construction exceeds an agreed-upon turbidity threshold based on pre-construction measurement (POD, Appendix X, Lake Sakakawea Pipeline Crossing Report). In addition, impacts from turbidity and siltation would be reduced by the use of turbidity curtains during crossing construction. These fabric barriers are suspended from floats and lines, and would control the extent of sediment suspension and contain the settlement of silts suspended during the crossing construction. In addition, as a contingency measure in case the pipe cannot be fully lowered into the trench using the jetting process (which is a minimal probability due to the fully saturated soil conditions on the lake bottom which are conducive to the prescribed jetting construction techniques), flexible concrete mats would be placed over the pipe and set at or below grade level of lake bottom. This would help protect the pipe from physical abrasion, such as contact with boat anchors. Concrete mats are safely used throughout the United States for these types of DOT / PHMSA pipeline applications where standard depth-of-cover cannot be fully obtained.

Water quality could be impacted if construction equipment and vehicles leaked or spilled petroleum products, lubricants, solvents, or other hazardous materials into or near waterbodies. Protective measures are presented in the Project SWPPP, SPCC Plan, and CMRP. These plans are in the POD, Appendices XVII, XVI, and XIII, respectively. Therefore, impacts to surface water resources due to construction of the pipeline are not anticipated.

Operation

During operation, impacts to surface water resources would occur if a pipeline leak or rupture released crude oil. The severity and duration of such an impact would depend on its location, the volume of oil released, and the spill response and countermeasures implemented. BakkenLink would install remotely controlled double mainline valves on both sides of Lake Sakakawea and a remotely controlled mainline valve on the southern border of USFS-administered lands and private lands. MLVs would be installed in accordance with federal regulations as described in the POD and as reviewed by PHMSA. To address potential water resources impacts, MLVs would be installed:

- Along the mainline at locations appropriate for the terrain in open country or populated areas that would minimize damage or pollution from accidental discharge;

- At each side of a waterbody crossing more than 100 feet wide from high-water mark to high-water mark;
- On each side of a reservoir holding water for human consumption; and
- At other locations along the mainline or at facilities.

As noted in Chapter 3.0 and on tables and maps in the POD, Lake Sakakawea (approximately 12,100 feet wide) is the only waterbody more than 100 feet wide from high-water mark to high-water mark. MLVs 1 and 2 would be located near the northern and southern shorelines of Lake Sakakawea, as described in **Table 2-4** and POD Table 5-1. MLV 3 would be located at the southern boundary of the USFS land at approximately MP 20.4 according to **Table 2-4** and POD Table 5-1. Proposed valve locations are depicted in **Figure 1-1**.

Table 4.5-1 summarizes the amount of water necessary to dilute spill volumes below aquatic toxicity and drinking water thresholds. While this does not account for fate and transport mechanisms, mixing zones, environmental factors, and emergency response capabilities, it does provide an initial screening benchmark for identifying areas of potential concern.

Table 4.5-1 Volume of Water Required to Dilute Benzene in Bakken Crude Oil Spills Below Benchmark Values

Barrels of Crude Oil	Volume of Water Required to Dilute Benzene in Crude Oil Below Benchmark (acre-feet)[1]		
	Acute Toxicity Threshold (7.4 milligrams per liter [mg/L])	Chronic Toxicity Threshold (1.4 mg/L)	Drinking Water MCL (0.005 mg/L)
4	0.7	3.2	891
50	7.5	39.8	11,140
1,000	151	796	222,796
10,000	1,505	7,957	2,227,959

[1] Benchmarks based on aquatic toxicity and drinking water thresholds established for benzene. The estimated benzene content of the Bakken crude oil is 0.28 percent by weight with a specific gravity of 0.8151 gram per milliliter.

Source: PHMSA 2014.

BakkenLink developed a Spill Risk Assessment (**Appendix A**) to address the potential for contamination from a pipeline release. In addition to evaluating a general-case spill to flowing waters, the Spill Risk Assessment also evaluated the potential for impacts to any specific waterbody. To do this, the occurrence interval for a spill at any one representative stream within one of four stream categories (i.e., low flow, low moderate flow, upper moderate flow and high flow) was calculated based on spill probabilities generated from the PHMSA database (PHMSA 2014). The resulting spill occurrence intervals indicate the chance of a spill occurring at any specific waterbody is very low. Conservative occurrence intervals for a spill at any representative stream within any of the stream categories ranged from about 1,397 years for a large waterbody to 4,656 years for a small waterbody (less likely to occur in any single small waterbody than any single large waterbody). If any release did occur, it is likely that the total release volume of a spill would be 4 barrels or less based on PHMSA data for historical spill volumes (PHMSA 2014). Nevertheless, streams and rivers with downstream drinking water intakes represent sensitive environmental resources and could be temporarily impacted by a crude oil release. BakkenLink's ERP would contain provisions for protecting and mitigating potential impacts to drinking water.

The pipeline would be monitored 24 hours a day, 365 days a year from an OCC using a sophisticated SCADA system. The SCADA system would allow abnormal operating conditions to be discussed immediately and addressed promptly, including shutdown of the system in the event of a leak or other appropriate circumstance. BakkenLink would implement additional and multiple leak detection methods and systems that are overlapping in nature and progress through a series of leak detection thresholds. The leak detection methods, including SCADA, are as follows:

- Remote monitoring performed by the OCC Operator, which would consist of monitoring pressure and flow data received from pump stations and valve sites fed back to the OCC by the BakkenLink SCADA system. Remote monitoring typically is able to detect leaks down to approximately 25 to 30 percent of the pipeline flow rate.
- Software-based volume balance systems that would monitor receipt and delivery volumes. These systems typically are able to detect leaks down to approximately 5 percent of the pipeline flow rate.
- CPM or model-based leak detection systems that would break the pipeline into smaller segments and monitor each of these segments on a mass balance basis. These systems typically are capable of detecting leaks down to a level of approximately 1.5 to 2 percent of pipeline flow rate.
- Atmos Pipe is a system that applies the Sequential Probability Ratio Test (SPRT) to detect changes in the overall behavior of flow and pressure at the receipt and delivery points. Although the control and operation may vary from one pipeline to another, the relationship between the pipeline pressure and flow will always change after a leak develops in a pipeline. For example, a leak will normally cause the pipeline pressure to decrease and introduce a discrepancy between the receipt and delivery flow rate. Atmos Pipe is designed to recognize these patterns. Leak determination is based on probability calculations at regular sample intervals. Although the flow and pressure in a pipeline fluctuate due to operational changes, statistically, the total mass entering and leaving a network must be balanced by the inventory variation inside the network. Such a balance cannot be maintained if a leak occurs in a network. The deviation from the established balance is detected by SPRT. The combination of SPRT with pattern recognition provides Atmos Pipe a very high level of system reliability (i.e., minimum spurious alarms).
- Computer-based, non-real time accumulated gain/loss volume trending that would assist in identifying low rate or seepage releases below the 1.5 to 2 percent by volume detection thresholds.
- Direct observation methods, which include aerial patrols, ground patrols, and public and landowner awareness programs that would be designed to encourage and facilitate the reporting of suspected leaks and events that may suggest a threat to the integrity of the pipeline.

The leak detection system would be configured in a manner capable of alarming the OCC operators through the SCADA system and also would provide the OCC operators with a comprehensive assortment of display screens for incident analysis and investigation.

The pipeline operator also would develop a Pipeline Integrity Management Plan, which together with the ERP, outlines the preventative maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity management procedures to be implemented during the operation of the Project. In order to reduce response time in the event of a spill, BakkenLink would construct three emergency response equipment storage areas for the Project. One of the areas would be located at the proposed Beaver Lodge Receipt Facility. The second area would be located on the south side of Lake Sakakawea near MLV 2 and would contain a small building. The building would house a 30-foot-long aluminum boat (landing craft type vessel) and three trailers (one trailer would have gear for a winter/ice spill response; one trailer would have booms for summer/water spill response; and one trailer would have miscellaneous gear required for initial response, containment, and cleanup) would be on site. The third area would be located on the north side of Lake Sakakawea near MLV 1 and would be used for storing a spill response trailer. The emergency response equipment storage areas at MLV 1 and MLV 2 would each store 1,000 feet of 18-inch-hard boom. In the event of a spill in Lake Sakakawea, the boat stored on the south side of the lake would be used for deploying the boom. BakkenLink is coordinating with the USACE to facilitate launching a boat from the permanent ROW on the south shoreline of Lake Sakakawea. A spill response trailer also would be located at the existing Dry Creek Terminal. In addition to storing emergency response equipment at the aforementioned BakkenLink facilities, BakkenLink has a cooperative agreement with the Sakakawea Area Spill Response LLC (SASR) and would have access to spill response equipment at the SASR storage facility in New Town, North Dakota. BakkenLink would have access to the trailers staged at the response unit in New Town, North Dakota, which includes three trailers (one trailer would have gear for a winter/ice spill response; one trailer would have booms for summer/water spill response; and one trailer would have miscellaneous gear required for initial response, containment, and cleanup). Also, this response unit has three boats for deploying containment and cleanup equipment on Lake Sakakawea and other waterbodies. SASR has 2,000 feet of boom available at the New Town facility. Finally, BakkenLink has a contract with Clean Harbors as their Oil Spill Response Organization. Clean Harbors has 10,000 feet of boom available as well as a large inventory of cleanup equipment in Watford City, North Dakota. These Project features would greatly reduce the spread of oil in Missouri River/Lake Sakakawea, limiting impacts to water resources to negligible levels.

Winter Spill Scenario

During the winter, Lake Sakakawea freezes over with a layer of ice that, in very cold years, can be as thick as 36 to 48 inches. This layer of ice would trap oil released below the lake's surface and prevent benzene evaporation from occurring. Therefore, during the winter, evaporative loss will be negligible, and would allow a longer contact between the crude oil and the water column. However, natural undulations in the bottom of the ice would trap the material and prevent it from spreading horizontally. The natural containment of winter releases facilitates cleanup efforts as the pockets of oil can be drilled to and removed using vacuum trucks. Thus, winter releases are predicted to have lower impacts, particularly with respect to area of extent, as compared to releases occurring during the warmer seasons.

4.5.1.2 Groundwater

<u>Construction</u>

Construction and operation of the Project is not expected to adversely affect groundwater resources in the Project area or vicinity. Blasting is not anticipated as a means for trench excavation. No measurable alteration of aquifer recharge should occur.

The trench excavated for pipe placement would be above the water table along the proposed route in most locations, with the exceptions of surficial alluvial aquifers along streams and shallow glacio-fluvial aquifer zones. These areas are described in Section 3.5.2, Groundwater. Portions of the proposed route in the immediate vicinity of these features may encounter shallow groundwater during excavation. Following backfilling of the trench, these areas would be returned to their original condition, and groundwater impacts would not be expected. No unpermitted withdrawals of groundwater would occur. Therefore, impacts to groundwater resources due to construction of the Project are not anticipated.

Some dewatering of construction areas and the pipeline trench may occur; however, relatively small volumes are expected and effects on the overall groundwater system would be small and temporary. Potential impacts on the groundwater would include minor fluctuations in groundwater levels and/or increased turbidity with the aquifer adjacent to the activity. Because of the relatively small amount of water removed, the short duration of the activity, and the local discharge of the water, groundwater levels would quickly recover after pumping stops. If temporary dewatering of groundwater is required during construction activities, dewatering would be discharged in compliance with a NPDES permit.

There is a risk for small spills of liquids during construction, but these would be contained to small, isolated areas centered along the construction ROW. Potential leaks or spills of petroleum products or other hazardous materials from construction equipment and vehicles have the potential to adversely affect near-surface groundwater. In such an event, actions and reporting conducted according to an approved SPCC Plan would reduce the extent and severity of groundwater impacts.

Operation

The greatest risk for impacts to surficial or shallow groundwater would result from the accidental release of crude oil during pipeline operations. Impacts of a crude oil release to groundwater are dependent on the volume of crude oil entering the waterbody and the volume of water within the waterbody, and, in the case of groundwater, soil properties, the depth to groundwater, and the amount of crude oil in the unsaturated zone.

Water for hydrostatic testing, dust abatement, and other construction uses would temporarily impact groundwater resources, either through withdrawals from municipal or private wells. Water planned for construction would total approximately 2.36 million gallons (7.2 acre-feet). This would include 1,887,197 gallons (5.8 acre-feet) for hydrostatic testing, and 104,373 gallons (0.3 acre-feet) for HDD. Additional water would be used for dust abatement and drilling. Water would be obtained through Temporary Use Agreements with current water users, as applied for and pending approval by the State of North Dakota. Hydrostatic testing would occur in three pipeline segments and three HDD sections as they are completed during the construction period. Water for hydrostatic testing would be disposed of according to applicable federal, state, and local regulations. Test water would be discharged into a selected dispersion device as described in the Hydrostatic Testing Plan, so as to avoid erosion and sedimentation in upland settings. The Hydrostatic Test Plan and provisions in the CMRP, Section 8, provide guidance on the location of dewatering structures, which would be located and constructed to avoid deposition of sediments into waterbodies or shallow aquifers. The discharge of water from dewatering and hydrostatic testing operations would comply with relevant state discharge guidelines. Additional methods and provisions for water management during hydrostatic testing are presented in POD, Appendices III, XIV, and XXI. Effects from dewatering would be localized and temporary.

No perennial streams would be crossed utilizing the HDD construction method. Therefore, inadvertent releases of drilling fluids and lubricants through seepage, which sometimes can reach surface water or shallow groundwater, would not occur.

4.5.2 No Action Alternative

Implementation of this alternative would avoid impacts to surface water and groundwater because surface and subsurface disturbance associated with the Project would not occur.

4.5.3 Mitigation

Based on the implementation of environmental protection measures and construction plans (i.e., SWPPP, SPCC Plan, and Hydrostatic Testing Plan), no additional mitigation measures for water resources are recommended.

4.5.4 Residual Effects

Assuming that successful site stabilization and revegetation are completed, residual impacts to surface water or ground water resources are expected to be negligible. Once established, controls on runoff, erosion, and sedimentation would reduce the long-term potential for impacts from disturbance. Implementation of the practices set forth in construction plans (such as the SWPPP, SPCC Plan, and Hydrostatic Testing Plan) would avoid or reduce impacts during Project construction. Burial depths at intermittent streams and the Lake Sakakawea crossings would counteract the potential for pipeline rupture or leaks at those locations. Concrete coating at Lake Sakakawea and rock covers and/or flexible concrete mats (placed as needed in areas having higher levels of marine traffic) would prevent pipeline damage and potential releases during operations. In addition, the SCADA system, Atmos Pipe leak detection system, and periodic pipeline inspections would monitor conditions during operations.

Therefore, if pipeline releases occurred, responses would be triggered to address impacts to water resources. All of these Project features would minimize residual impacts to water resources if a spill were to occur during pipeline operation.

4.6 Vegetation Resources

4.6.1 Proposed Action

The impact analysis area for vegetation resources encompasses the Project area. Construction impacts were calculated based on the inclusion of the construction ROW associated with the new pipeline facilities pipe storage yards, and ATWSs. A 100-foot-wide temporary construction ROW would be allowed in most areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated primarily based on the acreage that would be occupied by the permanent aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLVs).

The primary issues associated with vegetation resources include direct and/or indirect impacts to native vegetation communities, riparian/wetland habitats, and impacts associated with the potential introduction and/or spread of noxious weed species.

<u>Construction</u>

Direct impacts from Project-related activities would include the temporary loss of vegetation as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation as a result of construction. Increased fugitive dust emissions associated with vehicle and equipment travel along access roads during construction may result in a potential decrease in species and habitat productivity in the short term.

<u>Operation</u>

Permanent disturbances as a result of pipeline operation and maintenance activities would be limited to vegetation communities located within the permanent aboveground facilities. Woody species present within the shrubland and woodland vegetation cover type would be replaced pursuant to the *Tree and Shrub Mitigation Specifications* (POD, Appendix XXV). Tree and shrub replacement would be completed on 2:1 basis within the disturbed ROW; however, tree and shrub replacement would not be permitted within a 20- to 30-foot-wide path over the pipeline centerline to facilitate periodic visual inspections of the ROW. Although a loss of woody-dominated vegetation would occur from Project construction, an increase of woody species individuals and herbaceous-dominated vegetation cover would result with implementation of tree and shrub replacement plantings. **Table 4.6-1** summarizes temporary and permanent acreage disturbances to each vegetation cover type within the Project area.

Indirect impacts as a result of Project implementation may include the potential establishment of noxious weed species in areas of vegetation removal or soil disturbance, in areas where reclamation is unsuccessful or prolonged, or in areas of higher soil erosion or lower vegetative cover. Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-4**. The CMRP (POD, Appendix XIII) outlines the procedures to be followed during construction and reclamation, and the subsequent mitigation necessary to return all vegetation cover types to pre-disturbance conditions. Timely stabilization of areas disturbed by construction and reseeding with an appropriate seed mixture would minimize the magnitude and duration of vegetation disturbance. Trees and shrubs would be replaced in accordance with the Tree and Shrub Mitigation Specifications (POD, Appendix XXIV). BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to

Table 4.6-1 Summary of Temporary and Permanent Disturbances per Vegetation Cover Type and Project Component Within the Project Area

	Vegetation Cover Types													
	Grassland		Agriculture		Wetland/Waterbody		Developed		Woodland		Shrubland		Total	
Project Component	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]
Mainline	170.4	--	156.8	--	12.8	--	11.1	--	3.8	--	0	--	**354.9**	--
ATWSs	42.5	--	7.9	--	0.4	--	0.2	--	0.1	--	0	--	**51.1**	--
Receipt Facilities	--	0.5	--	68.5	--	0.1	--	1.2	--	1.1	--	0	**--**	**71.4**
MLVs	--	0.03	--	0	--	0	--	0	--	0	--	0	**--**	**0.03**
Emergency Response Equipment Storage Areas	--	0.5	--	0	--	0	--	0	--	0	--	0	**--**	**0.5**
Access Roads	--	5.5	--	1.3	--	0	--	0.3	--	0	--	0	**--**	**7.1**
Pipe Storage Yards	0	**--**	0	**--**	0	**--**	13.6	**--**	0	**--**	0	--	**13.6**	**--**
Total Surface Disturbance[1]	**212.9**	**6.5**	**164.7**	**69.8**	**13.2**	**0.1**	**24.9**	**1.5**	**3.9**	**1.1**	**0**	**0**	**419.6**	**79.0**

[1] Totals discrepancy with Table 2-1 due to rounding.

Source: USGS 2004.

determine reclamation success. The Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII) outlines protection measures to be employed prior to construction, and during construction, reclamation, and monitoring timeframes.

To minimize fugitive dust emissions, BakkenLink would follow the measures detailed within the CMRP (POD, Appendix XIII). The primary protection measure focuses on the use of water or chemical soil binders to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements.

Direct spills of fuels, drilling fluids, or other hazardous materials would saturate soils and adversely affect vegetation resources. To minimize the potential for spills, BakkenLink would employ the spill prevention, contingency plans, and spill containment and countermeasures outlined within the SPCC (POD, Appendix XVI).

4.6.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to vegetation since surface disturbance associated with the Project would not occur.

4.6.3 Mitigation

No additional mitigation measures for vegetation resources have been proposed.

4.6.4 Residual Effects

Residual effects to vegetation would include the permanent loss (greater than 20 years) of 79 acres of vegetation associated with the operation of aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLV locations).

4.7 Wetlands and Floodplains

The impact analysis area for wetland and floodplain resources encompasses the Project area. Construction impacts were calculated based on the inclusion of the construction ROW associated with the new pipeline facilities and ATWSs. A 100-foot-wide temporary construction ROW would be allowed in most areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated primarily based on the acreage that would be occupied by the permanent aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLVs).

The primary issues associated with wetland resources include direct and/or indirect impacts to wetlands and floodplains, and impacts associated with the potential introduction and/or spread of noxious weed species and potential for accidental oil spills.

4.7.1 Proposed Action

Construction

The majority of wetlands crossed by the proposed route would be avoided using HDD techniques and therefore, impacts would not occur. However, for the wetlands that are not being avoided using HDD techniques, direct impacts from Project-related activities would include the temporary loss of 2.5 acres of wetland vegetation, hydric soils, and potential hydrologic functionality as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation and substrate. All impacts to wetlands would be considered temporary in nature following the completion of successful reclamation, except for the permanent disturbance associated with the construction of the proposed Beaver Lodge Receipt Facility. The construction of this facility would result in 0.1 acre of permanent disturbance within a herbaceous wetland. Field surveys indicated that this is most likely a non-jurisdictional wetland, however final regulatory authority for wetlands within the Project area lies with the USACE. If determined to be jurisdictional, the total permanent disturbance would be less than 0.5 acre and it would meet the acreage requirement for a NWP 12. Impacts to surface waters are discussed in detail in Section 4.5, Water Resources.

Indirect impacts as a result of Project implementation may include the potential establishment of noxious weed species in areas of vegetation removal or soil disturbance, in areas where reclamation is unsuccessful or prolonged, or in areas of higher soil erosion or lower vegetative cover. Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. In addition, increased fugitive dust emissions associated with vehicle and equipment travel along access roads for construction, operation, and maintenance activities may result in a potential decrease in species and habitat productivity.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-4**. Minimization measures include a reduction in construction ROW width to 75 feet within wetlands (50 feet on federally administered lands), the exclusion of permanent facilities within wetlands, and the implementation of protection measures (e.g., installation of erosion control devices to reduce sediment transport into wetlands). The CMRP (POD, Appendix XIII) outlines the procedures to be followed during construction and reclamation, and the subsequent mitigation necessary to return all wetland and waterbodies to pre-disturbance conditions. Timely stabilization of areas disturbed by construction and reseeding with an appropriate seed mixture would minimize the magnitude and duration of vegetation disturbance. BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to determine reclamation success. No refueling or lubricating would occur within 100 feet of wetlands and hazardous materials, chemicals, and fuels would not be stored within 100 feet of wetlands. The Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII) outlines protection measures to be implemented prior to construction and during construction, reclamation, and monitoring timeframes. These protection measures would be implemented to minimize the potential for establishment or spread of noxious weeds and invasive species within wetlands.

To minimize fugitive dust emissions, BakkenLink would follow the measures detailed within the CMRP (POD, Appendix XIII). The primary protection measure focuses on the use of water or chemical soil binders and measures to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements.

Operation

Approximately 0.1 acre of permanent disturbance would be located within wetlands, which is under the acreage requirement of the NWP 12. Due to the isolated nature and small size of the wetland, impacts are anticipated to be minimal as a result of Project operation.

If an accidental spill were to occur within a wetland during operation, BakkenLink would employ the spill prevention, contingency plans, and spill containment and countermeasures outlined within the CMRP (POD, Appendix XIII).

4.7.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to wetlands and floodplains since surface disturbance associated with the Project would not occur.

4.7.3 Mitigation

No additional mitigation measures for wetlands and floodplains have been proposed.

4.7.4 Residual Effects

Residual impacts to wetlands and floodplains would include approximately 0.1 acre of permanent disturbance from the construction and operation of the Beaver Lodge Receipt Facility.

4.8 Noxious Weeds and Invasive Species

4.8.1 Proposed Action

The impact analysis area for noxious weeds and invasive species encompasses the Project area. Construction impacts were calculated based on the inclusion of the construction ROW associated with the new pipeline facilities, pipe storage yards, and ATWSs. A 100-foot-wide temporary construction ROW would be allowed in most areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated primarily based on the acreage that would be occupied by the permanent aboveground facilities (receipt facilities, emergency response equipment storage areas, and MLVs).

The primary issues associated with noxious weeds and invasive species include their potential introduction and/or spread into native vegetation communities and riparian/wetland habitats, and subsequent reduction of suitable vegetation species, overall habitats, or decreased land values.

Construction

Substantial increases in weed prevalence within the Project area are not anticipated; however, despite efforts to prevent the proliferation of noxious weed species, it is possible that construction activities could result in the spread or introduction of noxious weed species along the proposed route or that weed species could be transported into areas that were relatively weed-free. Implementation of the Project's Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII) would minimize the introduction and spread of noxious weed species within the Project area. The Noxious Weed and Aquatic Nuisance Species Control Plan identifies pre-construction, construction, and post-construction measures including, but not limited to, the following: pre-construction biological monitors and weed control, use of weed-free erosion control devices, pressure washing all construction equipment, and post-reclamation monitoring and control.

Operation

Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. Impacts to vegetation as a result of noxious weed invasions are anticipated to be minimal during Project operation with the implementation of the Noxious Weed and Aquatic Nuisance Species Control Plan, which includes post-reclamation monitoring and noxious weed control measures.

4.8.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to vegetation and the potential establishment and invasion of noxious weeds and invasive species since surface disturbance associated with the Project would not occur.

4.8.3 Mitigation

No additional mitigation measures for noxious weed control have been proposed.

4.8.4 Residual Effects

Residual effects to native vegetation as a result of invasion by noxious weeds and invasive species are not anticipated with the implementation of the Noxious Weed and Aquatic Nuisance Species Control Plan.

4.9 Wildlife and Fisheries

Wildlife species and related issues for this analysis were determined through consultation with the NDGFD, USFS, and USFWS. Construction impacts were calculated based on the inclusion of the construction ROW associated with the new pipeline facilities, pipe storage yards, and ATWSs. A 100-foot-wide temporary construction ROW would be allowed in most areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated primarily based on the acreage that would be occupied by the permanent aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLVs).

The primary issues related to wildlife species include the loss or alteration of native habitats, increased habitat fragmentation, animal displacement, and direct mortalities. Direct impacts to wildlife species include mortality and displacement related to pipeline construction and operation. Habitat loss, alteration, and fragmentation also would occur. Indirect impacts include disturbance from increased levels of noise and human activity.

Potential impacts to wildlife species can be further classified as temporary and permanent. Temporary impacts consist of habitat removal, activities associated with Project construction, and changes in wildlife habitats until reclamation activities have been completed and vegetation is re-established. Permanent impacts consist of permanent changes to habitats and the wildlife populations that depend on these habitats, regardless of reclamation success. The extent of both temporary and permanent impacts depends on factors such as species sensitivity to human activity, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage, precipitation).

Impacts to game and nongame wildlife species, which occur in the Project area are anticipated to be low because: 1) only a small portion of the potentially suitable, available habitat would be impacted by Project construction activities; 2) established topsoil handling techniques and subsequent reseeding of disturbed areas would aid in the re-establishment of habitats; 3) the temporary nature of Project construction would minimize the length of time that wildlife potentially would avoid habitats along the Project ROW; and 4) measures to avoid impacts to wetland and waterbody habitat would be implemented.

Electrical Transmission Lines

As discussed in Section 2.2.1.2, power would be required to serve the receipt facilities listed in **Table 2-2**. Of the three receipt facilities serving the pipeline, sufficient onsite power already is available at the existing Dry Creek Terminal. For the proposed Keene and Beaver Lodge receipt facilities, new offsite power sources would be required. According to BakkenLink, for all of these remaining receipt facility locations, power sources capable of serving them are located in close proximity in the form of existing transmission lines or substations. For each of these receipt facilities currently without power, less than 0.25 mile of new electrical underground transmission lines would be required. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers.

Hydrostatic Testing

Hydrostatic testing would be accomplished using private and/or municipal water sources; therefore, impacts to waterbody habitat and associated species would not occur.

4.9.1 Proposed Action

As presented in Section 4.6, Vegetation Resources, a total of five vegetation cover types occur in the Project area. Impacts from Project construction would include the temporary disturbance of 394.7 acres of potential wildlife habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland. No disturbance to shrubland habitat would occur as a result of Project construction. Permanent impacts would occur to 77.5 acres of potential wildlife habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

4.9.1.1 Management Indicator Species

Construction

Three MIS have been identified for the Project: sharp-tailed grouse, greater sage-grouse, and black-tailed prairie dog. Impacts to sharp-tailed grouse are discussed under Section 4.9.1.3, Small Game Species. No greater sage-grouse leks occur within the Project area; therefore, impacts to the species are not anticipated. No black-tailed prairie dog colonies occur within the Project area; therefore, impacts to the species are not anticipated.

4.9.1.2 Big Game Species

Construction

Impacts to big game habitat (e.g., mule deer, white-tailed deer, elk, pronghorn, and mountain lion) include the temporary loss of potential forage and vegetative cover (native and reclaimed vegetation) and increased habitat fragmentation within the Project area. No big game critical ranges have been identified within the Project area. A total of 394.7 acres of potential big game habitat would be temporarily impacted by Project construction. This includes 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland.

Operation

Project operation may result in direct and indirect impacts to big game species. Direct mortality to individuals may result from collisions with maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity.

Displacement of big game as a result of direct habitat loss and indirect reduction in habitat quality has been widely documented (Irwin and Peek 1983; Lyon 1983, 1979; Rost and Bailey 1979; Ward 1976). Big game species tend to move away from areas of human activity and roads, which reduces habitat utilization near disturbance areas (Cole et al. 1997; Sawyer et al. 2006; Ward 1976). Displacement distances are strongly influenced by the level and timing of human activity, topography, and vegetation cover (Cole et al. 1997; Lyon 1979), which affects noise attenuation and visual barriers. Mule deer and pronghorn appear to be more tolerant of human activity than elk. For mule deer, displacement distances ranged from 330 feet to 0.6 mile, depending on the presence of vegetation cover (Ward 1976). For evaluation purposes, 660 feet was the most common displacement distance used for mule deer, especially in areas with minimal vegetation cover. Mule deer and pronghorn have been observed to habituate to vehicles. Displacement distances decreased when traffic was predictable, moved at a constant speed, and was not associated with out-of vehicle activities (Ward 1976).

Disturbances associated with construction activities would be temporary, and it is assumed that animals would return to the area following construction. Based on the amount of available habitat within the Project area, impacts to big game species are anticipated to be low and primarily limited to displacement from areas of human activity and habitat alteration. In most instances, suitable habitat adjacent to disturbed areas would be available for big game species until herbaceous and woody vegetation are re-established within the disturbance areas.

Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. The loss of available woody/shrubby vegetation would require more than 20 years to become re-established. However, herbaceous species may become established within 3 to 5 years, depending on reclamation success, weather conditions, and grazing management practices in the Project area. Permanent impacts would occur to 77.5 acres of potential big game habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

4.9.1.3 Small Game Species

Construction

Direct impacts to small game would include mortality or displacement as a result of construction activities. Indirect impacts include habitat loss, alteration, and fragmentation. Disturbance from increased levels of noise and human activity also would indirectly impact small game species. Project construction would result in the temporary loss of 394.7 acres of potential small game habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. Construction-related impacts to waterfowl would include the temporary loss of 13.2 acres of wetland/waterbody habitat within the Project area.

Habitat fragmentation impacts to some small game species have been demonstrated to negatively impact populations. In most instances, suitable habitat adjacent to disturbed areas would be available for small game species until herbaceous and woody vegetation become re-established. Temporary loss of habitat would reduce productivity for the current breeding season. However, due to the large amount of suitable habitat in the Project area, impacts to small game species are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to small game species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Local populations may experience higher levels of hunting and poaching pressure due to improved public access (Holbrook and Vaughan 1985). Other potential indirect impacts would include displacement of individuals and decreased breeding success from increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 77.5 acres of potential small game habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

Sharp-tailed Grouse

Construction

Project construction would result in the temporary loss of 381.5 acres of potential brooding and winter habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas.

One active sharp-tailed grouse lek occurs along the proposed route. Project construction during the breeding season may impact the sharp-tailed grouse by destroying nests, causing nest abandonment, or causing injury or direct mortality to the young. The species is particularly sensitive to disturbance while the birds gather on lekking grounds each morning and evening from March to June. Construction activities and associated noise, which may occur in the early morning or late evening near lekking grounds, may disrupt and displace individuals that have gathered for breeding activities. Once breeding activities have concluded, hens build their nests on the ground beneath vegetation near the lekking grounds. As presented in **Table 2-4**, no construction activities would be allowed within 1 mile (line of sight) of identified sharp-tailed grouse leks on USFS-administered land during the breeding season (March 1 through June 15). Therefore, impacts to breeding sharp-tailed grouse are anticipated to be low.

<u>Operation</u>

Project operation may result in direct and indirect impacts to sharp-tailed grouse. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success from increased noise levels and human activity. However, as presented in **Table 2-4**, no operation or maintenance activities would be allowed within 1 mile (line of sight) of identified sharp-tailed grouse leks on USFS-administered land during the breeding season (March 1 through June 15). Therefore, impacts to breeding sharp-tailed grouse are anticipated to be low. Regarding sharp-tailed grouse habitat along the proposed route, Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland habitat as a result of the construction of aboveground facilities.

4.9.1.4 Nongame Species

<u>Construction</u>

Construction activities may result in mortalities of less mobile or burrowing nongame species (e.g., small mammals, and reptiles) within the ROW from crushing by construction vehicles and equipment. Indirect impacts include habitat loss, alteration, and fragmentation. Increased noise levels and human activity also would indirectly impact nongame species. Project construction would result in the temporary loss of 394.7 acres of potential nongame habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. Impacts would occur until herbaceous vegetation returns to pre-construction conditions (approximately 3 to 5 years). For species dependent on shrubland habitat, displacement would occur until shrubs become re-established, which would require over 20 years. However, due to the large amount of suitable habitat in the Project area impacts to nongame species are anticipated to be low.

<u>Operation</u>

Project operation may result in direct and indirect impacts to nongame species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Other potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 77.5 acres of potential nongame habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

Migratory Birds

<u>Construction</u>

Migratory birds that utilize various habitats in the Project area may be impacted by construction activities. Direct impacts to avian species include mortality, nest destruction, displacement, and disturbance from increased noise levels and human activity. Indirect impacts to migratory birds include habitat loss, alteration, and fragmentation. Project construction would result in temporary loss of 394.7 acres of potential migratory bird habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas.

In addition to habitat loss, reductions in bird population densities in both open grasslands and woodlands may be attributed to a reduction in habitat quality caused by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may add to density reduction at relatively short distances, the effect of noise appears to be the most critical factor. Breeding birds of open grasslands (threshold noise range of 43 to 60 dBA) and woodlands (threshold noise range of 36 to 58 dBA) respond very similarly to disturbance by traffic volume (Reijnen et al. 1997). Reijnen et al. (1996) determined a threshold level for effects to bird species as 47 dBA. As discussed in **Table 2-4**, BakkenLink has committed to conducting pre-construction surveys for active migratory bird nests during the breeding season. To minimize impacts, migratory birds and their nests would be avoided during construction of the pipeline. Clearing and grubbing of the construction ROW would occur in the fall or winter to avoid potential impacts to bird nests. The typical migratory bird nesting season in North Dakota is February 1 through July 15 (USFWS 2013). Consultation with the USFWS regarding migratory birds would be continued during construction activities. Therefore, impacts to migratory birds are anticipated to be low.

<u>Operation</u>

Project operation may result in direct and indirect impacts to migratory birds. Direct impacts may result if maintenance activities are conducted during the breeding season. Mortality to individuals or destruction of nests may result from being crushed by or colliding with maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Herbaceous species may become established within 3 to 5 years depending on reclamation success, weather conditions, and grazing management practices in the proposed Project area. Permanent impacts would occur to 77.5 acres of potential migratory bird habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to migratory birds due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to migratory birds are low because: 1) the low probability of a spill and 2) the low probability of the spill coinciding with the presence of most migratory birds (5 months per year). **Appendix A**, BakkenLink Dry Creek to Beaver Lodge Pipeline Project Risk Assessment and Environmental Consequence Analysis, provides additional information regarding impacts to migratory birds from a potential spill event. If a spill event of sufficient size were to occur, federal and state laws would require cleanup to prevent impacts to bird species.

Raptors

<u>Construction</u>

A number of raptor species (e.g., bald eagle, golden eagle, ferruginous hawk, red-tailed hawk, Swainson's hawk, prairie falcon, American kestrel, Cooper's hawk, sharp-shinned hawk, great-horned owl, long-eared owl, short-eared owl, burrowing owl, and northern harrier) utilize various habitats in the Project area. Direct impacts to raptor species may include mortality and displacement. Indirect impacts include the loss or alteration of habitat, reduction in prey base, and disturbance from increased levels of noise and human activity.

Project construction would result in temporary loss of 394.7 acres of potential raptor habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas.

The loss of native habitat to human development has resulted in declines of hawks and eagles throughout the West (Boeker and Ray 1971; Schmutz 1984). In some cases, habitat changes have not reduced numbers of raptors, but have caused shifts in species composition (Harlow and Bloom 1987). Impacts to small mammal populations due to habitat loss and fragmentation can cause a reduced prey base for raptors, resulting in lower raptor densities. Thompson et al. (1982) and Woffinden and Murphy (1989) found that golden eagles and ferruginous hawks had reduced nesting success where native vegetation had been lost because the habitat was no longer able to support jackrabbit (prey) populations. In addition, raptors have low tolerance of disturbance while nesting or roosting, which results in displacement and reduced nesting success (Holmes et al. 1993; Postovit and Postovit 1987; Stalmaster and Newman 1978). Thompson et al. (1982) and Woffinden and Murphy (1989) found that increased levels of noise and human activity also can preclude otherwise acceptable raptor habitat from use (USFWS 2002). Vehicles that stop and go cause greater levels of disturbance to raptors than continuously moving vehicles (Holmes et al. 1993; White and Thurow 1985).

As described in **Table 2-4**, a preconstruction survey would be conducted to identify raptor nests in and adjacent to surface disturbance areas. To minimize impacts, raptors and their nests would be avoided during construction of the pipeline. Clearing and grubbing of the Project ROW would occur in the fall or winter to avoid potential impacts to raptor nests. The typical raptor nesting season in North Dakota is February 1 through July 15 (USFWS 2013). Distance buffers for active raptor nests vary by species, ranging from 0.25 mile to 0.5 mile. Consultation with the USFWS regarding migratory birds, including raptors, would be ongoing during construction activities. Therefore, impacts to raptor species are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to raptors. Direct impacts may result from collision with maintenance vehicles. Indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Herbaceous species may become established within 3 to 5 years, depending on reclamation success, weather conditions, and grazing management practices in the Project area. Permanent impacts would occur to 77.5 acres of potential raptor habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

Reptiles

Construction

Construction activities may result in direct and indirect impacts to less mobile species, such as reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by vehicles and equipment. Indirect impacts may include habitat loss, alteration, and fragmentation; and disturbance from increased levels of noise and human activity. Project construction would result in temporary loss of 394.7 acres of potential reptile habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland until reclamation has been completed and vegetation is re-established within the disturbance areas. However, due to the presence of suitable habitat adjacent to the disturbed areas and the temporary nature of Project construction, impacts to reptiles are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Herbaceous species may become established within 3 to 5 years, depending on reclamation success, weather conditions, and grazing management practices in the Project area. Permanent impacts would occur to 77.5 acres of potential reptile habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

4.9.1.5 Fisheries

Construction

The primary issues related to aquatic species include the loss or alteration of native habitats, increased sedimentation, potential toxicity related to fuel or other hazardous material spills, and issues associated with water management during open cut stream crossing construction. Most intermittent streams and wetland crossings would be avoided using HDD techniques but some would be constructed using open cut methods. The Lake Sakakawea crossing (12,321 feet in length) would be constructed with a trench/pull technique. Project construction would result in temporary impacts to 13.2 acres of wetland/waterbody habitat until reclamation has been completed and vegetation is re-established. Assuming a 10-foot-wide disturbance footprint for the jet sled, approximately 2.8 acres of lake bottom would be disturbed during construction of the Lake Sakakawea crossing.

Direct impacts to aquatic communities and habitat in Lake Sakakawea and wetlands containing aquatic resources would be minimized by implementation of environmental protection measures as described in **Table 2-4**.

Surface water quality may be impacted if construction equipment and vehicles leaked or spilled petroleum products or other hazardous materials into Lake Sakakawea or wetlands containing aquatic species. Direct spills of fuels or other hazardous materials would saturate soils and adversely affect wildlife habitat; less mobile species; and young, which are still dependent on the nest or burrow site. Environmental protection measures are presented in **Table 2-4** and the SWPPP. It is unlikely that a potential spill would affect terrestrial species due to the low probability of a spill and the behavioral avoidance of a spill area by wildlife species. Hazardous materials, chemicals, fuels, etc., would not be stored within 100 feet of wetlands or perennial/intermittent waterbodies (**Table 2-4**). Other setbacks would include at least 50 feet for all equipment staging areas and 10 feet for temporary storage of spoil material. Therefore, impacts to aquatic resources from potential fuel or other petroleum product spills are not anticipated.

Water withdrawal from municipal water sources for hydrostatic testing would not affect fisheries. Hydrostatic test water would be discharged through dissipation structures constructed of geotextile fabric, silt fence/filter cloth, and straw bales. Final discharge would occur at locations identified by landowners and/or the applicable land management agency. Discharge water quality would meet NPDES requirements.

Operation

Project operation may result in direct and indirect impacts to fisheries resources. Direct mortality to individuals could occur from maintenance activities conducted near waterbodies. Indirect impacts would include displacement of individuals, increased sedimentation, and degradation of habitat. Maintenance activities near waterbodies would remove a small amount of riparian and wetland vegetation. The removal of grasses and small shrubs near stream crossings would represent a relatively small portion of streamside cover for aquatic species. Repairs in areas near waterbodies may result in temporarily increased erosion. Erosion control procedures, as part of the Project SWPPP and CMRP (POD, Appendices XVII and XIII), would be implemented as part of the Project to minimize any erosion in disturbed areas. Project operation would allow vegetation to become re-established. However, trees and shrubs within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

In the unlikely event of a spill that would enter Lake Sakakawea, exposure to crude oil may result in adverse toxicological effects to fisheries resources. Despite this designation, it is unlikely that an oil spill into Lake Sakakawea would result in acute benzene toxicity to fisheries resources. Benzene was chosen as the primary contaminant of concern due to its relatively high toxicity and solubility, which results in the highest relative toxicity of crude oil hydrocarbons. Even following a worst-case scenario spill volume, benzene levels in affected areas are not expected to raise benzene concentrations to a level sufficient to cause acute toxicity in the most sensitive fish species, such as rainbow trout. While this species is not found within Lake Sakakawea, rainbow trout are much more sensitive than most other fish species, and therefore are often used as a baseline species when determining toxicity levels from a spill. See **Appendix A**, BakkenLink Dry Creek to Beaver Lodge Pipeline Project Risk Assessment and Environmental Consequence Analysis, for further information regarding impacts to fisheries resources from a potential spill event. Additionally, the Missouri River also is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195).

Also, it is unlikely that the Bakken crude oil would sink to the bottom sediments where it potentially could come in contact with benthic fisheries resources. The composition of Bakken crude oil contains minor amounts of heavy molecular weight hydrocarbons; therefore, Bakken crude oil would float on the water's surface facilitating containment and cleanup, even as the crude oil weathers. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills, so that the potential impacts to fisheries resources are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of fisheries resources, coupled with the mandated cleanup of spills, impacts to fisheries resources are considered unlikely.

Winter Spill Scenario

During the winter, Lake Sakakawea freezes over with a layer of ice that, in very cold years, can be as thick as 36 to 48 inches. This layer of ice would trap oil released below the lake's surface and prevent benzene evaporation from occurring. Therefore, during the winter, evaporative loss would be negligible and would allow a longer contact between the crude oil and the water column. However, natural undulations in the bottom of the ice would trap the material and prevent it from spreading horizontally, potentially causing very localized impacts to aquatic organisms in prolonged contact with the near-surface water (e.g., phytoplankton). Exposure to fish deeper in the water column likely would not experience adverse impacts.

The natural containment of winter releases facilitates cleanup efforts as the pockets of oil can be drilled to and removed using vacuum trucks. Thus, winter releases are predicted to have lower impacts to fisheries, particularly with respect to area of extent, as compared to releases occurring during the warmer seasons.

4.9.2 No Action Alternative

The temporary disturbance of 394.7 acres of potential wildlife habitat and the permanent disturbance of 77.5 acres of potential wildlife habitat would not occur if the No Action Alternative were to be implemented. Impacts to fish and wildlife resources would not occur.

4.9.3 Mitigation

No additional mitigation measures for wildlife and fisheries have been proposed.

4.9.4 Residual Effects

Residual impacts to wildlife and aquatic resources as a result of surface disturbance would include the permanent reduction of approximately 77.5 acres of potential habitat associated with permanent facilities, such as receipt facilities, emergency response equipment storage buildings, and MLVs. In addition, a 20- to 50-foot-wide easement would be permanently maintained, including vegetation removal as necessary. Habitat fragmentation and displacement of wildlife species could occur. Increased human presence during operations and maintenance activities would continue to affect the overall distribution of wildlife. The pipeline would remain submerged in Lake Sakakawea with approximately 4 feet of cover.

4.10 Special Status Species

The impact analysis area for special status species is defined by the Project area and relevant buffers for sensitive, mobile wildlife species. Construction impacts were calculated based on the inclusion of the construction ROW, new pipeline facilities, pipe storage yards, and ATWSs. A 100-foot-wide temporary construction ROW would be allowed in all areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated primarily based on the acreage that would be occupied by the permanent aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLV locations). The primary issues associated with special status species include potential loss of individuals and/or loss of suitable habitat.

The Project may result in both direct and indirect impacts to special status species. Direct impacts to special status plants could include the temporary loss of individual plants or local plant populations as a result of partial removal of vegetation from trampling or crushing by construction vehicles and equipment, or permanent loss of individuals from ROW clearing. Direct impacts to special status wildlife could include mortalities or displacement related to pipeline construction and operation, as well as habitat loss, alteration, and fragmentation.

Indirect impacts to special status plants could include temporary and long-term establishment of noxious weeds and invasive species, temporary accumulation of fugitive dust on plant species within suitable habitat resulting from construction and operation vehicle and equipment use, and potential loss of species from adjacent noxious weed-related herbicide application. Indirect impacts to special status wildlife could include temporary displacement of mobile species (e.g., larger mammals, adult birds) caused by increased noise levels and human activity. Impact levels would depend on timing and type of construction, sensitivity of the impacted species, and seasonal use patterns.

Potential impacts to special status plant and wildlife species can be further classified as temporary and permanent. Temporary impacts consist of habitat and vegetation removal, disturbance from Project construction, and changes in wildlife habitats and plant assemblages until reclamation activities have been completed and/or native vegetation populations are re-established. Permanent impacts consist of permanent changes to habitats and the plant and wildlife populations that depend on these habitats, regardless of reclamation success. The extent of both temporary and permanent impacts depends on the sensitivity of the species; seasonal use patterns; type and timing of construction activities; and physical parameters (e.g., topography, cover, forage, precipitation).

<u>Electrical Transmission Lines</u>

As discussed in Section 2.2.1.2, power would be required to serve the receipt facilities listed in **Table 2-2**. Of the three receipt facilities serving the pipeline, sufficient onsite power already is available at the existing Dry Creek Terminal. For the proposed Keene and Beaver Lodge receipt facilities, new offsite power sources would be required. According to BakkenLink, for all of these remaining receipt facility locations, power sources capable of serving them are located in close proximity in the form of existing transmission lines or substations. For each of these receipt facilities currently without power, less than 0.25 mile of new electrical underground transmission lines would be required. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers.

<u>Hydrostatic Testing</u>

Hydrostatic testing would be accomplished using private and/or municipal water sources; therefore, impacts to special status species' habitats would not occur.

4.10.1 Plant Species

Species-specific impact summaries and applicant-committed environmental protection measures for the nine USFS sensitive plant species carried forward in detailed analysis are presented below. As summarized in Section 3.10.1, species-specific surveys were conducted to determine the presence of special status species individuals and populations within and adjacent to the Project area on USFS-administered lands.

4.10.1.1 Proposed Action

As presented in Section 4.6, Vegetation Resources, a total of five vegetation cover types occur in the Project area. Impacts from Project construction would include the temporary disturbance of 394.7 acres of potential habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland. No disturbance to shrubland habitat would occur as a result of Project construction. Permanent impacts would occur to 77.5 acres of potential habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

4.10.1.2 Blue Lips (*Collinsia parviflora*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-4**. Implementation of the CMRP (POD, Appendix XV) and Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) would minimize the magnitude and duration of suitable habitat disturbance. BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures following construction, and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to determine reclamation success and identify post-reclamation noxious weed populations. To minimize fugitive dust emissions, BakkenLink would follow the environmental protection measures and design features detailed within the CMRP (POD, Appendix XV). The primary protection measure focuses on the use of water or chemical soil binders and measures to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements. Based on the implementation of the aforementioned environmental protection measures and design features, impacts to suitable habitat would be considered temporary in nature, pending successful reclamation.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.3 Dakota Buckwheat (*Eriogonum visheri*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for blue lips.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.4 Missouri Pincushion Cactus (*Escobaria missouriensis*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for blue lips.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.5 Sand Lily (*Leucocrinum montanum*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for blue lips.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.6 Golden Stickleaf (*Mentzelia pumila*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for blue lips.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.7 Alyssum-leaved Phlox (*Phlox alyssifolia*)

Construction

No individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. It is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the blue lips.

Operation

No permanent impacts to the species from the Project are anticipated.

4.10.1.8 Stemless Townsend Daisy (*Townsendia exscapa*) and Hooker's Townsendia (*Townsendia hookeri*)

Construction

One *Townsendia* sp. population was identified within the Project area; however, portions of the population are located between 39 and 78 feet from the pipeline centerline (**Figure 3.10-2**). The population was located outside of the construction and operation disturbance footprints. The population would be noted on alignment sheets and flagged/marked in the field for avoidance. No impacts to this population are anticipated.

Suitable habitat for the species was identified within the Project area. Construction-related disturbances to suitable habitat would be considered temporary in nature pending successful reclamation. Due to avoidance of the viable population, it is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the blue lips.

Operation

Permanent facilities would not be constructed within suitable habitat for this species; therefore, no permanent loss of habitat is anticipated.

4.10.2 Wildlife Species

4.10.2.1 Proposed Action

As presented in Section 4.6, Vegetation Resources, a total of five vegetation cover types occur in the Project area. Impacts from Project construction would include the temporary disturbance of 394.7 acres of potential wildlife habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, 13.2 acres of wetland/waterbody habitat, and 3.9 acres of woodland. No disturbance to shrubland habitat would occur as a result of Project construction. Permanent impacts would occur to 77.5 acres of potential wildlife habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 1.1 acres of woodland, and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities.

Species-specific impact summaries and applicant-committed environmental protection measures for the 16 special status wildlife species carried forward in detailed analysis are presented below.

4.10.2.2 Mammals

Northern Long-eared Bat

Construction

Pending regulatory approvals, construction activities are planned for second quarter 2015. Direct and indirect impacts to the northern long-eared bat include mortalities or displacement related to pipeline construction; habitat loss, alteration, and fragmentation; and increased levels of noise, activity, and human presence. Project construction would result in the temporary loss or alteration of approximately 3.9 acres of potential roosting habitat and foraging habitat.

Operation

No direct impacts to the northern long-eared bat are anticipated during operations. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts to 1.1 acres of suitable roosting and foraging habitat would occur as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement of individuals due to increased noise levels at facilities and human activity. During operation, vegetation would be re-established. Operations maintenance would remove trees and shrubs within 15 feet either side of the centerline to allow for aerial inspections of the ROW.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to the northern long-ear bat due to oiling of the body and ingestion of crude oil from contaminated prey. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to northern long-ear bats are low due to: 1) the low probability of a spill of any size, 2) the low probability of a spill coinciding with the presence of northern long-ear bat individuals, and 3) the unlikely exposure of bats through direct contact or from a reduction in its food base. It is estimated that a spill would occur while northern long-eared bats are in the area approximately once every 527 years. This estimate is based on the estimated spill frequency of 0.0019 incidents per mile per year, the maximum anticipated species presence in the Project area (i.e., 12 months out of the year), and a total of 0.9 mile of suitable habitat crossed. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the "pre-modern" era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills, so that the potential impacts to the northern long-eared bat would be temporary with reduced magnitude. Due to the low probability of a release coupled with the low probability of concurrent species presence in the same area as the spill, exposure pathways for becoming exposed to crude oil, and the mandated immediate cleanup of spills, adverse impacts to this species are considered low.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. Specifically, trees and shrubs (i.e., roosting habitat), would be replaced in accordance with the PSC's tree and shrub mitigation specifications. As a result, it is anticipated that implementation of the Project would have low impacts on northern long-eared bats.

<u>Black-tailed Prairie Dog</u>

Construction

No black-tailed prairie dog colonies have been identified within the Project area (Carlson McCain, Inc. 2014, 2013). However, suitable habitat exists within the Project area and the species is known to occur near the Project area in the LMNG complex. Impacts to this species, if present, would include direct mortalities of individuals if burrows are crushed by construction vehicles or equipment. Indirect impacts would result from increased noise levels and human activity. There would be no impacts to individual black-tailed prairie dogs as a result of the Project. However, the Project may impact suitable black-tailed prairie dog habitat. Therefore, direct impacts to this species would be limited to the incremental temporary loss of 212.9 acres of potentially suitable grassland habitat.

Operation

If black-tailed prairie dog colonies become established along the construction ROW in the future, direct and indirect impacts during Project operations may occur. Permanent impacts would occur to 6.5 acres of potential habitat as a result of the construction and operation of aboveground facilities. Direct mortality to individuals may result from collisions with maintenance vehicles. Indirect impacts may include habitat fragmentation as a result of ROW maintenance activities. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. This may in fact benefit black-tailed prairie dogs, which prefer grassland habitat as opposed to shrubland habitat.

Information regarding the presence, size, density, and activity status (active or inactive) or any newly established prairie dog colonies potentially impacted by the Project would be determined prior to construction. Based on the implementation of the aforementioned environmental protection measures and design features, impacts to suitable habitat would be considered temporary in nature pending successful reclamation.

4.10.2.3 Bird Species Associated with Wetland/Waterbody Habitat

Whooping Crane

Construction

Whooping cranes do not nest in North Dakota. However, the Project area lies within a 90-mile-wide corridor that includes approximately 75 percent of all reported sightings of migrating whooping cranes in North Dakota (USFWS 2013). Although suitable roosting and/or foraging habitat occurs within the Project area, historic records for this species do not exist. Established communal roost sites have not been documented in or adjacent to the Project area.

Indirect impacts may result from individual migrants being flushed from the Project area during construction. Disturbance during roosting and foraging activities can stress the whooping cranes during critical times of the year. Since whooping cranes are highly mobile, it is anticipated that individuals would move to other suitable resting and foraging habitats within the Project region. Based on the rarity of the species and the lack of occurrence data for the Project area, potential impacts from encountering and flushing a migrating whooping crane from the Project area would be low.

Habitat loss from Project construction would include the temporary disturbance of 164.7 acres of agricultural land and 13.2 acres of wetland/waterbody habitat within the Project ROW. Crops and rangeland would return to their original state during the following growing season. In most instances, suitable foraging habitat adjacent to disturbed areas would be available to whooping cranes. Additionally, any surface disturbance adjacent to wetland/waterbody habitat would be allowed to completely re-vegetate following Project construction.

Hydrostatic testing would be accomplished using private and/or municipal water sources. As a result, impacts from hydrostatic testing on the whooping crane would be negligible. The Hydrostatic Test Plan for the Project is provided in the POD, Appendix XIV.

Operation

Project operation may result in indirect impacts to the whooping crane, including habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 69.8 acres of agricultural land and 0.1 acre of wetland/waterbody habitat as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement and increased stress to individuals during migration by increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to whooping crane due to oiling of plumage and ingestion of crude oil from contaminated plumage. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to whooping cranes are low due to: 1) the low probability of a spill, and 2) the extremely low probability of the spill coinciding with the presence of whooping crane individuals. Based on the species presence in the

Project area a possible 4 months out of the year (i.e., spring and fall migration) and 17.4 miles of suitable habitat crossed, a spill frequency of 0.0122 incidents per mile per year was derived, which estimates that a spill could occur while whooping cranes are in the area approximately once every 82 years. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the "pre-modern" era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements or best management practices. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills so that the potential impacts to the whooping crane are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species, and mandated cleanup of potential spills, impacts to this species are considered low.

As discussed previously in Section 2.2.1.2, Receipt Facilities, power would be required to serve the receipt facilities listed in **Table 2-2**. Of the three receipt facilities serving the pipeline, sufficient onsite power already is available at the existing Dry Creek Terminal. For the proposed Keene and Beaver Lodge receipt facilities, new offsite power sources would be required. For all of these remaining receipt facility locations, power sources capable of serving them are located in close proximity in the form of existing transmission lines or substations. For each of these receipt facilities currently without power, less than 0.25 mile of new electrical underground transmission lines would be required. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. There would be no construction of new overhead transmission line segments for the Project, including across Lake Sakakawea, and therefore no impacts to whooping cranes would occur.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during migration, appropriate avoidance measures would be implemented if birds are seen. As a result, it is anticipated that implementation of the Project would have low impacts on whooping cranes.

<u>Interior Least Tern</u>

Construction

As indicated, suitable breeding habitat for the interior least tern may be located within or near the Project at the Lake Sakakawea crossing. Potential impacts would include the incremental, temporary loss of potentially suitable breeding habitat as a result of Project construction. Based on BakkenLink's proposed plan to cross Lake Sakakawea, potential impacts to interior least tern breeding habitat would be limited to the temporary loss of approximately 8.8 acres of potential habitat at the Lake Sakakawea crossing. However, it is anticipated that impacts to breeding habitat would be temporary, based on BakkenLink's construction and reclamation methods for the Project included in BakkenLink's CMRP (POD, Appendix XIII) and the Lake Sakakawea Pipeline Crossing Report (POD, Appendix X)

Additionally, Lake Sakakawea and its tributaries are not a source of water for hydrostatic testing. Therefore, there would be no water depletion impacts on the interior least tern or its habitat from hydrostatic testing. The Hydrostatic Test Plan for the Project is provided in the POD, Appendix XIV.

According to the Project's construction schedule, construction activities are planned for second quarter 2015. However, if construction activities were to get delayed, the schedule may overlap with the beginning of the interior least tern breeding season (April 1 to August 31). Indirect impacts could result from increased noise and human presence at work site locations if breeding interior least terns are located within or adjacent to the Project area.

Operation

Indirect impacts could result from increased noise and human presence during any pipeline maintenance activities if breeding interior least terns are located within or adjacent to the Project. Prior to any Project activities that would occur within or adjacent to potential breeding habitat, BakkenLink operations personnel would coordinate with the USFWS to establish authorized mitigation if maintenance activities are required during the breeding season within or adjacent to suitable breeding habitat.

As discussed previously in Section 2.2.1.2, Receipt Facilities, power would be required to serve the receipt facilities listed in **Table 2-2**. Of the three receipt facilities serving the pipeline, sufficient onsite power already is available at the existing Dry Creek Terminal. For the Keene and Beaver Lodge receipt facilities, new offsite power sources would be required. For all of these remaining receipt facility locations, power sources capable of serving them are located in close proximity in the form of existing transmission lines or substations. For each of these receipt facilities currently without power, less than 0.25 mile of new electrical underground transmission lines would be required. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. There would be no construction of new overhead transmission line segments for the Project, including across Lake Sakakawea, and therefore, no impacts to interior least terns would occur.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to interior least terns due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to interior least terns is very low due to: 1) the low probability of a spill, and 2) the low probability of the spill coinciding with the presence of least tern individuals (5 months per year). It is estimated that a spill would occur while interior least terns are in the area approximately once every 517 years. This estimate is based on the estimated spill frequency of 0.0019 incidents per mile per year, the maximum anticipated species presence in the Project area (i.e., 5 months out of the year), and a total of 2.2 miles of suitable habitat crossed. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the “pre-modern” era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. The Missouri River also is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195), which specifies how pipeline operators must identify, prioritize, assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that could, in the event of a leak or failure, affect HCAs within the U.S. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills, so that the potential impacts to the interior least tern are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to this species are considered low.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable breeding habitat. Appropriate avoidance measures would be implemented, if nests are identified. As a result, it is anticipated that implementation of the Project would have low impacts on interior least terns.

Piping Plover

Construction

Threats to piping plover nesting habitat include reservoirs, channelization of rivers, and modifications of river flows that have eliminated hundreds of miles of nesting habitat along Northern Great Plains' rivers (USFWS 1994). Eggs and young are vulnerable to predation and human disturbance, including recreational activities and off-road vehicle use.

As previously indicated, suitable breeding and critical habitat for the piping plover is located within or near the Project area at the Lake Sakakawea crossing. Impacts to piping plover would parallel those discussed above for the interior least tern. Based on BakkenLink's proposed plan to cross Lake Sakakawea, potential impacts to piping plover critical habitat would be limited to the temporary loss of approximately 8.8 acres of designated critical habitat at the Lake Sakakawea crossing. However, it is anticipated that impacts to critical habitat would be temporary, based on BakkenLink's construction and reclamation methods for the Project, included in BakkenLink's CMRP (POD, Appendix XIII) and the Lake Sakakawea Pipeline Crossing Report (POD, Appendix X).

Additionally, Lake Sakakawea and its tributaries are not a source of water for hydrostatic testing. Therefore, there would be no water depletion impacts on the piping plover or its habitat from hydrostatic testing. The Hydrostatic Test Plan for the Project is provided in the POD, Appendix XIV.

According to the Project's construction schedule, construction activities are planned for second quarter 2015. However, if construction activities were to get delayed, the schedule may overlap with the beginning of the piping plover breeding season (April 1 to August 31). Impacts could result from increased noise and human presence at work site locations if breeding piping plovers are located within or adjacent to the Project area.

Operation

Indirect impacts could result from increased noise and human presence during any pipeline maintenance activities if breeding piping plovers are located within or adjacent to the Project. Prior to any Project activities that would occur within or adjacent to potential breeding habitat, BakkenLink operations personnel would coordinate with the USFWS to establish authorized mitigation if maintenance activities are required during the breeding season within or adjacent to suitable breeding habitat.

As discussed in Section 2.2.1.2, power would be required to serve the receipt facilities listed in **Table 2-2**. The proposed Keene and Beaver Lodge receipt facilities would require less than 0.25 mile of underground transmission lines to provide power to the sites. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. There would be no construction of new overhead transmission line segments for the Project, including across Lake Sakakawea, and therefore, no impacts to piping plovers would occur.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to piping plover due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to piping plover is very low due to: 1) the low probability of a spill, and 2) the low probability of the spill coinciding with the presence of piping plover (5 months per year). It is estimated that a spill would occur while piping plovers are in the area approximately once every 517 years. This estimate is based on the estimated spill frequency of

0.0019 incidents per mile per year, the maximum anticipated species presence in the Project area (i.e., 5 months out of the year), and a total of 2.2 miles of suitable habitat crossed. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the "pre-modern" era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. The Missouri River also is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195), which specifies how pipeline operators must identify, prioritize, assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that could, in the event of a leak or failure, affect HCAs within the U.S. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills, so that the potential impacts to the interior least tern are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to this species are considered low.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable breeding habitat. Appropriate avoidance measures would be implemented if nests are identified. As a result, it is anticipated that implementation of the Project would have low impacts on piping plovers.

Rufa Red Knot

Construction

Suitable stop-over habitat for the rufa red knot is located within or near the Project area at the Lake Sakakawea crossing. If present, impacts to this species would parallel those discussed above for the interior least tern. Potential impacts would include the incremental, temporary loss of potentially suitable stop-over habitat as a result of Project construction. Based on BakkenLink's proposed plan to cross Lake Sakakawea, potential impacts to rufa red knot stop-over habitat would be limited to the incremental, temporary loss of approximately 8.8 acres of potential habitat at the Lake Sakakawea crossing. However, it is anticipated that impacts to stop-over habitat would be temporary, based on BakkenLink's construction and reclamation methods for the Project, included in BakkenLink's CMRP (POD, Appendix XIII) and the Lake Sakakawea Pipeline Crossing Report (POD, Appendix X).

Additionally, Lake Sakakawea and its tributaries are not a source of water for hydrostatic testing. Therefore, there would be no water depletion impacts on the rufa red knot from hydrostatic testing. The Hydrostatic Test Plan for the Project is provided in Appendix XIV of the POD.

Operation

Project operation may result in indirect impacts to the rufa red knot, including habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts would include displacement and increased stress to individuals during migration by increased noise levels and human activity.

As discussed in Section 2.2.1.2, power would be required to serve the receipt facilities listed in **Table 2-2**. The proposed Keene and Beaver Lodge receipt facilities would require less than 0.25 mile of underground lines to provide power to the sites. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. There would be no construction of new overhead transmission line segments for the Project, including across Lake Sakakawea, and therefore, no impacts to rufa red knots would occur.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to rufa red knots due to oiling of plumage and ingestion of crude oil from contaminated plumage and prey. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to rufa red knot is very low due to: 1) the low probability of a spill, and 2) the low probability of the spill coinciding with the presence of individual rufa red knots (4 months per year). It is estimated that a spill would occur while rufa red knots are in the area approximately once every 646 years. This estimate is based on the estimated spill frequency of 0.0015 incidents per mile per year, the maximum anticipated duration of species presence in the Project area (i.e., 4 months out of the year), and a total of 2.2 miles of suitable habitat crossed. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the “pre-modern” era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. The Missouri River also is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195), which specifies how pipeline operators must identify, prioritize, assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that could, in the event of a leak or failure, affect HCAs within the U.S. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills, so that the potential impacts to the interior least tern are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to this species are considered low.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during migration, appropriate avoidance measures would be implemented if birds are seen. As a result, it is anticipated that implementation of the Project would have low impacts on rufa red knots.

4.10.2.4 Bird Species Associated with Grassland Habitat

<u>Sprague’s Pipit, Baird’s Sparrow, and Long-billed Curlew</u>

Construction

Direct and indirect impacts to the Sprague’s pipit, Baird’s sparrow, and long-billed curlew would include mortalities or displacement related to pipeline construction if construction occurs during the breeding season (February 1 through July 15); habitat loss, alteration, and fragmentation; and disturbance from increased noise levels and human activity. In addition to habitat loss, reductions in bird population densities also may be attributed to a reduction in habitat quality produced by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may negatively affect densities at relatively short distances, the effects of noise appear to be the most critical factor, since breeding birds of open grasslands (threshold noise range of 43 to 60 dBA) and woodlands (threshold noise range of 36 to 58 dBA) respond similarly to disturbance by traffic volume. Reijnen et al. 1996 determined a threshold effect for bird species to be 47 dBA. Project construction would result in temporary impacts to 390.8 acres of potential breeding and foraging habitat, including 212.9 acres of grassland, 164.7 acres of agricultural land, and 13.2 acres of wetland/ waterbody habitat.

Operation

Project operation may result in direct and indirect impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals or nests may result from being crushed by or colliding with maintenance vehicles. Indirect impacts may include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 76.4 acres of potential breeding and foraging habitat, including 69.8 acres of agricultural land, 6.5 acres of grassland, and 0.1 acre of wetland/waterbody habitat, as a result of the construction of aboveground facilities. Other potential indirect impacts include displacement of individuals and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to the Sprague's pipit, Baird's sparrow, and long-billed curlew due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to these species are low due to: 1) the low probability of a spill, and 2) the low probability of the spill coinciding with the presence of Sprague's pipits, Baird's sparrows, and long-billed curlews (5 months per year). Based on the estimated species presence in the Project area of 5 months and 18 miles of suitable habitat crossed, a spill frequency of 0.0158 incidents per mile per year was derived, which is used to estimate that a spill could occur while these species are in the Project area approximately once every 63 years. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the "pre-modern" era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills so that the potential impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to these species are considered low.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable habitat for nests of these species. Appropriate avoidance measures would be implemented if nests are identified. As a result, it is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species.

<u>Burrowing Owl</u>

Construction

No black-tailed prairie dog colonies occur within the Project area; therefore, the potential for nesting burrowing owls to be present is low. However, burrowing owls are known to nest in other types of mammalian burrows that may be present in the Project area. Therefore, according to the Land and Resource Management Plan for the Dakota Prairie Grasslands, if an active nest is identified within 0.25 mile of construction activities, no surface occupancy or use is allowed within 0.25 mile (line of sight) of burrowing owl nests (USFS 2001).

Potential impacts to the burrowing owl, if present, would result from the incremental reduction of suitable habitat within the Project area during construction activities. Temporary impacts to 377.6 acres of potential burrowing owl habitat would occur, including 212.9 acres of grassland, 164.7 acres of agricultural land. However, due to the lack of primary nesting habitat (i.e., prairie dog colonies), potential for construction-related impacts to the species are low.

Operation

Project operation may result in direct and indirect impacts to the burrowing owl, if present. Direct impacts may result if maintenance activities are conducted during the breeding season (May 1 to September 15 [Grondahl and Schumacher 1997]). Direct mortality to individuals or nests may result from being crushed by or colliding with maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 76.3 acres of potential burrowing owl habitat, including 69.8 acres of agricultural land, and 6.5 acres of grassland as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to the burrowing owl due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to burrowing owls are low due to: 1) the low probability of a spill, 2) the low probability of the spill coinciding with the presence of burrowing owls, and 3) the requirement for containment and cleanup of a release in coordination with federal and state authorities. **Appendix A** provides additional information regarding impacts to wildlife from a potential spill event.

Based on the low potential for occurrence of nesting burrowing owls within the Project area and implementation of BakkenLink’s environmental protection measures (**Table 2-4**), it is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species.

4.10.2.5 Bird Species Associated with Shrubland Habitat

<u>Loggerhead Shrike</u>

Construction

Potential indirect impacts to the loggerhead shrike, if present, include displacement related to pipeline construction; and habitat avoidance and disturbance from increased noise, activity, and human presence. The Project construction would not result in the temporary loss or alteration of shrubland habitat. However, reductions in bird population densities in both open grasslands and woodlands also may be attributed to a reduction in adjacent habitat quality produced by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may add to density effects at relatively short distances, the effects of noise appear to be the most critical factor since breeding birds of open grasslands (threshold noise range of 43 to 60 dBA) and woodlands (threshold noise range of 36 to 58 dBA) respond very similarly to disturbance by traffic volume (Reijnen et al. 1997). Reijnen et al. (1996) determined a threshold effect for bird species to be

47 dBA, while a New Mexico study in a pinyon-juniper community found that impacts of gas well compressor noise on bird populations were strongest in areas where noise levels were greater than 50 dBA. However, moderate noise levels (40 to 50 dBA) also showed some effect on bird densities in this study (LaGory et al. 2001).

Operation

Project operation may result in indirect impacts to the loggerhead shrike. Indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity. No permanent impacts would occur to shrubland habitat as a result of the construction and operation of aboveground facilities.

In the event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to the loggerhead shrike due to oiling of plumage, ingestion of crude oil from contaminated plumage and prey, and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to loggerhead shrikes are low due to: 1) the low probability of a spill, 2) the low probability of the spill coinciding with the presence of loggerhead shrikes, and 3) the requirement for containment and cleanup of a release in coordination with federal and state authorities. **Appendix A** provides additional information regarding impacts to wildlife from a potential spill event.

As described in **Table 2-4**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable habitat for loggerhead shrike nests. Appropriate avoidance measures would be implemented if nests are identified. As a result, it is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the population or species.

4.10.2.6 Butterfly Species

<u>Dakota Skipper, Ottoe Skipper, Regal Fritillary Butterfly, Tawny Crescent</u>

Construction

The USFS has documented one historic occurrence of the tawny crescent near the proposed route near MP 20.8 (USFS 2013). Historic occurrences for the other butterfly species do not occur near the Project area. However, proposed critical habitat for the federally threatened Dakota skipper occurs approximately 3.2 miles west and approximately 2.3 miles east of the Project area on USFS-administered lands south of Lake Sakakawea.

The main reasons for the decline of Dakota skippers, Ottoe skippers, regal fritillary butterflies, and tawny crescents include the loss and fragmentation of native habitat through grazing, fire, weed control, pesticide use, and other ground disturbances (Opler et al. 2012). Pipeline construction reduces native grassland areas by removing vegetation and disturbing the prairie sod. Once disturbed, this sod is extremely slow to redevelop. Disturbing soil along the construction ROW encourages the establishment of weeds and other invasive species. Project construction would result in the temporary disturbance to 212.9 acres of grassland habitat, including mixed-grass prairie and sand prairie.

Operation

Project operation may result in direct and indirect impacts to the Dakota skipper, Ottoe skipper, regal fritillary butterfly, and tawny crescent. Direct impacts may result if maintenance activities are conducted when these species are present. Direct mortality to individuals may result from being crushed by or colliding with maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Permanent impacts would occur to 6.5 acres of mixed-grass prairie habitat and sand prairie habitat as a result of the construction and operation of aboveground facilities. Other potential indirect impacts would include displacement of individuals due to increased noise levels and human activity. Project operation would allow vegetation to become established. However, trees and shrubs within 15 feet either side of the centerline would be removed as necessary maintenance during operations to allow for aerial inspections of the ROW.

In the unlikely event of a spill or leak, direct contact with a crude oil spill could result in adverse effects to the Dakota skipper, Ottoe skipper, regal fritillary butterfly, and tawny crescent due to oiling of exoskeleton/wings and ingestion of crude oil from contaminated vegetation. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to these species are low due to: 1) the low probability of a spill, 2) the low probability of the spill coinciding with the presence of Dakota skippers, Ottoe skippers, and tawny crescents, and 3) the requirement for containment and cleanup of a release in coordination with federal and state authorities. Based on the maximum duration of species presence in the Project area of 12 months out of the year and 18 miles of suitable habitat crossed, a spill frequency of 0.0380 incidents per mile per year was derived, which is used to estimate that a spill may occur while these species are in the area once every 26 years. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the “pre-modern” era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills so that the potential impacts to the Dakota skipper, Ottoe skipper, regal fritillary butterfly, and tawny crescent are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to this species are considered low.

Based on implementation of BakkenLink’s environmental protection measures (**Table 2-4**), it is not anticipated that implementation of the Project would contribute to a trend toward federal listing or cause a loss of viability to the populations or species. Additionally, impacts to suitable habitat would be considered temporary in nature pending successful reclamation.

4.10.2.7 Fish Species

<u>Pallid Sturgeon</u>

Construction

As discussed in Chapter 2.0, Description of the Proposed Action, BakkenLink proposes to cross Lake Sakakawea by installing 13,026 linear feet of new 16-inch-diameter steel pipeline using the pipe pull method of construction, where all pipe laying operations are conducted from a barge. The pipeline would be buried to a minimum depth of 4 to 5 feet below the lake shoreline surface and 3 feet below the lake bottom. The proposed duration of construction activities at the Lake Sakakawea crossing is approximately 2 months including preparation time. The primary push-pull construction sequence would last approximately 1 week and wire cables placed in Lake Sakakawea for this construction technique would be strung across the lake bottom for approximately 1 to 2 days. In order to avoid potential spawning impacts to the pallid sturgeon, BakkenLink has committed to construct at Lake Sakakawea after June 1 to avoid the warmwater fish spawning period (April 15 through June 1).

Direct impacts to the pallid sturgeon from construction activities at the Lake Sakakawea crossing may include increased sedimentation and alteration of potentially suitable lake bottom habitat. In order to minimize potential impacts to the pallid sturgeon and its habitat, BakkenLink has committed to the following measures discussed in the Lake Sakakawea Pipeline Crossing Report (POD, Appendix X): 1) placing turbidity containment fencing on each side of the excavation/soil discharge area to minimize the movement of silt; 2) utilizing turbidity mats behind the pipe lowering skid and above the discharge diffuser to reduce turbidity during pipe pulling across Lake Sakakawea; 3) deploying turbidity monitoring instrumentation at pre-determined locations with STOP authority in case of the construction activity exceeding a turbidity level above "control" conditions; 4) siting spoil disposal areas so as to avoid wetlands and woody vegetation; 5) installing and maintaining erosion control measures, such as rip rap, sediment barriers, and temporary slope breakers (water bars), throughout project construction; and 6) reclaiming the disturbed areas adjacent to the lake, according to BakkenLink's CRMP (POD, Appendix XIII) and in coordination with NDGFD, USFWS, and USACE.

Potential hazardous materials, fuel, or other petroleum product spills would not affect pallid sturgeon or their habitat since these activities would be restricted to within a minimum of 100 feet of Lake Sakakawea and its tributaries. Other setbacks would include at least 50 feet for ATWS and equipment staging areas. Environmental monitors would inspect the construction areas to ensure that leaks or spills have not occurred at the lake crossing.

Hydrostatic testing would not affect this species, since Lake Sakakawea or its tributaries would not be used as test water. In addition, hydrostatic test water would not be discharged into the Missouri River or Lake Sakakawea.

Operation

Routine pipeline operation would not affect the pallid sturgeon.

In the unlikely event of a spill that would enter Lake Sakakawea, exposure to crude oil may result in adverse toxicological effects to pallid sturgeon. Despite this designation, it is unlikely that an oil spill into Lake Sakakawea would result in acute benzene toxicity to pallid sturgeon. It is unlikely that the Bakken crude oil would sink to the bottom sediments where it potentially could come in contact with pallid sturgeon. This is due to the composition of Bakken crude oil containing minor amounts of heavy molecular weight hydrocarbons. Bakken crude oil would float on the water's surface facilitating containment and cleanup, even as the crude oil weathers. However, benzene was chosen as the primary contaminant of concern due to its relatively high toxicity and solubility, which results in the highest relative toxicity of crude oil hydrocarbons to aquatic species. Assuming a worst-case scenario spill volume, benzene levels in affected areas are not expected to raise benzene concentrations to a level sufficient to cause acute toxicity in the most sensitive fish species, such as rainbow trout (LC_{50} of 7.4 ppm). While this species is not found within Lake Sakakawea, rainbow trout are much more sensitive than most other fish species (including pallid sturgeon), and therefore, are often used as a baseline species when determining toxicity levels from a spill.

Based on the maximum duration of species presence in the Project area of 12 months out of the year and 2.2 miles of suitable habitat crossed by the Project, a spill frequency of 0.0048 incidents per mile per year was derived, which is used to estimate that a spill could occur while pallid sturgeon are in the area once every 210 years. Because the Project has not yet been constructed, it does not have an operational history from which to derive incident frequency rates. Consequently, a conservative approach was taken by first determining the baseline incident frequencies from industry data (i.e., PHMSA data). Baseline incident frequencies are derived from historical national pipeline incident data for both hazardous liquid and natural gas transmission. Because the majority of pipelines in the U.S. were constructed in the "pre-modern" era (i.e., the 1970s or earlier), these baseline frequencies reflect incident rates associated with earlier pipeline design and construction methods that often do not meet the current regulatory requirements. Further, these historical data do not account for supplemental protective measures that BakkenLink would implement.

Appendix A provides additional information regarding impacts to wildlife from a potential spill event. The Missouri River also is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195), which specifies how pipeline operators must identify, prioritize, assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that could, in the event of a leak or failure, affect HCAs within the U.S. Further, if a spill event were to occur, federal and state laws would require containment and cleanup of spills so that the potential impacts to the pallid sturgeon are further reduced in magnitude. Due to the low probability of a release that would need to coincide with the presence of the species in the same area as the spill, and mandated cleanup of potential spills, impacts to this species are considered low.

As described in the POD, Appendix X and **Table 2-4**, BakkenLink would implement environmental protection measures designed to eliminate construction during the spawning season as well as minimize turbidity and erosion at the Lake Sakakawea crossing during construction. As a result, it is anticipated that implementation of the Project would have low impacts on pallid sturgeon.

4.10.3 No Action Alternative

Implementation of the No Action Alternative would avoid direct impacts to all special status species and their associated habitats because surface disturbance associated with the Project would not occur.

4.10.4 Mitigation

4.10.4.1 Northern Long-eared Bat

1. In areas along the Project route where woodlands and shrublands would be crossed, BakkenLink would conduct acoustic bat surveys (minimum of 2 detector nights per 0.6 miles of suitable summer habitat) between May 1 and August 31, in coordination with the USFWS, to determine if northern long-eared bats are present within the Project area (as per the Northern Long-Eared Bat Interim Conference and Planning Guidance [USFWS 2014]).
2. If acoustic surveys indicate the presence of northern long-eared bats, BakkenLink would conduct surveys prior to construction to identify potential roosting trees/snags within and immediately adjacent to the Project ROW that are potentially suitable habitat for the northern long-eared bat. Once identified, BakkenLink would not construct in these areas from June 1 to August 15, when there may be young present. In the case that construction occurs between June 1 and August 15, BakkenLink would implement additional measures to ensure potential roosting trees/snags and trees surrounding potential roosting trees/snags are not impacted by Project activities, including fencing-off and/or monitoring.

4.10.4.2 Dakota Skipper

1. In order to further reduce impacts to potential grassland habitat, BakkenLink would construct one additional HDD segment (MP 28.3 to 28.8) to avoid impacts to potential grassland habitat. BakkenLink would also reduce the construction ROW width from 100 feet to 75 feet in nine areas (MP 4.7 to 4.9, MP 5.0 to 5.1, MP 8.0 to 8.5, MP 21.2 to 21.6, MP 29.8 to 30.6, MP 31.9 to 32.3, MP 33.9 to 34.1, and MP 34.3 to 34.4) to reduce impacts to potential grassland habitat. To the extent practical, BakkenLink would utilize existing disturbed or recently disturbed areas for additional temporary workspaces.
2. Constructing one additional HDD segment, reducing the construction ROW width from 100 feet to 75 feet in nine areas, and utilizing existing disturbed and recently disturbed areas for additional temporary workspaces, would avoid impacts to approximately 10.2 acres of grassland habitat potentially suitable for Dakota skippers (i.e., native and native-invaded grassland habitat). This would result in a 5 percent decrease in overall impacts to potential grassland habitat.

4.10.5 Residual Effects

No residual loss of suitable habitat for special status plant species would occur as a result of permanent aboveground facility placement. Residual impacts to special status wildlife species as a result of surface disturbance would include the permanent reduction of approximately 77.5 acres of potential habitat associated with permanent aboveground facilities. In addition, a 20- to 50-foot-wide easement would be permanently maintained, including vegetation removal as necessary. Habitat fragmentation and displacement of special status species could occur. Increased human presence during operations and maintenance activities could continue to affect the overall distribution of special status species. The pipeline would remain submerged under Lake Sakakawea with approximately 4 feet of cover. Residual impacts to the pallid sturgeon could occur as a result of the unlikely possibility of an oil leak or pipeline rupture.

4.11 Land Use

4.11.1 Proposed Action

Construction

The Project would require approximately 498 acres for construction. This acreage accounts for the construction ROW and associated facilities, as well as aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, MLVs) and ATWSs/staging areas.

BakkenLink would use a 100-foot-wide construction ROW for the majority of the proposed route. A 50-foot-wide construction ROW would be used on USFS-administered lands. BakkenLink also proposes ATWSs at site-specific locations to accommodate rough terrain, side slope, topsoil segregation, and road and waterbody crossings. The standard width of the permanent ROW for operation would be 50 feet, except on USFS-administered lands where it would be 20 feet.

No residential lands would be traversed. Likewise, no residential lands are adjacent to aboveground facilities. Furthermore, there are no schools, churches, parks, or any other sensitive land use areas within 500 feet of the proposed route.

The most common land cover types, based on USFWS Land Cover and North Dakota GAP database information, include grassland (212.9 acres) and cultivated cropland (164.7 acres). The least common land cover types are open wetland/waterbodies (13.2 acres), woodland (3.9 acres). No shrubland systems would be impacted. Potential land use impacts associated with the Project would be temporary reductions in areas of rangeland and cropland/pasture. However, potential impacts to cultivated cropland would occur only if construction occurs on those lands during the appropriate growing season. Because the construction ROW can be used for crop production and grazing following construction, this loss would be a temporary impact. Construction is scheduled for second quarter 2015, resulting in not more than one growing season being impacted.

Agricultural lands would be restored to their former use after construction. Landowners would be compensated for crop loss during construction. In agricultural lands, crops could be planted on top of the new pipeline. Restoration would be guided by BakkenLink’s CMRP. The Plan includes measures to ensure that soil productivity is not diminished in agricultural lands by using site-specific topsoiling measures and alleviating compaction if noted. Revegetation would be according to the landowner’s preference in agricultural lands. In rangelands, the ROW would be seeded using the mixes selected in consultation with the NRCS or relevant land management agency.

Based on the Project plans and other conservation commitments, it is anticipated that impacts to general land use would be minor. The majority of the construction ROW for the Project is located on private land. The proposed route does not cross any formal public recreation lands. No national parks, national landmarks, state or municipal parks, or wild and scenic rivers would be traversed by the proposed route. The construction ROW temporarily would affect approximately 20 acres of national grassland managed by the USFS. Based on the Project plans and other conservation commitments, it is anticipated impacts to special land uses would be minor.

Operation

The land required for the operation of the Project is approximately 79 acres. This accounts for the permanent placement of pipeline facilities, such as the receipt facilities, emergency response equipment storage areas, and MLVs.

4.11.2 No Action Alternative

Implementation of this alternative would avoid impacts to land use because surface disturbance associated with the Project would not occur.

4.11.3 Mitigation

No additional mitigation measures for land use have been proposed.

4.11.4 Residual Effects

Residual effects to land use would include the permanent loss of 79 acres of land and uses associated with this land as a result of construction and operation of aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLVs).

4.12 Recreation

4.12.1 Proposed Action

Construction

One of the primary concerns in crossing public lands is the impact construction would have on recreational activities. Disruption and noise during construction could be a nuisance to hikers, hunters, anglers, and campers, and could cause disturbance to wildlife. Construction during the summer months could affect hiking, fishing, and other summer activities when they are at their peak. Additionally, construction during the fall could affect hunting activities. Hunting is an important local recreational use in the Project area.

The duration of recreational impacts in any one area usually would be temporary, lasting several days to several weeks. Wintertime activities would not be affected. The Project would not transect any WMAs, PLOTS, national parks, state or municipal parks, or developed recreational facilities. Scenic views temporarily would be affected during construction until revegetation blends the colors and textures of the ROW into the surrounding landscape. Areas of high visual sensitivity for the remainder of the Project area are further discussed in Section 4.14, Visual Resources.

Portions of the Project would cross hunting units managed by NDGFD. Some of the most commonly hunted species in these hunting units are white-tailed deer, mule deer, and pronghorn. The recreational enjoyment of wildlife (such as hunting during big game hunting seasons) temporarily may be affected by construction activities, depending on season and location. However, this effect would be temporary.

Impacts to urban and dispersed recreation resources as a result of the construction work force are expected to be minimal due to the minor temporary population increase (300 workers) and the intensive nature of the construction schedule. After disturbed areas are reclaimed to pre-construction conditions, there would be no impacts to recreation resources.

BLM standard stipulations would be followed as part of the abandonment process. At Project termination, all surface facilities would be removed, and the disturbed areas would be reclaimed. Chapter 2.0 contains more details regarding Project abandonment.

Operation

The incremental work force size during operations (after construction) for the Project is estimated to be less than 10 pipeline personnel, resulting in a negligible long-term increase to recreational users in the region. Recreational boat traffic could be affected if a spill were to occur at the proposed Lake Sakakawea crossing. If a spill were to occur, BakkenLink would implement emergency response measures that would include the use of boats, booms, and other equipment to capture the oil, which could impede or restrict recreational boat traffic in the short term until the spill was remediated.

4.12.2 No Action Alternative

Implementation of this alternative would avoid impacts to recreation because surface disturbance associated with the Project would not occur.

4.12.3 Mitigation

No additional mitigation measures for recreation have been proposed.

4.12.4 Residual Effects

Residual effects to recreation areas are not anticipated as a result of Project construction and operation.

4.13 Wilderness

4.13.1 Proposed Action

Construction

Construction of the Project would not impact the characteristics of wilderness areas or lands suitable for wilderness south of the Project area as none of the activity would occur within either of the respective boundaries (Theodore Roosevelt National Park and Potential Lands with Wilderness Characteristics). Congress' management guidelines for these lands suitable for wilderness areas would not be violated. Construction-related impacts, which would occur outside of the boundaries, would be temporary and the disturbed areas would be reclaimed and revegetated in accordance with applicable regulations and permit requirements as discussed in Chapter 2.0.

Operation

Operation of the Project would not impair characteristics of the wilderness area or lands suitable for wilderness south of the Project area. Vehicular traffic along the permanent ROW would be limited to workers performing periodic pipeline and MLV maintenance and emergency repairs to the pipeline or corrosion protection devices. The aboveground facilities would be located within or immediately adjacent to the construction ROW. These facilities would not impair lands suitable for preservation as wilderness.

4.13.2 No Action Alternative

All impacts to wilderness would be avoided because the Project would not be constructed.

4.13.3 Mitigation

Additional mitigation measures for wilderness have not been proposed.

4.13.4 Residual Effects

Residual effects to potential lands with wilderness characteristics on Theodore Roosevelt National Park are not anticipated as a result of Project construction or operations.

4.14 Visual Resources

The assessment of the Project's impacts to visual resources is based on an evaluation of the changes to the existing visual environment that would result from Project construction and operation.

In determining the extent and implications of the visual changes, a number of factors were considered:

- The specific changes in the affected environment's composition, character, and any outstanding valued qualities;
- The context of the affected visual environment;
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration; and
- The numbers of viewers, their activities, and the extent to which these activities are related to the visual qualities affected by proposed changes.

The USFS scenic management system was used for determination of potential impact significance. If impacts meet applicable SIOs, they are considered less than adverse. If they do not meet the SIOs, they are considered potentially significant.

4.14.1 Proposed Action

<u>Construction</u>

Immediate foreground views of the Project would occur from Lake Sakakawea (**Figure 3.14-3**), SHs 23, 73, 1806, and 1804. These locations are defined as sensitive due to scenery-related concerns of viewers and the high numbers of viewers. Construction activities, ground disturbance, pipeline materials, equipment, and vehicles would be visible from these public viewing locations. Construction activities would disturb the ground surface by removing low-growing vegetation, shifting soil, and altering drainage patterns. Surface disturbances would affect scenery by creating exposed soil across the construction area with a different texture and color, and by creating land barren of vegetation and topsoil. A visually strong edge of vegetation would appear along the construction ROW. The construction ROW would visually divide the landscape due to absence of vegetation and the altered lines of topography.

Construction activities would affect scenery due to dust originating from the movement of vehicles, excavation work, and wind blowing across exposed soil. Construction activities would use lights for safety and illumination of work areas.

Glare and glint from reflective surfaces of construction equipment and vehicles would be seen by casual viewers. The intensity and amount of glare would vary throughout the day and also would depend on atmospheric conditions and the presence of construction equipment and vehicles. The construction activities would affect visual resources by adding a noticeable level of activity to an area with little present land use activity. The color of construction equipment and vehicles would not resemble the muted tans, browns, greys, and greens of the terrain and vegetation. For all immediate foreground viewing situations, the degree of visual impact temporarily would be moderate to strong, involving changes to vegetation patterns and the lack of screening elements to block direct views of the Project.

The continuous line of ROW disturbance would reduce the openness of the landscape by visually dividing views. Although the homogenous texture of vegetation would mimic the texture of other pipeline corridors, it would not resemble the texture of any other landscape element. Although views of the Project originate in the immediate foreground distance, visible extents of the Project vary by location and relationship with terrain.

Operation

The Project would be visible from 689 acres of SIO high landscapes, 0 acres of SIO moderate landscapes, and 7,154 acres of SIO low landscapes (**Figure 4.14-1**).Visual impacts would be weak to moderate for changes in the color of vegetation and none to moderate for changes in form, line, and texture of landform and structures. As reclamation progresses, moderate impacts for changes in colors of vegetation eventually would become weak. These weak impacts would meet the objectives for SIO high, medium, low, and very low landscapes.

The Project's overall effects on visual conditions during hours of both daylight and darkness would be low. Some nighttime lighting would be required for operational safety and security at the receipt facilities and emergency response equipment storage areas. However, because of other minimal manmade sources of light in these remote areas, the overall change in ambient lighting conditions at the Project site may be moderate to substantial when viewed from nearby offsite locations.

The Project likely would create a weak to moderate visual impact in SIO high and low, categories of rangeland and riparian landscapes and a weak visual impact in cultivated cropland landscapes. This impact would be more apparent in visually sensitive areas such as the Lake Sakakawea viewshed. However, it is not anticipated that long-term impacts would be considered adverse. With application of reclamation measures suitable for the soils and climate of the Project area, croplands would achieve visual compatibility in the first or second season, while rangeland and riparian landscape would require 3 to 5 years during the operations phase for the ROW disturbance to blend with the surrounding grassland landscape and a longer time to blend with shrub-dominated landscapes. Aboveground facilities such as receipt facilities, emergency response equipment storage areas, and MLVs would remain on the landscape long-term and therefore result in moderate impacts to the landscape surrounding the Project.

Decommissioning of the Project would have temporary impacts similar to construction phase impacts.

4.14.2 No Action Alternative

Implementation of this alternative would avoid impacts to visual resources because surface disturbance associated with the Project would not occur.

4.14.3 Mitigation

VR-1: Aboveground structures will be painted with BLM-approved environmental colors to minimize contrasts with surrounding landscapes.

4.14.4 Residual Effects

Residual effects to visual resources would include the construction and operation of aboveground facilities (e.g., receipt facilities, emergency response equipment storage areas, and MLVs), which would remain in the landscape in the long-term. These facilities would result in moderate impacts to the surrounding landscapes.

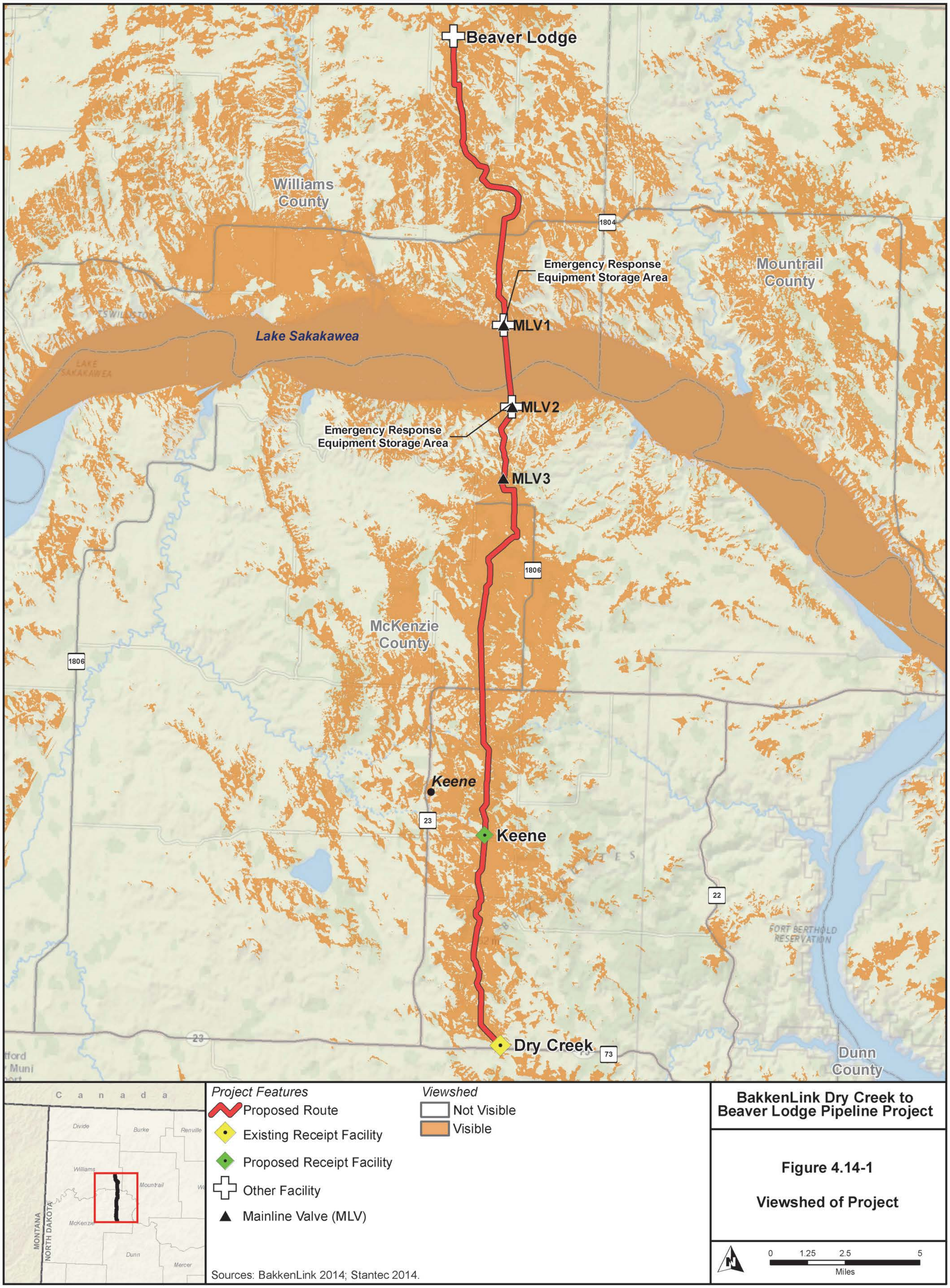


Figure 4.14-1

Viewshed of Project

4.15 Noise

4.15.1 Proposed Action

Construction

The nearest noise receptor (private residence) is at least 500 feet from the construction ROW and aboveground facilities. Noise resulting from construction activities would be temporary (2 to 3 weeks in any given area) in duration and limited to daylight hours. Based on construction noise analyses conducted for other pipeline projects (USEPA 1974), noise levels of 60 dBA or above could extend perpendicularly up to 12,000 feet (2.5 miles). These levels could occur sporadically over the construction period, and the zone of impact would be limited to the local area of construction activities as construction progresses along the ROW. The terrain along portions of the proposed route is more diverse and occasionally would pass through areas where the terrain enhances the noise levels during construction. As a result of the short duration of construction (approximately 4 months), the daylight-only construction period, and generally rural alignment of the construction ROW, noise levels should not be overly disruptive.

Operation

Operation-related noise would be limited to the three receipt facilities where tanker trucks would be periodically unloading crude oil at storage tanks. In addition, support vehicles and equipment used by maintenance personnel also would contribute to increased noise levels. Residences are located more than 500 feet from the receipt facilities; therefore, impacts to these residences are not anticipated as a result of operational activities.

4.15.2 No Action Alternative

Implementation of this alternative would avoid noise-related impacts associated with the Project.

4.15.3 Mitigation

No additional mitigation measures for noise have been proposed.

4.15.4 Residual Effects

Residual effects to soundscapes adjacent to the receipt facilities from noise generated during operations would be localized to the immediate vicinity of the receipt facilities. No sensitive noise receptors (e.g., residences) are known to occur within 500 feet of the receipt facilities.

4.16 Socioeconomics

This section evaluates the beneficial and adverse effects of the Project within the context of social and economic changes in the Project area. Calculations of impacts were based on known characteristics of the Project area.

4.16.1 Proposed Action

4.16.1.1 Population and Communities

Construction

The Project would take approximately 6 to 8 months to construct from start to finish. Construction of the Project would require an estimated total of 300 workers divided among three construction spreads: one north of Lake Sakakawea, one south of the lake, and one for the lake crossing. The total workforce would include foremen, inspectors, equipment operators, welders, laborers, and other skilled workers. The number of construction workers in the area at any particular time would vary somewhat depending on the stage of construction. Although BakkenLink has indicated it would hire as many local workers as possible, the extremely tight labor market in northwestern North Dakota, where unemployment rates are estimated at less than 1.0 percent, suggests most of the required personnel would come from outside the Project vicinity. Local employment opportunities initiated by the Project construction would be considered beneficial to the local area economies.

As a result of the short duration of construction, it is assumed that very few, if any, of the non-local work force would bring their families with them to the Project vicinity. If the estimates from the nearly 35-year-old 1979 Pipeline Construction Workers and Community Impact Surveys Report are still valid, there would be 0.3 dependents per worker in addition to the workers themselves (Mountain West, Inc. 1979). Assuming 90 percent of construction workers would be non-local (270 persons at peak), with 0.3 dependents each (81 persons), the maximum Project-related increase in Project vicinity population would be 351 people, or 1.0 percent of the estimated 2012 population of Williams and McKenzie counties. This very small percentage, maximum case increase in the Project area population, combined with the short duration of construction and some variation in the particular workers needed during changing stages of construction, would at worst produce minimal adverse social, economic, and community infrastructure impacts during construction. No measurable effect on demography in Williams and McKenzie counties would be expected.

Operation

Assuming operations and maintenance of the Project would be conducted by existing BakkenLink employees, there would be no effect from the Project on the population or demography of Williams and McKenzie counties during its operating life.

4.16.1.2 Community Services and Temporary Housing

Construction

Because construction would be short in duration, housing demand would be temporary. It generally is accepted that pipeline workers prefer to stay in accommodations closest to the pipeline that offer adequate housing. Based on typical pipeline construction, it is assumed that housing for most of the non-local pipeline work force would be divided among man camps, hotels/motels, recreational vehicles, and other accommodations; however, the current western North Dakota boom in oil and gas development has stretched thin existing housing resources in the Project vicinity. There are over 10,000 beds in man camps in Williams and McKenzie counties, although it is not known how many are now or would be available at the time of construction. There also are numerous RV park type facilities in Williams and McKenzie counties where some construction workers may prefer to locate, and there are numerous hotel and motel facilities in the area as well. Because of the short duration of construction, housing demand would be temporary and it likely is that few, if any, of the non-local construction workers would pursue housing in more permanent accommodations. Although actual vacancy rates for any of the temporary/transient housing resources are not known, housing continues to be at a premium in the area. Construction of new residential housing has greatly accelerated in recent years, which may be reducing pressure on temporary housing to some degree by providing alternative opportunities for new workers who are in more permanent work, but who have been using temporary housing resources in the short-term. If local housing is not available for construction workers, some may commute long distances and some may locate RVs in ad hoc locations. BakkenLink anticipates that workers would be able to find accommodations at existing man camps as workers depart and beds becomes available.

A potential effect of the construction work force on housing would be competition with travelers, recreationists, and more notably, industry workers for temporary accommodations. Peak construction would not occur during the summer tourist and fall hunting seasons; however, accommodations in the Project vicinity currently are limited, such that the Project construction work force would only have an incremental impact on an already strained housing environment.

As noted in Section 3.16, Project area government services have been stressed by the rapid expansion of oil and gas development in the region. The Project would increase the demands on facilities and services, but the effects would be temporary, lasting only for approximately 6 to 8 months during the scheduled construction period. Effects to government services also would be a relatively minor incremental increase over existing demands because the estimated project-related population increase, which would be the primary driving factor in service demand, is projected to be at most approximately 1.0 percent of the estimated current population in Williams and McKenzie counties. In particular, effects on schools would be minimal because most workers on such a temporary construction project would not be expected to bring school-aged children with them to Williams and McKenzie counties.

Operation

The Project permanent work force would be small and would place a negligible demand on local services such as police, medical facilities, fire or educational services; it would not be expected to cause any detrimental effects to community social well-being.

4.16.1.3 Tax Revenues and Finance

Construction

The estimated cost of the Project would be $19.4 million dollars. Although most of the construction workforce would likely be non-local, some portion of the construction wages would be spent locally, which would generate local economic activity and state sales taxes; it is likely that some local sales taxes and possibly lodging taxes also would accrue to Williston, Watford City, Tioga, and Ray. Since Williams and McKenzie counties do not levy sales taxes, the counties would not benefit from that potential revenue source. The sales tax receipts from construction worker spending would be a temporary beneficial effect ending at completion of construction.

In addition to construction worker local expenditures, other income generated by construction would include local material purchases by contractors and other support personnel. It is assumed that the contractor would purchase as many materials as possible from local sources. These expenditures would include tools, fuel, oil, parts, and repairs. Local communities would benefit from fuel sales and repair expenditures.

Operation

The permanent work force for operation would be a slight increase of the current population full-time positions, probably stationed at Watford City, Tioga, and Williston. Maintenance would be done with local contractors specializing in this type of work.

The estimated total Project-related ad valorem tax receipts for the first year of operations are presented in **Table 4.16-1** (based on the 2012 county-wide average mill levy). After the pipeline goes into operation, the assessment of value also would include consideration of Project income. Each county and school district would benefit from the Project-related tax base increase. The total amount of property tax generated each year would vary, depending on the yearly mill levy and the assessed valuation, which likely would decline over the life of the Project due to depreciation.

Table 4.16-1 Estimated Ad Valorem Tax Receipts from the Project

County	Miles of Pipeline	2012 Average Tax Rate[1] (mills)	Estimated Taxable Value of Pipeline and Facilities[2] ($)	Estimated Property Tax Receipts From Pipeline and Facilities[3] ($)
McKenzie	13.4	122.09	1,247,336	152,287
Williams	23.8	219.75	614,359	132,005
Total	**37.2**	**NA**	**1,861,695**	**284,292**

[1] Estimated average county-wide tax rates may not reflect actual tax rate applied to pipeline.

[2] Estimated values of pipe and facilities were multiplied by 0.50 to determine the assessed value and 0.10 to determine the estimated taxable value. Typically this value is calculated by the North Dakota Office of State Tax Commissioner. Estimates provided by BakkenLink.

[3] Estimated annual taxes based on first year valuation and 2012 average mill rates.

NA – Not Applicable.

Sources: North Dakota State Tax Commissioner 2012; BakkenLink 2014.

At the end of the Project's useful life, abandonment of Project facilities would decrease the tax bases of the affected counties and districts. At the time of abandonment, tax receipts in each county would be reduced from the pipeline's in-service date due to depreciation. Total decreases in tax receipts cannot be quantified at this time.

4.16.2 No Action Alternative

If the Project is not constructed, there would be no effects on the socioeconomic condition in Williams and McKenzie counties.

4.16.3 Mitigation

No monitoring or mitigation is recommended for socioeconomic issues.

4.16.4 Residual Effects

Residual effects would include an increase in the local and state tax revenue base during construction and operation, as well as stressed local government services and housing during the construction phase. Economic benefits of the Project, including primarily purchases of supplies and services and provision of tax revenues, would continue for the life of the Project.

4.17 Environmental Justice

4.17.1 Proposed Action

Construction

With the exception of the American Indian population in McKenzie County, estimated percentages of minority and low-income populations in Williams and McKenzie counties are either lower than statewide percentages, or slightly higher than statewide percentages, but not high enough to be considered "meaningfully greater" for purposes of the environmental justice analysis.

The Fort Berthold Indian Reservation, a portion of which lies in McKenzie County, does have substantially higher percentages of American Indians and persons below the poverty level. However, the reservation is approximately 5 miles from the Project and there is no indication that residents of the reservation would be affected by construction or operation of the Project any differently than the rest of the population in Williams and McKenzie counties. Consequently, it is anticipated that there would not be any disproportionately high adverse effects on the health or environment of minority and low-income populations residing on the reservation. The Project would generate income in the two counties, potentially benefiting the residents, including minority communities. Based on this analysis, no environmental justice issues concerning minority and/or low-income populations are expected to occur as a result of the Project.

Operation

No disproportionate adverse effects on minority or low-income populations would occur as a result of operation of the Project.

4.17.2 No Action Alternative

The No Action Alternative would continue existing trends in economic and environmental effects of oil and gas development in northwest North Dakota, but would not be expected to disproportionately adversely affect minority or low-income populations as compared with effects on the population at large.

4.17.3 Mitigation

No additional mitigation measures for environmental justice have been proposed.

4.17.4 Residual Effects

No disproportionate adverse residual effects on minority or low-income populations are anticipated to occur as a result of construction and operation of the Project.

4.18 Transportation

4.18.1 Proposed Action

Construction

Construction of the Project would generate an increase in traffic on local roads from trucks hauling pipe, other construction materials, and heavy equipment, and from construction workers accessing the ROW. Pipe and construction materials would either arrive by rail or be trucked in via state and U.S. highways to staging areas in preparation for distribution to the ROW as needed. The pipe and most construction material would be shipped by truck to the existing and proposed receipt facilities as well as contractor offices and facilities. These materials shipments would increase traffic temporarily on major access routes: I-94, U.S. Highway 85, and possibly U.S. Highway 2. Primary access routes within the Project vicinity would be SH 1804 and CR 21 and 23 in Williams County and SH 1806 and SH 23 in McKenzie County. All of these highways have sufficient capacity to accommodate the Project-related traffic without creating major delays. Effects on traffic flows would be minor and temporary, although the increase in heavy trucks could create some queuing delays on road segments where passing is restricted.

Pipe and construction materials would be transported to the ROW via a grid of gravel surface rural roads and temporary construction roads that would provide direct access to the ROW. Traffic on these roads generally is very light. Specific local roads used would vary as construction progressed along the construction ROW. Local motorists may experience minor delays caused by heavy trucks traveling under restrictions for weight and speed, but the rapid progression of the construction process and the relatively short total duration of construction would minimize the adverse effects.

There are load limit restrictions on county and township roads and bridges that must be observed at all times to prevent surface and structural damage. If construction would occur during the spring freeze-thaw cycle, additional restrictions may apply. Oversize loads would comply with special permit requirements of the North Dakota Department of Transportation and county highway departments.

Effects of the Project on traffic safety would be expected to be minor. The number of total accidents could be expected to increase approximately in proportion to the Project-related increase in total traffic. However, the incremental increase in traffic would be relatively small and the accident rate per million vehicle miles would not be expected to increase measurably.

Increased heavy truck traffic would tend to accelerate deterioration of road surfaces. This effect would be minimal on state and U.S. highways built to accommodate such traffic. Road maintenance requirements on unpaved county roads may be notably increased during the brief periods of heavy usage for access to particular segments of the proposed route during construction activities. The degree of increase in maintenance needed would depend on weather conditions and the quality of each existing roadway. County restrictions on weight and speed of heavy vehicles, especially during freeze-thaw cycles, should minimize the damage.

All crossings of paved highways and roads constructed of stabilized material would be bored; therefore, traffic interruptions would be limited to equipment and personnel crossing the road. Some unpaved roads would be open-cut, but construction would be completed within a few days, limiting potential impacts.

Operation

Operation of the Project would reduce the current levels and distances of truck traffic in the general area by replacing approximately 500 daily truck trips transporting oil with pipeline transport. This would have a positive long-term effect on traffic. There would be localized increases in truck traffic at the two new receipt facilities at Beaver Lodge and Keene, and possibly at the Dry Creek Terminal, as well. These increases would partially offset the overall reduction in current trips that would be removed from local roads by the proposed pipeline.

Occasional pipeline maintenance or repair requirements would cause activity similar to construction but only for very brief periods and on a much smaller scale and more localized basis than would be experienced during the initial construction of the Project.

4.18.2 No Action Alternative

Implementation of this alternative would avoid both beneficial and negative impacts to transportation because construction and operational activities associated with the Project would not occur. Without the construction of the Project, additional truck traffic would continue to occur on existing highways and county roads in the Project vicinity. The beneficial effects to traffic congestion would not be realized.

4.18.3 Mitigation

No additional mitigation measures for transportation are proposed.

4.18.4 Residual Effects

Truck traffic in the Project vicinity would decrease with the operation of the Project but local truck traffic in the immediate vicinity of the receipt facilities is expected to increase relative to existing levels.

4.19 Public Safety

4.19.1 Proposed Action

Construction

Construction of the Project would generate the possibility of elevated risks to public safety through increased traffic, local population, and hazardous chemical and fire-related risks. To address potential impacts during construction, workers would be housed in temporary accommodations and would utilize temporary transportation measures to minimize public safety impacts on local citizens. Additionally, emergency response procedures for all incidents would be developed involving hazardous materials and possible fire emergencies.

Traffic along the proposed route would temporarily increase during construction; however, this increase is expected to be negligible when considered in the scope of the increased traffic as a result of recent oil and gas development. The Project is expected to help reduce overall truck traffic after it is in service, as crude oil would be shipped by pipeline and not tanker trucks.

Operation

The transportation of crude oil by pipeline involves some risk to the public in the event of an accident and subsequent release of oil. The PHMSA is the primary federal regulatory agency responsible for ensuring that pipelines are safe and reliable. The PHMSA works cooperatively with other agencies that regulate pipelines. The safety regulations implement the laws found in 49 CFR 195.

To address potential impacts during operation, an ERP has been developed in conjunction with local authorities and first responders to build site-specific response plans, detail emergency equipment availability and location, and emergency contacts. Additionally, water trucks, portable water pumps, chemical fire extinguishers, hand tools, and heavy equipment would be available to address effects from fire during operation.

A spill of crude oil during Project operation as a result of a pipeline leak could contaminate soil and groundwater if the leak is not properly contained and remediated. As discussed in Section 2.2.1.5, the pipeline would be monitored by an electronic system that would sense pressure and flow rates 24 hours a day, as well as by aerial patrols. Consistent monitoring would allow concerns to be immediately identified and addressed. A Pipeline IMP would be developed, which, in conjunction with the ERP, would outline pipeline integrity management procedures to be implemented during operation.

In order to decrease response time in the event of a spill and to expedite containment of a spill, BakkenLink would construct three emergency response equipment storage areas for the Project. One of the areas would be located at the proposed Beaver Lodge Receipt Facility. The second area would be located on the south side of Lake Sakakawea near MLV 2 and would contain a small building. The building would house a 30-foot-long aluminum boat (landing craft type vessel). The third area would be located on the north side of Lake Sakakawea near MLV 1 and would be used for storing a spill response trailer. The emergency response equipment storage areas at MLV 1 and MLV 2 would each store 1,000 feet of 18-inch-hard boom. In the event of a spill in Lake Sakakawea, the boat stored on the south side of the lake would be used for deploying the boom. A spill response trailer also would be located at the existing Dry Creek Terminal. In addition to storing emergency response equipment at the aforementioned BakkenLink facilities, BakkenLink has a cooperative agreement with the SASR and would have access to spill response equipment at the SASR storage facility in New Town, North Dakota. BakkenLink would have access to the trailers staged at the response unit in New Town, North Dakota, which includes three trailers (one trailer would have gear for a winter/ice spill response; one trailer would have booms for summer/water spill response; and one trailer would have miscellaneous gear required for initial response, containment, and cleanup). Also, this response unit has three boats for deploying containment and cleanup equipment on Lake Sakakawea and other waterbodies. SASR has 2,000 feet of boom available at the New Town facility. Finally, BakkenLink has contracted Clean Harbors as their Oil Spill Response Organization. Clean Harbors has 10,000 feet of boom available as well as a large inventory of cleanup equipment in Watford City, North Dakota.

4.19.2 No Action Alternative

Implementation of this alternative would avoid impacts to public safety because construction and operational activities associated with the Project would not occur.

4.19.3 Mitigation

No additional mitigation measures for public safety have been proposed.

4.19.4 Residual Effects

Truck traffic in the Project vicinity would decrease with the operation of the Project but local truck traffic in the immediate vicinity of the receipt facilities is expected to increase relative to existing levels.

4.20 Hazardous Materials and Solid Waste

Issues related to the presence of hazardous materials are the potential impacts to the environment from an accidental release of hazardous materials during transportation, and materials use during construction and operation of the Project. Also, the crude oil to be transported in the pipeline is considered a hazardous material that, if leaked or spilled, has the potential to contaminate soil and water resources and pose a threat to public health and safety.

Improper handling or storage of hazardous materials or pipeline leaks can result in contamination of soil and water resources, as well as pose a threat to worker and public health and safety. The environmental effects of a release would depend on the material released, the quantity released, and the location of the release. Potential releases could include a small amount of fuel spilled during transfer operations in the construction ROW to the loss of several thousand gallons of fuel into a riparian drainage. The release of a hazardous material or solid waste into a sensitive area (e.g., wetland or populated area) is judged to be very unlikely. Depending on the material released, the amount released, and the location of the release, an accident resulting in a release could affect soils, water, biological resources, and human health.

4.20.1 Proposed Action

<u>Construction</u>

Contamination of soil and water may occur due to spills during transportation, storage, and handling of hazardous materials and solid waste. Also, unknown subsurface contaminants could be encountered during excavation.

Hazardous Materials

Soil and water contamination along the construction ROW may result from spills during construction and trench excavation. Impacts from spills typically would be minor because of the low frequency of spill occurrence and relatively low volume of materials being handled and potentially spilled. The Project SPCC Plan would address procedures to ensure the proper handling and storage of these materials and procedures for the containment and cleanup of spills at aboveground facilities. In addition, POD, Appendix XX provides additional protection measures for the handling of hazardous materials with respect to sensitive receptors.

Solid Waste

BakkenLink would dispose of construction waste in accordance with applicable rules. Construction debris would not be placed in or adjacent to waterways and construction trash would be removed from the construction ROW. BakkenLink would comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations.

Contaminated Sites

It is possible that contaminated soil and groundwater (e.g., hydrocarbon contamination) could be encountered during trench excavation operations. In case contaminated soil is encountered, BakkenLink would suspend work in the area of the suspected contamination until the type and extent of the contamination was determined. The specific procedures for handling the discovery of potentially contaminated soils are described in Chapter 5.0 of the SPCC Plan (POD, Appendix XVIII). The type and extent of contamination; the responsible party; and local, state, and federal regulations would determine the appropriate cleanup method for contaminated soil and groundwater.

Operation

Hazardous Materials

Table 3.20-1 lists various hazardous materials that would be used in the operation of the pipeline. The procedures for safe handling of these materials are outlined in the regulatory programs described in Section 3.20.

The USDOT classifies crude oil as a hazardous liquid. Accordingly, the pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR 195. The regulations are intended to ensure adequate protection for the public and to prevent pipeline and facility accidents and failures, as well as specify material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

BakkenLink would design, construct, and operate the pipeline in accordance with federal regulations. Important features to ensure the safe operation of the pipeline include:

- Hydrostatic testing to verify the pipeline's integrity prior to operations;
- Corrosion protection by using high integrity fusion bonded epoxy coating and cathodic protection;
- Internal inspection of the pipe using "smart pigs" designed to detect irregularities on the internal and external surfaces of the pipe;
- SCADA system to continuously monitor the pipeline and the pressure of its contents;
- Utilizing their Atmos Pipe Leak Detection System;
- Participation in state "one call" programs;
- Use of remotely activated valves at key locations; and
- Construction of emergency response equipment storage areas (Section 2.2.1.4).

Solid Waste

As described in Section 3.20, the waste generated during operations would be similar to waste generated during construction, except for certain waste that may be generated from pipeline maintenance operations. Such waste materials may be considered hazardous and would have to be accumulated, stored, and disposed of in accordance with applicable rules and regulations.

4.20.2 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and the potential effects associated with the transportation, storage, or use of hazardous materials or the disposal of solid waste would not occur. Unknown contaminated sites that may exist along the construction ROW would not be discovered and impacts would continue undetected until discovery sometime in the future by other parties.

4.20.3 Mitigation

No additional mitigation measures for hazardous materials and solid waste have been proposed.

4.20.4 Residual Effects

Residual adverse effects from the use of hazardous materials under the Proposed Action would depend on the substance, quantity, timing, location, and response involved in the event of an accidental spill or release. Operation in compliance with applicable regulations and in accordance with the facility's SPCC Plan, as well as the prompt cleanup of potential spills and releases, would minimize the potential of residual adverse effects due to accidental spills or releases of hazardous materials.

4.21 Cultural Resources

4.21.1 Proposed Action

4.21.1.1 Cultural Resources

Construction

The BLM 8100 Manual states that cultural resources need not be determined eligible for the NRHP to receive consideration under NEPA (BLM 2004). Under the NHPA, potential impacts to historic properties are assessed by applying the "criteria of adverse effect" (36 CFR 800.5[a][1]). "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." The analysis of impacts using the criteria is limited to those resources that are either listed in the NRHP or have been recommended as eligible for inclusion in the NRHP.

Potential direct impacts to known and unknown cultural resources include physical disturbance associated with Project-related construction activities. Indirect impacts could include soil erosion and the potential for illegal artifact collecting and vandalism due to the presence of increased numbers of people during construction and increased public access. Visual impacts could result from the introduction of visual intrusions (e.g., aboveground ancillary facilities) resulting in changes in the setting surrounding such resources.

Cultural resources inventories conducted for the Project identified a total of 19 prehistoric sites, 2 historic sites, and 1 multi-component site in the APE. The prehistoric sites contain stone features and/or CMS, the historic sites are documented as farmsteads, and the multi-component site consists of a prehistoric CMS and modern rock pile. Of the 22 sites, 2 are recommended as eligible for listing on the NRHP, 2 are recommended as not eligible for the NRHP, and the eligibility of the remaining sites is undetermined.

With the exception of one site, minor variations to the proposed pipeline ROW have resulted in avoidance of all sites by at least 50 feet, thereby avoiding direct impacts to these resources. The 2 exceptions are 32MZx1423 where the pipeline centerline is located approximately 40 feet from the site and 32MZ2767 where the pipeline centerline is located approximately 12 feet from the site. Neckdown of the construction ROW and monitoring of construction activities in the vicinity of 32MZx1423 are recommended (**Table 4.21-1**); HDD construction methodology would be utilized near 32MZ2767. Although sites 32MZ1151, 32MZ2695, 32MZ2741, 32MZ2753, 32MZ2760, 32MZ2763, 32WI1124, and 32WI1506 are outside of the construction ROW and would be avoided by ground-disturbing activities, additional avoidance measures such as, monitoring, fencing, and/or neckdown of the pipeline ROW would be required to further protect the sites from Project construction (**Table 4.21-1**).

Table 4.21-1 Cultural Resources Requiring Additional Avoidance Measures

Site Number	Site Type	Land Status	NRHP-eligibility	Avoidance Measure
32MZ1151	Prehistoric CMS/stone feature	USFS	Recommended eligible	Monitor
32MZx1423	Prehistoric CMS	Private	Undetermined	Neckdown/monitor
32MZ2695	Prehistoric CMS	Private	Undetermined	Monitor/fence/neckdown
32MZ2741	Prehistoric CMS	Private	Undetermined	Monitor/fence/neckdown
32MZ2753	Prehistoric CMS	Private	Undetermined	Monitor
32MZ2760	Historic farmstead	Private	Undetermined	Neckdown
32MZ2763	Prehistoric CMS	Private	Undetermined	Monitor

Table 4.21-1 Cultural Resources Requiring Additional Avoidance Measures

Site Number	Site Type	Land Status	NRHP-eligibility	Avoidance Measure
32WI1124	Prehistoric CMS	USACE	Eligible	Monitor/fence
32WI1506	Prehistoric CMS	Private	Undetermined	Neckdown/monitor

Source: Metcalf 2014.

Resolution of Effects

Avoidance by fencing, narrowing of the construction ROW, and/or monitoring during construction are recommended for historic properties located within and adjacent to the APE. If avoidance by these measures is feasible, then no adverse effects to these sites as a result of the Project would be anticipated. If avoidance is not feasible, a treatment plan would be developed by the BLM in consultation with the North Dakota SHPO, interested tribes, USFS, and USACE (if the site is on USFS or USACE lands). The treatment plan would include measures to minimize or mitigate unavoidable adverse effects. Mitigation measures could include, but would not be limited to, data recovery (archaeological excavation), development of interpretive materials, or other mitigation determined by the BLM through consultation with the North Dakota SHPO, interested tribes, USFS, and USACE.

Potential indirect effects to historic properties located adjacent to the APE as a result of drainage or soil erosion would be minimized through implementation of procedures described in the SWPPP and the CMRP (Section 2.2.2, Environmental Protection Measures). Other indirect effects, such as illegal collecting of artifacts and inadvertent damage to archaeological sites, could occur in the area of the Project due to an increase in the number of workers during construction and increased public access. In accordance with the environmental protection measures (**Table 2-4**), Project-related personnel would be educated as to the sensitive nature of the resources; a strict policy of prohibiting collecting of these resources would be implemented. To prevent unauthorized use of the ROW, access would be blocked at locations specified by agencies and/or private landowners (**Table 2-4**).

To reduce potential visual effects to a historic property in which site setting contributes to its NRHP eligibility, aboveground structures would be painted with BLM-approved environmental colors to minimize contrasts with surrounding landscapes (**Table 2-4**).

Per the environmental protection measures and as described in the *Unanticipated Discoveries Plan* (POD, Appendix XV), if any previously unknown archaeological sites are discovered on private, state, or federal land during Project construction, all construction activities would cease in the area of the discovery and the consulting archaeologist, BLM, and North Dakota SHPO would be notified of the find. Steps would be taken to protect the site from vandalism or further damage until the appropriate federal agency and North Dakota SHPO could evaluate the nature of the discovery. If the site qualifies as a historic property, a mitigation plan would be developed and executed before construction can resume in the vicinity of the discovery. If the site does not qualify as a historic property, construction can resume in the vicinity of the discovery. The BLM Project Manager would provide written notice for when construction can resume at the discovery location for both scenarios (i.e., historic property and discovery that does not qualify as a historic property).

If construction or other Project personnel discover what may be human remains, funerary objects, or items of cultural patrimony, construction would cease within a 100-foot radius from the point of discovery, and the local law enforcement agency, North Dakota SHPO, BLM, and/or applicable land-managing agency would be notified of the find. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the NAGPRA. Non-Native American human remains found on federal, state, or private lands would be handled in accordance with the NDCC §23-06-27 and the administrative rules in the North Dakota Administrative Code Chapter 40-02-03. Construction activities would not resume until the BLM Project Manager has issued a Notice to Proceed.

Operation

No impacts to cultural resources associated with operation of the Project are anticipated.

4.21.2 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and therefore no potential impacts to cultural resources would occur.

4.21.3 Mitigation

Additional mitigation has not been proposed for cultural resources. Protection measures for unknown cultural resources and human remains that may be discovered during Project construction are described in the *Unanticipated Discoveries Plan* (POD, Appendix XV).

4.21.4 Residual Effects

The Project would result in the loss of cultural resources that are not eligible for the NRHP. Although these sites would be recorded to BLM and North Dakota SHPO standards and the information integrated into local and statewide databases, the sites ultimately would be destroyed by Project construction. Historic properties and sites not formally evaluated to the NRHP identified within the Project APE would be avoided. If avoidance is not feasible, potential adverse effects would be minimized or mitigated in accordance with a BLM- and SHPO-approved treatment plan. Although historic properties would be mitigated through implementation of data recovery or other forms of mitigation, some of the cultural values associated with these sites cannot be fully mitigated; therefore, it is anticipated that residual impacts to these resources would occur.

4.22 Tribal Treaty Rights and Interests

4.22.1 Proposed Action

Construction

In accordance with all applicable mandates, including, but not limited to Section 101[d][6] of the NHPA, the AIRFA, EO 13007 (Indian Sacred Sites), EO 13175 (Consultation and Coordination with Indian Tribal Governments), Presidential Memorandum on Government to Government Consultation with Native American Tribal Governments (April 29, 1994), and USACE Upper Missouri River Programmatic Agreement (2004), Presidential Memorandum on Tribal Consultation issued on November 5, 2009, the BLM has consulted with federally recognized Native American tribes regarding potential impacts to properties of traditional, religious, and cultural importance to the tribes. During two face-to-face meetings with THPOs and other tribal representatives, the tribes expressed several concerns associated with Project construction, in particular, impacts to water supplies/intakes (as a result of a spill), Dakota Skipper populations, cultural resources potentially submerged by the creation of the lake, and unanticipated discoveries potentially discovered during installation of the pipe across the lake. For potential impacts to water supplies/intakes and the Dakota Skipper populations, the reader is referred to Section 4.5, Water Resources, **Appendix A** (Spill Risk Assessment), Section 4.9, Wildlife and Fisheries, and Section 4.10, Special Status Species. No impacts to cultural resources potentially submerged by the creation of the lake are anticipated given the lack of previously recorded cultural resources in the Project area as indicated through examination of historical documents, and the fact that no features/anomalies were identified during the use of remote sensing technologies.

The assessment of impacts to properties of tribal concern identified through the consultation effort utilizes the same process used for cultural resources involving determinations of NRHP-eligibility and application of the criteria of adverse effect. Potential direct, indirect, and visual impacts to properties of tribal concern are similar to those that may affect cultural resources.

During June and July 2014, the tribes conducted field surveys of the proposed pipeline ROW. A total of 21 features/sites were identified by the tribal members participating in the surveys. As a result of the surveys, BakkenLink adjusted the proposed pipeline ROW to avoid all of the 21 features/sites. No adverse effects to these features/sites are anticipated as a result of Project construction.

Unanticipated discoveries would be handled under the *Unanticipated Discoveries Plan* (POD, Appendix XV), which includes a provision specific to potential discoveries during installation of the pipe across the lake. The provision states that during the pull of pipe across the lake bottom, commercial divers would be utilized to monitor the installation of the pipe, take measurements concerning pipe depth, and observe the underwater construction for the possibility of an inadvertent discovery from a safe distance. The divers would be trained to identify items potentially requiring additional investigations by the consulting archaeologist. If any potential cultural resources are discovered during installation of the pipe across the lake, the resources would be handled as stipulated in the *Unanticipated Discoveries Plan*. Construction activities would not resume until the BLM Project Manager has issued a Notice to Proceed.

Public lands retain social, economic, and both traditional and contemporary cultural value for tribal people, as well as contemporary and ongoing spiritual and cultural uses (United Nations Declaration on the Rights of Indigenous Peoples 2008). Some of the tribes with traditional or cultural affiliation with the Project area may have treaty rights that give them the right to hunt, fish, gather, and conduct traditional cultural activities on federal lands crossed by the Project. Construction activities associated with the Project may temporarily reduce the amount of federal lands outside of the reservation where tribal members could exercise their hunting, fishing, and gathering rights; change the way a tribal member accesses resources for tribal use; and, restrict certain activities (e.g., hunting or gathering). However, these temporary impacts would be negligible. There would be no restrictions on access to resources and/or areas for religious purposes after construction has been completed.

The BLM would continue to consult with federally recognized tribes that have treaty rights pertinent to the Project area, have aboriginal territories encompassing the Project area, or have expressed an interest in the Project area. Tribal consultation currently is ongoing and would continue up to and including Project construction.

<u>Operation</u>

No impacts to treaty rights or properties of traditional religious and cultural importance associated with operation of the Project are anticipated.

4.22.2 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and therefore no potential impacts to treaty rights or properties of traditional religious and cultural importance to the tribes would occur.

4.22.3 Mitigation

Additional mitigation has not been proposed for properties of traditional religious and cultural importance. Protection measures for unknown sites of tribal concern and human remains that may be discovered during Project construction are described in the *Unanticipated Discoveries Plan* (POD, Appendix XV).

4.22.4 Residual Effects

Properties of traditional religious and cultural importance identified within the Project APE would be avoided. If avoidance is not feasible, potential adverse effects would be minimized or mitigated in accordance with a BLM- and SHPO-approved treatment plan. Interested tribes would be invited to participate in the development of the treatment plan. Although these properties would be mitigated through implementation of data recovery or other forms of mitigation, some of the cultural, religious, and traditional values associated with these sites cannot be fully mitigated; therefore, it is anticipated that residual impacts to these resources would occur.

5.0 Cumulative Impacts

5.1 Introduction

The NEPA requires the identification and consideration of incremental impacts that are related to the Project when added to other past, present, and reasonably foreseeable future actions (RFFAs), regardless of what agency (federal or non-federal) or private entity undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time (40 CFR 1508.7). Impacts first must be identified for the Project before cumulative impacts with past, present, and RFFAs can occur.

The cumulative effects study area (CESA) includes a 4-county (McKenzie, Williams, Dunn and Mountrail counties) area (approximately 5,780,380 acres) in western North Dakota as illustrated on **Figure 5-1**. Past actions and RFFAs with the potential to cause cumulative impacts in combination with the Project also are illustrated on **Figure 5-1**. These actions were identified primarily by geographic location and type of activities associated with the projects that are being considered in the analysis, as well as the type of resources potentially affected. A brief description of these actions is provided in **Table 5-1**. The area of concern for cumulative impacts would vary by resource. Impacts to certain resources would be restricted to the actual area of disturbance. Other resources, such as vegetation, wildlife and socioeconomics, may be affected by a wider area, and cumulative impacts could involve more than surface disturbance.

As stated in Chapter 3.0 and Chapter 4.0, there are eight USACE Authorized Project Purposes for Garrison Dam/Lake Sakakawea. Four Purposes (i.e., municipal and industrial water supply, fish and wildlife, recreation, and water quality) may be impacted cumulatively by the Project and past, present, and RFFAs. Four Purposes (i.e., flood control, navigation, irrigation, and hydropower) would not be impacted by the Project and past, present, and RFFAs. The Purposes that may be impacted cumulatively by the Project and past, present, and RFFAs and resource sections in which these are addressed include the following:

- Municipal and industrial water supply – Section 5.5, Water Resources;
- Fish and wildlife – Sections 5.9, Wildlife and Fisheries and 5.10, Special Status Species;
- Recreation – Section 5.12, Recreation; and
- Water quality – Section 5.5, Water Resources.

Flood control, navigation, irrigation, and hydropower would not be cumulatively impacted by the Project and past, present, and RFFAs.

5.2 Past, Present and Reasonably Foreseeable Future Actions

Table 5-1 briefly describes past, present, and reasonably foreseeable future projects within the CESA that were considered in the cumulative impacts analysis. The table is organized by past, present, and RFFAs and under each category, the various types of linear projects such as crude oil and natural gas pipeline, one CO_2 pipeline, and electric transmission line projects.

5.2.1 Past Projects

Past projects within the CESA include crude oil, natural gas, natural gas liquids (NGL), and electric transmission lines (**Table 5-1**). The CESA includes 13 crude oil pipelines (742 miles; 4,498 acres), 14 natural gas, NGL, and other pipelines (565 miles; 3,422 acres), and 7 electric transmission lines (467 miles; 2,832 acres). These projects extend a total of 1,774 miles and have disturbed 10,752 acres.


Divide
Burke
Renville
Kenmare
Ward
Williams
Mountrail
Stanley
Parshall
New Town
LAKE SAKAKAWEA
McKenzie
Watford City
McLean
Dunn
Mercer
Beulah
Golden Valley
Billings
Stark
Morton
Beach
MONTANA
Canada
Proposed Route
CESA Boundary
Past Action
Present Action
RFFA
Crude Oil Pipelines
Electric Transmission Lines
Natural Gas Pipeline/NGL/Other
Source: BakkenLink 2014.
BakkenLink Dry Creek to Beaver Lodge Pipeline Project
Figure 5-1
Cumulative Effects Study Area
0 5 10 20
Miles

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
Past Actions					
Crude Oil Pipelines					
1	Bicentennial to Dickinson Pipeline (McKenzie and Dunn)	Belle Fourche Pipeline Co.	This project included the construction of a 32-mile-long, 8-inch-diameter liquid petroleum pipeline that interconnected with the Belle Fourche facilities at Alexander Station and Bowling Junction. The pipeline has a 30,000 bpd capacity.	102	618
2	Cenex Pipeline System (McKenzie and Mountrail)	Cenex Pipeline	This project included the construction of an 8-inch-diameter petroleum pipeline.	105	636
3	EPND Pipeline (McKenzie, Dunn, and Williams)	Enbridge	This project included the construction of a 204-mile-long, 16-inch-diameter crude oil pipeline and the installation of new station facilities and tank age at EPND's existing Beaver Lodge, Stanley, and Berthold Station and Terminal facilities.	142	861
4	Heart River Pipeline System (McKenzie, Mountrail, and Dunn)	Bridger Pipeline LLC	This project included the construction of a 10-inch-diameter crude oil pipeline with 3 gathering pipeline interconnects and 2 truck receipt points interconnecting with the Little Missouri System at Fryburg Station and Belle Fourche Pipeline at Skunk Hill Station.	19	115
5	High Plains Pipeline (McKenzie, Mountrail, Williams, and Dunn)	Tesoro – High Plains Pipeline Company	This is a crude oil pipeline. Tesoro High Plains Company operates approximately 700 miles of pipeline and related storage assets in the Bakken Shale and Williston Basin area.	148	897
6	Keystone XL On-ramp Pipeline System (McKenzie, Williams, and Dunn)	BakkenLink Pipeline LLC	This project included the construction of an 110-mile-long, 10-inch-diameter and 55-mile-long, 12-inch-diameter crude oil header pipelines and a 145-mile-long, 16-inch-diameter trunk line from Watford City to the Keystone XL Pipeline System in Fallon, Montana.	48	290
7	Killdeer Dickinson Pipeline (Williams, Mountrail, and Dunn)	Plains All American Pipeline, LP	This project included the construction of a 33-mile-long, 6-inch-diameter crude oil gathering pipeline from the Killdeer Crude Oil Gathering Facility in Dunn County to 2 miles northwest of Dickinson. The capacity of the pipeline is 10,000 bpd.	29	175
8	Parshall Pipeline System (McKenzie, Mountrail, and Dunn)	Bridger Pipeline LLC	This project included the construction of 210 miles of 4.5-, 6.6-, and 8.6-inch-diameter steel and 4.5-inch-diameter composite pipelines at various operating pressures, which was part of a gathering system for crude oil.	9	54

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
9	Trenton Gathering Pipeline (Williams, Mountrail, and Dunn)	Plains Pipeline LP	This project included the construction of 303 miles of 4-, 6-, and 10-inch-diameter crude oil pipelines, of which 280 miles were constructed in Montana.	3	18
10	Stanley Plant to Storage Pipeline (Mountrail)	Hawthorn Oil Transportation (North Dakota), Inc.	This project included the construction of an 11-mile-long, 4.5-inch-diameter pipeline from the Stanley Gas Plant to a storage facility in Mountrail County.	19	115
11	Stanley to Railroad Pipeline (Mountrail)	Hawthorn Oil Transportation (North Dakota), Inc.	This project included the construction of a 4-mile-long, 12-inch-diameter pipeline for crude oil from 1 mile southeast of Stanley to a railroad loading facility 2 miles northeast of Stanley.	4	24
12	The Saddle Butte Gathering System (McKenzie and Dunn)	Saddle Butte Pipeline Company	This project consisted of 5 segments ranging from 3- to 6-inch diameter up to 16-inch diameter pipes totaling 1,592 miles of crude oil and natural pipelines within the McKenzie and Dunn county area. The pipelines carry the crude oil to a crude oil stabilization and transfer facility while the natural gas is transported to a main gas processing facility.	56	339
13	BakkenLink Pipeline (AMS to Fryburg Pipeline) (McKenzie)	BakkenLink Pipeline LLC	This project included the construction of a crude oil pipeline system consisting of approximately 97 miles of 12-inch-diameter crude oil pipeline and multiple receipt points.	58	352
Crude Oil Pipeline Totals				**742**	**4,498**
Natural Gas, NGL, and Other Pipelines					
14	Amerada Hess Natural Gas Pipeline (McKenzie and Williams)	Amerada Hess	This project included the construction of a 62-mile-long, 10.75-inch-diameter natural gas pipeline from the AHC Tioga Gas Plant to a delivery point on the Northern Border Pipeline.	21	127
15	Dakota Gasification CO_2 Pipeline (Williams and Dunn)	Dakota Gasification Company	This project included the construction of 205 miles of pipeline, including a12-inch-diameter pipeline segment from the Synfuels Plant site to Tioga, North Dakota, and a 14-inch diameter pipeline from Tioga, North Dakota, to Weyburn Oil Field in southeastern Saskatchewan, Canada.	88	533
16	Beaver Lodge Loop Pipeline (McKenzie, Williams, and Dunn)	Enbridge	This project included the construction of 56 miles of a 16-inch-diameter NGL pipeline from Berthold Station in Ward County to Beaver Lodge Station in Williams County. This 145,000-bpd capacity pipeline was constructed parallel to the EPND pipeline.	26	158

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
17	Belle Creek Northern Border System Pipeline (Williams and Mountrail)	Williston Basin Interstate Pipeline Co.	This project included the construction of an 81-mile-long, 16-inch-diameter natural gas pipeline.	24	145
18	Cabin Creek Williston System Pipeline (Williams and Mountrail)	Williston Basin Interstate Pipeline Co.	This project included the construction of a 66-mile-long, 8- and 12-inch-diameter natural gas pipeline.	32	193
19	Cartwright to Trenton System Pipeline (McKenzie and Williams)	Hiland Operating LLC	This project included the construction of a 10-mile-long, 4-inch-diameter NGL pipeline.	24	145
20	Cartwright to Trenton System Pipeline (McKenzie and Williams)	Hiland Operating LLC	This project included the construction of a 10-mile-long, 6-inch-diameter NGL pipeline.	7	42
21	Cartwright to Trenton System Pipeline (McKenzie and Williams)	Hiland Operating LLC	This project included the construction of a 10-mile-long, 8-inch-diameter NGL pipeline.	5	30
22	Fryburg Gathering Pipeline (Williams, Mountrail, and Dunn)	Plains Pipeline LP	This project included the construction of a 14.1-mile-long, 6-inch-diameter NGL pipeline.	2	12
23	NBPL Pipeline (Williams)	Northern Border Pipeline Company	This project included the construction of a 1,407-mile-long, 8 inch-diameter natural gas pipeline through the Williston Basin of Montana and North Dakota.	170	1,030
24	Prairie Rose Pipeline "Aquired by AUX Sable" (Mountrail)	Pecan Pipeline (North Dakota), Inc.	This 12-inch-diameter, 83-mile-long Prairie Rose Pipeline commenced operation in February 2010 and gathers gas from the Stanley Plant and other sources for delivery into the Alliance Pipeline system at Bantry, North Dakota. The pipeline has an estimated capacity of 110 million cubic feet (MMcf) per day and can be easily expanded to meet additional demand.	9	55
25	Robinson Lake Gas Pipeline (Mountrail)	Whiting Petroleum Corp	This project included the construction of a 16.5 mile-long, 6 inch-diameter natural gas pipeline that interconnected with the Williston Basin Interstate Pipeline System. The maximum design operating pressure of the pipeline is 720 psig with a maximum design flow rate of 20 MMcf per day.	14	85

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
26	Williston Basin Pipeline (McKenzie)	Bear Paw Energy LLC	This project included the construction of a 64.2-mile-long, 10.75-inch-diameter NGL pipeline. The pipeline was designed to transport approximately 65,000 bpd.	17	103
27	Williston Tioga Minot System Pipeline (Williams and Mountrail)	Williston Basin Interstate Pipeline Co.	This project included the construction of a 166-mile-long, 12-inch-diameter NGL pipeline.	126	764
Natural Gas, NGL, and Other Pipeline Totals				**565**	**3,422**
Electric Transmission Lines					
28	Electrical Transmission Lines (Williams)	North Dakota Electric Companies	Detailed project descriptions or operating companies were not available.	373	2,261
29	Buford Trenton Tap-Buford Trenton P.P. 57-kV Transmission Line (McKenzie and Dunn)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	12	73
30	Charlie Creek – Watford City Transmission Line (McKenzie)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	27	164
31	Dawson-Williston 115-kV Transmission Line (Williams)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	15	91
32	Watford City – Beulah 115-kV Transmission Line (McKenzie, Mercer)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	11	67
33	Williston – Watford City Transmission Line (Williams and McKenzie)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	12	73
34	Wolf Point – Williston 115-kV Transmission Line (Williams)	Western Area Power Administration	Upper Great Plains Region Transmission Line Network.	17	103
Electric Transmission Line Totals				**467**	**2,832**
Past Actions Totals				**1,774**	**10,752**

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
Present Actions					
Crude Oil Pipelines					
35	BakkenLink Pipeline (Dry Creek to Beaver Lodge Pipeline) (McKenzie and Williams)	BakkenLink Pipeline LLC	This project would include the construction of a crude oil pipeline system consisting of approximately 37 miles of 16-inch-diameter crude oil pipeline extending from multiple receipt points in McKenzie and Williams counties.	37	498
36	Bakken North Project Pipeline (Williams, Mountrail, and Dunn)	Plains Pipeline LLC	This project would include the construction of a 103-mile-long, 12.75-inch-diameter crude oil pipeline (44 miles in North Dakota) extending from Trenton, North Dakota, to Regina, Saskatchewan, Canada. The pipeline capacity would be 50,000 bpd.	18	109
37	Belle Fourche Pipeline (McKenzie and Dunn)	True Companies	This project would include the construction of a crude oil pipeline (50,000 bpd capacity) from the Williston Basin of western North Dakota to the Powder River Basin in Wyoming.	39	236
38	Bicentennial to Dickinson Pipeline (McKenzie and Dunn)	Belle Fourche Pipeline	This project would include an 8-inch-diameter liquid petroleum pipeline.	71	430
39	COLT Connector Pipeline Project (Williams)	Rangeland Energy	This project would include a 21-mile-long, 8-inch-diameter crude oil pipeline from Epping to Tioga, North Dakota.	3	18
40	Parshall System Pipeline (McKenzie, Mountrail, and Dunn)	Bridger Pipeline LLC	This project would include a 54-mile-long crude oil pipeline that would gather Bakken crude oil from over 250 wells in Mountrail County with delivery to Stanley, North Dakota.	54	327
41	Market Center Pipeline (McKenzie and Williams)	Hiland Crude	This project would consist of 6 segments (Tioga, Plains Delivery, Musket Lateral, Epping to Tioga, Johnson's Corner, and New Town Delivery) all within Williams and McKenzie counties of North Dakota.	226	1,370
Crude Oil Pipeline Totals				**448**	**2,988**
Natural Gas, NGL, and Other Pipelines					
42	Garden Creek Pipeline (McKenzie)	Bear Paw Energy	This project would include a 64.2-mile-long, 10.75-inch-diameter (55.3 miles in North Dakota) NGL pipeline. The pipeline would operate at 400 to 1,300 psig and have a capacity of 65,000 bpd.	42	255

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
43	Tioga Pipeline (McKenzie and Williams)	Hess Corporation	This project would include 6- and 8-inch-diameter pipelines connected to the Tioga Gas Plant and extending south of Tioga.	48	291
44	Tioga Lateral (Williams and Mountrail)	Alliance Pipeline Company	This pipeline would branch off from the existing Hess processing facility in Tioga, North Dakota, and would connect to the existing Alliance pipeline in Sherwood, North Dakota. It would be an 80-mile pipeline, 12 inches in diameter, and would transport rich natural gas from Tioga to Sherwood.	14	85
Natural Gas, NGL, and Other Pipeline Totals				**104**	**631**
Electric Transmission Lines					
45	Antelope Valley Station to Northwestern North Dakota 345-kV Transmission Line Project (McKenzie, Williams, Mountrail, and Dunn)	Basin Electric Power Cooperative	This project would include the construction of approximately 190 miles of 345-kV electric transmission lines extending from the Antelope Valley Station near Beulah, North Dakota, to the existing Williston Substation near Williston, North Dakota, and onto the Neset Substation near Tioga, North Dakota.	45	273
Electric Transmission Line Total				**45**	**273**
Present Actions Totals				**597**	**3,892**
Reasonably Foreseeable Future Actions					
Crude Oil Pipelines					
46	Little Muddy Station Connection Project (McKenzie, Williams, and Dunn)	Enbridge Pipelines (North Dakota) LLC	This project would include the construction of a new pump and terminal facility, the Little Muddy Station, and an approximately 6-mile-long, 10-inch-diameter pipeline from the new Little Muddy Station to Enbridge's East Fork Station in Williams County. The Little Muddy Station would include two 30,000-barrel tanks, pumping facilities, a shipper-owned and operated truck-offloading facility, and pipeline interconnects to allow for a capacity of 55,000 bpd. The Little Muddy Station Connection is a part of Enbridge's 968-mile-long existing underground petroleum gathering and mainline pipeline system that extends from eastern Montana through North Dakota to Minnesota.	6	36
47	Crude Oil Pipeline (Williams)	Rangeland Pipeline, LLC	This project would include the construction of approximately 20.5 miles of 10-inch pipeline and a storage tank and meter station approximately 8 miles south of Tioga, for the transmission of crude oil, all in Williams County, North Dakota.	18	109

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
48	Nelson to Ross Pipeline (Williams and Mountrail)	Plains Pipeline, L.P.	This project would include the construction and operation of approximately 16.9 miles of 10.75-inch crude oil pipeline. The pipeline capacity would be 47,000 bpd.	15	91
49	Confidential Pipeline (McKenzie)	Confidential Proponent	Either 6-inch or 8-inch line (possibly could be up to as big as 12-inch). Assuming 100-foot temporary construction ROW with 50-foot permanent ROW. Aboveground facilities would consist of launcher/receiver, emergency shutdown valve, meter facility, associated station piping, power and communications tower.	1	12
50	Confidential Pipeline (McKenzie)	Confidential Proponent	Size of the line could be between 6 inches and 12 inches (yet to be determined). Assuming 100-foot temporary construction ROW with 50-foot permanent ROW. Aboveground facilities would consist of launcher/receiver, ESD valve, meter facility, associated station piping, power and communications tower.	3	36
51	Hawkeye Pipeline (McKenzie and Williams)	Hess	Project would consist of a crude oil, NGL, and high pressure natural gas pipeline system from the proposed Hawkeye Central Oil Facility near Keene, North Dakota to the Ramburg Truck Facility and Silurian Compressor Station near Tioga, North Dakota.	26	250
52	Bakken Bridge Pipeline (McKenzie and Williams)	Bakken Bridge	The proposed Bakken Bridge Pipeline Project is an approximately 6.2-mile-long pipeline system consisting of 2, 60-inch-diameter carrier pipes that will contain multiple crude oil, natural gas, and natural gas liquids pipelines.	6	103
53	Bakken Oil Express Phase II Pipeline (McKenzie and Dunn)	Bakken Oil Express	Project would consist of 12-inch-diamter crude oil pipeline from Johnson's Corner, North Dakota to Killdeer, North Dakota.	39	473
Crude Oil Pipeline Totals				**114**	**1,110**
Natural Gas, NGL, and Other Pipelines					
54	Sanish Project Pipeline (McKenzie, Williams, and Dunn)	Enbridge	This project would include the construction and operation of approximately 36 miles of 12-inch-diameter and 1 mile of 10-inch-diameter pipeline for crude oil.	33	200

Table 5-1 Projects within the CESA

Map ID Number	Project Name (County)	Company	Project Description	Estimated Distance Within CESA (miles)	Total Estimated Surface Disturbance (acres)
55	Stateline to Riverview Pipeline (McKenzie and Williams)	ONEOK Rockies Midstream LLC	This project would include the construction and operation of approximately 53.4 miles (12.4 miles in North Dakota) of 10.75-inch-diameter NGL pipeline. The pipeline capacity would be 65,000 bpd and operating at 400 to 1,300 psig.	9	55
56	Vantage Pipeline Project (McKenzie and Williams)	Vantage Pipeline US LP	This project would include the construction and operation of approximately 430 miles of 10- and 12-inch-diameter NGL pipeline running from the Hess Corporation Gas Plant in Tioga, North Dakota, to Empress, Alberta, Canada.	34	206
Natural Gas, NGL, and Other Pipeline Totals				**76**	**461**
Reasonably Foreseeable Future Action Totals				**190**	**1,571**
All Projects Totals				**2,561**	**16,215**

Note: Total surface disturbance was calculated assuming a 50-foot disturbance corridor for each line (unless otherwise indicated) regardless of product.

Note: Pipeline lengths are rough estimates. Data for exact location and length (miles) was not available.

The majority of the surface disturbances associated with these projects have been reclaimed and returned to their previous land uses, with the exception of the associated permanent, aboveground facilities.

5.2.2 Present Projects

In addition to the Project, a total of 11 projects currently are under construction within the CESA, undergoing NEPA review, or applications are being developed to meet state permitting requirements (**Table 5-1**). These other projects include 7 crude oil pipelines (448 miles; 2,988 acres), 3 natural gas pipelines (104 miles; 631 acres), and 1 electric transmission line (45 miles; 273 acres). Therefore, the total combined surface disturbance including all present projects would be 3,892 acres and 597 total miles.

5.2.3 Reasonably Foreseeable Future Actions

Activities considered to be RFFAs were evaluated based on the criteria listed below. Information was gathered to identify potential future actions in the following ways: obtaining information from the North Dakota PSC's website, computer databases, and considering other EIS/EAs recently completed for other projects in the region. The information gathered was evaluated based on the criteria to determine which of these projects are speculative due to limiting factors and which are reasonably foreseeable to occur and relevant to the cumulative impacts discussion.

- **Siting authorities/applications** – identify if an application has been submitted to a siting authority (e.g., a utilities commission, PSC) that regulates the rates and services of a public utility, reviews, and approves and/or denies applications for development of pipeline and electric transmission line projects.
- **NEPA process/federal approvals –** identify if a project is under NEPA review (e.g., federal agencies are required to consider and disclose the potential environmental impacts of their "major" or "significant" proposed actions prior to decision-making, to keep the decision-making process transparent and cooperative).
- **System studies and planning analysis** – determine if a project requires analysis or an evaluation of proposal design to determine the difficulty in carrying out a designated task. Such studies precede technical development and project implementation. The subsequent discussion describes the activities determined to be RFFAs.

Using the above criteria, 20 projects have been identified as reasonably foreseeable, which are listed in **Table 5-1**. These RFFAs would include 14 crude oil pipelines (approximately 114 miles; approximately 1,110 acres) and 6 NGL pipelines (approximately 76 miles; approximately 461 acres), which would have a combined total surface disturbance of approximately 1,571 acres and a total length of approximately 190 miles. There are no known electric transmission lines proposed for construction within the CESA in the reasonably foreseeable future.

All past, present, and RFFAs within the CESA cover a total of 16,215 acres (estimated surface disturbance) and extend across 2,561 miles (estimated distance) of land.

5.3 Resource-specific Cumulative Effects

5.3.1 Air Quality

To the extent that construction of the Project would occur simultaneously and in the same general area as other projects, there could be minor cumulative temporary impacts to air quality. Simultaneous construction activities in close proximity to one another could result in locally elevated concentrations of pollutants; however, those concentrations are not expected to result in a degradation of local or regional air quality, or result in any exceedences of the NAAQS. There would be no permanent cumulative impacts associated with the Project, and the expected reduction in the number of oil tanker miles driven could result in a net decrease in air quality impacts.

5.3.1.1 Criteria Pollutants

Ambient air quality data for the region reflects impacts of all currently existing operations in the airshed. Air quality in the region meets applicable state and national standards and would be expected to remain in compliance under the existing operations (i.e., the No Action Alternative). As previously discussed, the Project emissions are expected to be negligible because activities are temporary in nature; therefore, it is reasonable to expect that cumulative impacts resulting from the Project would be in compliance with all applicable state and national standards. Evaluating the cumulative impacts of the Project within the CESA can best be completed by comparing the scale and nature of the development to relevant existing and proposed developments and the impacts those projects are predicted to have.

As seen in **Table 5-1**, existing developments total a combined 16,215 acres of surface disturbance. The overall scale of the Project, approximately 37 miles and 498 acres of surface disturbance, are consistent with several existing developments that do not have impacts on the NAAQS. In addition, the Project only accounts for less than 1 percent of the total surface disturbance for all existing and proposed developments in the CESA. Therefore, the contribution of the Project to cumulative impacts would be minor compared to the impacts from all existing and proposed developments.

5.3.1.2 HAPs

The Project would not be a major source for HAPs and is not expected to greatly increase adverse cumulative impacts from HAPs, and may provide beneficial effects by decreasing truck traffic in the area.

5.3.1.3 AQRVs

Due to the projected negligible emissions associated with the Project, it is not anticipated that the Project would contribute significantly to cumulative impacts at the nearest sensitive area (i.e. Lake Sakakawea), and may provide beneficial effects from reduction of daily truck traffic.

5.3.2 Geology and Minerals

5.3.2.1 Geology

Incremental effects to geology from the Project would consist of a temporary disturbance of surficial glacial and alluvial geologic units along the proposed route shown on **Figure 5-1**. This temporary disturbance would be in addition to the temporary disturbances generated by past projects (**Table 5-1**) and RFFA projects. The disturbances to surficial geologic units would be reclaimed upon completion of construction of the Project, which would restore surficial geologic units to their approximate pre-construction distribution.

5.3.2.2 Minerals

There are no anticipated impacts to oil and gas or mineral resources during construction or operation of the Project. Therefore, no cumulative impacts to mineral or oil and gas resources are expected. The Project's demand for aggregate would be small compared to the overall aggregate production in North Dakota. The increase in oil and gas drilling and associated construction in North Dakota, along with unforeseen events like the flooding in Minot, North Dakota, in 2011 (Schramm 2011), have put additional pressures on local suppliers of aggregate and have resulted in temporary shortages. The Project would cover a total of 37 linear miles and is expected to use approximately 20,608 tons of aggregate. Current estimates of past and present actions and RFFAs related to construction of linear facilities total 2,561 linear miles (**Table 5-1**). The Project is not expected to have a noticeable effect on aggregate use or production compared to the total aggregate demand in the CESA. Thus, the cumulative effect of the Project on aggregate demand is expected to be minimal.

5.3.3 Paleontological Resources

Cumulative impacts to paleontological resources would result from surface disturbance related to industrial developments, unauthorized collection, and natural erosion processes within the CESA. With the implementation of the recommended mitigation measures, the Project would not contribute to cumulative impacts to paleontological resources in the CESA when added to past, present, and RFFAs. A cumulative beneficial impact could result from the discovery of important fossil localities because of construction of the Project or other RFFAs in previously undisturbed areas.

5.3.4 Soils

Past and present actions and RFFAs that contribute to cumulative impacts to soil resources in the CESA include construction of pipelines and electric transmission lines. Impacts to soils from construction and operation activities associated with pipeline construction would be similar to those described in Section 4.4, Soils. Cumulative impacts to soils would include removal of vegetation, exposure of the soil, mixing soil horizons, soil compaction, loss of topsoil productivity, and increased susceptibility of soils to erosion. Approximately 16,215 acres of soils would be disturbed as a result of past and present actions, RFFAs, and construction of the Project. As stated in Section 5.2.1, the majority of the past surface disturbances associated with these projects have been reclaimed and returned to their previous land uses, with the exception of permanent, aboveground facility locations.

When added to past and present actions and RFFAs, and with implementation of environmental protection measures and recommended mitigation measures, the cumulative impacts to soils from project development is expected to be minimal.

5.3.5 Water Resources

The Project would cross two major aquifers, the Dry Fork Creek alluvial aquifer and the Missouri River/Lake Sakakawea alluvial aquifer. The Missouri River is a Class I stream. All other streams crossed are designated Class III streams and are intermittent. Bedrock aquifers in the Fox Hills and Fort Union formations also would be crossed. These river and aquifer crossings would be in addition to the extensive crossing of streams and aquifers in the CESA by past and present actions and RFFAs, as shown in **Figure 5-1**. The cumulative effect of the Project related to stream and aquifer crossings would be minimal compared to crossings associated with past and present actions and RFFAs, as shown on **Figure 5-1**. Any spills, ruptures, or leaks from the proposed pipeline would be addressed in a timely manner and impacts to water quality in streams and surficial alluvial aquifers would be remediated and would be temporary in nature. Thus, the cumulative effect of the Project on water resources is expected to be minimal.

5.3.6 Vegetation

Project-related surface disturbance, in addition to past and present actions and RFFAs within the CESA, would result in the cumulative surface disturbance of approximately 16,215 acres. Surface disturbance from these projects would total approximately 0.3 percent of the entire CESA. Cumulative impacts to vegetation would be minimized by implementing numerous environmental protection measures including proper handling of topsoil and spoil, noxious weed control measures, and reclamation techniques as described in the CMRP (POD, Appendix XIII), the Tree and Shrub Mitigation Specifications (POD, Appendix XXIII), and the Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII). Implementation of these measures, in addition to the minimal loss of vegetation in relation to the total amount of vegetative cover within the CESA, would be considered minimal.

5.3.7 Wetlands and Floodplains

Temporary impacts to wetlands within the CESA have occurred as a result of construction of past actions including pipelines and electric transmission lines. Vegetation within these wetlands likely has naturally recovered over time and regained a substantial amount of their vegetative productivity. Present actions and RFFAs also would result in temporary impacts to wetlands. Environmental protection measures and mitigation measures would be implemented to minimize impacts to wetlands. Permanent loss of wetland vegetation and function is not anticipated from construction of the Project. Therefore, cumulative impacts to wetlands would be limited to temporary direct and indirect surface disturbance within wetlands. Impacts to floodplains are not anticipated as a result of Project implementation; therefore, cumulative impacts are not anticipated.

5.3.8 Noxious Weeds and Invasive Species

Impacts to existing vegetation types from noxious weed and invasive species establishment are not anticipated as a result of Project implementation. Environmental protection measures and mitigation measures outlined in the CMRP (POD, Appendix XIII), and the Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII) would be implemented to minimize impacts related to noxious weeds and invasive species. Therefore, cumulative impacts are not anticipated.

5.3.9 Wildlife and Fisheries

The cumulative analysis for wildlife and fisheries focuses on the past and present actions and RFFAs presented in **Table 5-1,** and the Project disturbance presented in **Table 2-1**. It assumes that: 1) human use of the CESA would increase with the implementation of the Project; 2) wildlife habitats are currently at their respective carrying capacities in and adjacent to the Project area; and 3) the overall region has been previously affected by at least some level of historic and current development activities and would be affected by RFFAs.

Cumulative impacts to wildlife and aquatic species would be directly related to habitat loss, habitat fragmentation, animal displacement, and direct mortalities. Permanent surface disturbance incrementally adds to wildlife habitat losses, overall habitat fragmentation, and animal displacement. In areas where development has occurred, habitat fragmentation may have resulted in the disruption of seasonal patterns or migration routes. Historic, current, and future developments in the vicinity of the Project have resulted, or would result in the reduction of carrying capacities, as characterized by the amount of available cover, forage, and breeding areas for wildlife species.

The CESA includes four counties and approximately 5,780,380 acres of land. As presented in **Table 5-1**, a total of 15,115 acres are estimated to be disturbed. Impacts from Project construction would include the temporary disturbance of approximately 493 acres and permanent disturbance of approximately 78 acres of wildlife habitat. Surface disturbance from these projects would be less than 1 percent of the entire CESA.

Surface disturbance considered in the CESA results from the construction and operation of pipelines and electric transmission lines. However, other activities such as livestock grazing, agriculture, and recreational activities also contribute to cumulative impacts on wildlife and their habitats. Wildlife species would be susceptible to these cumulative impacts since encroaching human activities in the CESA resulted or would result in habitat loss and fragmentation and animal displacement in areas that may be at their relative carrying capacity for these resident species. Many of the local wildlife populations (e.g., small game, migratory birds, raptors, reptiles) that occur in the CESA likely would continue to occupy their respective ranges and breed successfully, although population numbers may decrease relative to the amount of cumulative habitat loss and disturbance from incremental development.

5.3.10 Special Status Species

5.3.10.1 Special Status Wildlife Species

Special status wildlife species would be cumulatively impacted by past and present actions, RFFAs, and the Project. The resulting direct impacts would be similar to those discussed in Section 4.10, Special Status Species. However, in many cases, surveys for special status species are required in potential or known habitats. Surveys would help determine the presence of any special status wildlife species or the extent of potential habitat, and protective measures would be taken to avoid or minimize direct disturbance in these species and their habitat.

The CESA includes four counties and approximately 5,780,380 acres of land. As presented in **Table 5-1**, a total of 16,215 acres are estimated to be disturbed. Impacts from the Project construction would include the temporary disturbance of approximately 493 acres and permanent disturbance of approximately 78 acres of special status wildlife species habitat. Surface disturbance from these projects would be less than 1 percent of the entire CESA.

Surface disturbance considered in the CESA results from the construction and operation of pipelines and electric transmission lines. However, other activities such as livestock grazing, agriculture, and recreational activities also contribute to cumulative impacts on special status wildlife species and their habitats. Special status wildlife species would be susceptible to these cumulative impacts since encroaching human activities in the CESA have resulted, or would result in habitat loss and fragmentation and animal displacement in areas that may be at their relative carrying capacity for these resident species. Many of the local special status wildlife species populations that occur in the CESA likely would continue to occupy their respective ranges and breed successfully, although population numbers may decrease relative to the amount of cumulative habitat loss and disturbance from incremental development.

5.3.10.2 Special Status Plant Species

Project-related surface disturbance, in addition to past and present actions and RFFAs within the CESA, would result in the cumulative surface disturbance of approximately 16,215 acres. An unknown percentage of this total acreage would be considered potentially suitable habitat for the 8 special status plant species impacted by the implementation of the Project, in addition to past and present actions and RFFAs. Cumulative impacts to vegetation would be minimized by implementing numerous environmental protection measures including proper handling of topsoil and spoil, noxious weed control measures, and reclamation techniques as described in **Table 2-4**, the CMRP (POD, Appendix XIII), and the Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix XXVII). Implementation of these measures, in addition to the minimal loss of vegetation in relation to the total amount of vegetative cover within the CESA, would be considered minimal.

5.3.11 Land Use

Cumulative land use effects are at two potential scales: highly localized to the degree that they affect the same property, or at least the same ownership; and CESA-wide representing the degree of disturbance or loss of productivity to the CESA as a whole. No cumulative effects to individual properties have been identified. Past and present actions and RFFAs that contribute to cumulative land use impacts in the CESA include pipeline**,** electric transmission line, and oil and gas development projects. Past actions are pipeline or transmission line projects where a large majority of surface lands have been returned to their pre-disturbance land uses; their effects are represented in the affected environment description in Section 3.11, Land Use. Present actions include potential disturbance of 3,892 acres. The Project would add temporary disturbance during construction of approximately 498 acres, or 13 percent of the present actions. If, as a maximum case, the disturbance would all occur simultaneously with the Project construction – described in Section 4.11, Land Use – the cumulative disturbance would be 4,390 acres. This would represent approximately 0.08 percent of the land surface in the CESA, which is a negligible impact. Permanent impacts would be substantially less after restoring most of the surface land in the Project ROW following completion of construction activities.

Permanent surface disturbance from the Project would be 79 acres, which would represent approximately 5 percent of the disturbance anticipated from RFFAs and 0.5 percent of the total disturbance from past and present actions and RFFAs. The total potential cumulative disturbance (16,215 acres) would represent approximately 0.3 percent of the CESA.

With implementation of environmental protection measures, the Project would result in minimal cumulative impacts to land use within the CESA when added to past and present actions and RFFAs.

5.3.12 Recreation

Past and present actions and RFFAs that contribute to cumulative recreation impacts in the CESA include pipeline, electric transmission line, and oil and gas development projects. Past actions are pipeline or transmission line projects where a majority of disturbed lands have been returned to approximately their pre-disturbance condition; their effects are represented in the affected environment description in Section 3.12, Recreation. Impacts to recreation from construction and operation or RFFAs would be similar to those described in Section 4.12, Recreation. Construction impacts would include potential temporary disruptions to hikers, hunters, anglers, and campers from increased use of facilities by construction workers. However, these effects would be highly localized, for the most part, and potential impacts would end as soon as construction activities were completed. Cumulative effects would only occur if other individual projects were under construction nearby at the same time as the Project was being constructed. For example, if several present actions and RFFAs were under construction simultaneously during deer hunting season, there could be some temporary adverse effects on hunter success or hunting access; however, the duration of the effects would be one hunting season at most. Permanent impacts to recreation would be negligible.

With implementation of environmental protection measures, the Project would result in minimal cumulative impacts to recreation within the CESA when added to past and present actions and RFFAs.

5.3.13 Wilderness

Impacts to wilderness are not anticipated as a result of Project implementation; therefore, cumulative impacts are not anticipated.

5.3.14 Visual Resources

The existing visual landscape character of the Project area includes and is defined by past and present land uses and activities. For a majority of the landscape, existing uses include prairie rangeland and cultivated agricultural land with some recreation activity primarily occurring on Lake Sakakawea from a visual perspective. There also is a network of existing roads, utilities, and fencelines. Although these activities and structures provide the visual background, existing oil and gas wells and support facilities are the most dominant features in the visual character of the Project area. RFFAs would add modestly to the existing plethora of oil and gas facilities and activities. The Project’s contribution to impacts on visual resources would be minor relative to the past, present, and reasonably foreseeable future development in the area. The Project’s primary contribution to effects on the visual environment would occur during construction and would be temporary in nature. Clearing of vegetation and very brief changes to land contours would be required. The Project would be located adjacent to other facilities and ROWs where possible, such that the level of change in the characteristic landscape would be minimal after successful reclamation and revegetation of the pipeline ROW. After reclamation, the corridor would be visually subordinate to other existing and reasonably foreseeable manmade features, including dominating oil and gas facilities and a few farmsteads. Proposed new aboveground facilities (Keene and Beaver Lodge receipt facilities) and the Emergency Response Equipment Storage Areas would have permanent visual effects in localized areas.

Because the visual effects from the Project would be temporary or minor compared to existing and reasonably foreseeable future development in the area, the Project would contribute minimally to cumulative visual resources impacts in the Project area.

5.3.15 Noise

Past and present actions contributing to the ambient noise environment in the CESA include primarily oil and gas pipelines. Noise from these sources is included in the description of the affected environment in Section 3.15, Noise.

Impacts to soundscapes from noise generated during construction and operation of RFFAs would be similar to those described in Section 4.15, Noise. However, noise effects would be highly localized and there are no identified noise sensitive areas that would be in the impact areas of both the Project and one or more RFFAs. Consequently, no cumulative noise effects have been identified with RFFAs.

5.3.16 Socioeconomics

Past and present actions and RFFAs that contribute to cumulative socioeconomics effects in the CESA include pipelines and electric transmission lines. Impacts to socioeconomics from construction and operation activities associated with pipeline construction would be similar to those described in Section 4.16, Socioeconomics. Past actions are pipeline or transmission line projects where most social and economic effects have been assimilated into the affected environment as described in Section 3.16, Socioeconomics. A majority of economic and employment effects from past actions have ended, except for modest effects including employment, materials and services purchases, and continuing tax revenues from ongoing operations. Cumulative effects from present activities would be similar to those described in Section 4.16, Socioeconomics, for the Project. There would be some cumulative loss of agricultural productivity, although the acreages are small and affected landowners would be compensated for the losses. There would be increased cumulative demand for worker housing from present activities, RFFAs, and the Project in the face of limited supply. The degree of competition for housing would depend on construction timing for the various projects. Present actions and RFFAs also would contribute to the local tax base, adding increased public revenue. Cumulative impacts within the CESA generally would be beneficial, except for some additional demand for public services and the competition for worker housing. The Project would be a minor contributor to total cumulative social and economic effects in the CESA.

5.3.17 Environmental Justice

Past and present actions and RFFAs in the CESA are primarily pipelines. Cumulative environmental justice effects from construction and operation of the identified past and present actions and RFFAs would be similar to those described in Section 4.17, Environmental Justice. Despite the presence of a meaningfully greater Native American population and comparatively high poverty rates on the Fort Berthold Indian Reservation, no disproportionately high adverse effects on these populations have been identified. Cumulative projects would generate income through direct and indirect employment opportunities and would increase local government revenues through payment of property taxes. Minority and low-income communities would be expected to benefit similarly to the population at large from these effects. The Project, when added to past and present actions and RFFAs, would be expected to contribute proportionately to cumulative effects, both positive and negative, on the population at large in the CESA.

5.3.18 Transportation

Past and present actions in the transportation CESA include numerous pipelines, which have substantially increased vehicle traffic in the area particularly during construction. However, the Project would reduce the amount of truck traffic in the long term by facilitating transport of oil via pipelines as an alternative mode of transportation.

Construction of the Project would be expected to increase traffic throughout the CESA, but primarily in the immediate Project area because of the need to transport materials and construction workers. The temporary increase in traffic would occur on roadways at all levels, but the roads have sufficient capacity to accommodate the expected increases. The traffic increase would be temporary and minor. The degree of cumulative effect would depend on whether construction activities for the Project would occur simultaneously with construction of other RFFAs in the immediate vicinity.

During the operating life of the Project, overall surface traffic is expected to be reduced by replacing truck transportation of oil with pipeline transport, as noted in Section 4.18, Transportation. It is anticipated that development of other pipeline RFFAs would have a similar effect on road traffic over the long term, such that the cumulative effect of past, present, and RFFAs would reduce tank truck-related traffic congestion and wear and tear on most roads and highways in the CESA from levels that would occur without the projects.

5.3.19 Public Safety

Past and present actions and RFFAs that contribute to cumulative impacts to human health and safety within the CESA include pipeline and electric transmission lines. Impacts to human health and safety from construction and operation activities associated with pipeline construction would be similar to those described in Section 4.19, Public Safety. Long-term impacts to human health and safety are not anticipated from the Project. Therefore, long-term cumulative impacts to human health and safety from past and present actions and RFFAs are not anticipated. Temporary impacts would include increased risk of accidents as a result of construction and operation activities.

5.3.20 Hazardous Materials and Solid Waste

Compliance with existing regulations and implementation of spill plans and environmental protection measures, the Project would represent a small contribution to cumulative impacts and the amount of hazardous materials and solid waste produced when added to past and present actions and RFFAs.

5.3.21 Cultural Resources

Cumulative impacts to cultural resources within the Project area could occur as a result of erosion, increased access, and non-project-related ground disturbance such as livestock grazing. Increased access could lead to cumulative adverse impacts from recreational activities (e.g., ORV traffic, hiking, hunting) and vandalism/unauthorized collection of artifacts associated with the increase in population due to energy development in the surrounding area.

Past and present actions and RFFAs have altered and most likely would continue to alter the landscape surrounding the Project area. Indirect impacts, such as illegal collection of artifacts, vandalism, and erosion are difficult to minimize or mitigate because most of the damage has occurred by the time it is discovered. Direct impacts to all identified NRHP-eligible sites located in the Project APE that cannot be avoided would be minimized or mitigated in consultation with the North Dakota SHPO, USFS (if on USFS lands), USACE (if on USACE lands), and interested tribes. In addition, any potential impacts to previously unknown NRHP-eligible sites discovered during construction activities would be minimized or mitigated in accordance with the *Unanticipated Discoveries Plan.* Therefore, the Project is not expected to cumulatively impact NRHP-eligible sites.

5.3.22 Tribal Treaty Rights and Interests

Tribes may have treaty rights and/or traditional cultural interests within the Project area. Cumulative impacts to these areas and associated traditional values could result from surface disturbance, surface structures, unauthorized collection of artifacts, and natural erosion processes. In addition, the Project temporarily may reduce the amount of federal lands within which tribal members can exercise their hunting, fishing, and gathering rights outside of the reservation. The reader is referred to Sections 5.3.6, 5.3.9, and 5.3.10 for cumulative effects to vegetation, wildlife and fisheries, and special status species.

Temporary impacts may occur by changing the way in which a tribal member accesses resources of tribal use. There also may be temporary impacts to tribal treaty rights by the temporary restrictions of certain activities (e.g., hunting or gathering) in the ROW corridor during construction. However, the Project is not expected to cumulatively impact resources of significance to the tribes when added to past, present, and RFFAs. The Project also is not expected to cumulatively impact tribal trust resources because there would be no restrictions on accessing resources and/or areas for religious purposes in the ROW after construction has been completed.

6.0 Consultation and Coordination

6.1 Agency Scoping

Formal agency scoping meetings were held in the USACE Omaha District Office (Omaha, Nebraska) and the USFWS North Dakota Ecological Service Field Office on November 7, 2013, and January 15, 2014, respectively. Agencies that participated in the meetings or provided written comments during the agency scoping period included the USFWS, USACE, USFS, Bureau of Indian Affairs (BIA), NDGFD, North Dakota State Water Commission, and North Dakota Parks and Recreation. Key issues discussed at these meetings or provided in letters included the following:

- Special status species (federal listed, proposed, candidate, and USFS-sensitive species);
- Migratory birds (compliance with the MBTA);
- Bald and golden eagles (compliance with the BGEPA);
- ANS;
- Waterfowl production areas;
- Wetlands, native prairie, and wooded draws (conservation plan, compensation);
- Soils and hydrology;
- Noxious weeds;
- Cultural resources;
- Water quality issues – potential disturbance in the substrate of Lake Sakakawea and potential impacts to the pallid sturgeon (federal listed species);
- Potential for accidental release of crude oil into waters, primarily Lake Sakakawea (potential impacts to the pallid sturgeon, which is a concern to the USFWS); the USFWS and USACE recommended that a Spill Risk Assessment and Spill Response Plan be completed for the Project;
- The USFS has a maximum construction ROW width of 50 feet and permanent ROW width of 20 feet across the LMNG;
- Potential impacts to Management Indicator Species as described in the Grassland Management Plan for USFS land;
- Need to develop additional alternatives;
- Impacts to air quality;
- Degradation of roads and public safety; and
- Permanent impacts from aboveground facilities.

6.2 Public Interest/Public Scoping

The BLM compiled a mailing list of agencies, organizations/companies, individuals, and other entities that may have an interest in the Project. The list included federal, state, and local agency offices with jurisdiction over the Project, as well as potentially affected landowners, Native American tribes, and NGOs. An information letter describing the Project and requesting comments was distributed on April 22, 2013, to all individuals identified on the mailing list. A 30-day comment period was provided.

Public notices were published in the following regional newspapers from April 22, 2013, notifying the public of the Project and soliciting comments:

- Associated Press [BHG Newsgroup and Bloomberg];
- Beulah Beacon;
- Billings County Pioneer;
- Bismarck Tribune;
- Bowman County Pioneer;
- Dickinson Press;
- Dunn County Herald;
- Golden Valley News;
- Hazen Star;
- Kenmare News;
- Mandan News;
- McKenzie County Farmer [Watford City newspaper];
- Mclean County Independent;
- Minot Daily News;
- Mountrail County Promoter;
- Mountrail County Record;
- New Town News;
- Tioga Tribune;
- Turtle Mountain Star;
- Turtle Mountain Times;
- Washburn Leader News; and
- Williston Daily Herald

Seven comment letters were received during the public scoping period. A summary of the issues identified in these letters has been provided below.

- Must evaluate a reasonable range of alternative pipeline routes (at least one route alternative that would not traverse public lands) including the No Action Alternative;
- Cumulative impacts from oil and gas development within the Project region.
- Fragmentation of and surface disturbance within wildlife habitat;
- Potential impacts at the Lake Sakakawea crossing;
- Potential impacts to groundwater wells;
- Potential decrease in soil productivity;
- Full disclosure of associated facilities needed for Project operation;
- Mass wasting and soil erosion along the north and south bluffs of Lake Sakakawea;

- Potential for pipeline rupture and crude oil release;
- Potential impacts to wetlands as a result of pipeline construction and operation; and
- Potential impacts to cultural resources from pipeline construction.

After the official scoping period closed, a letter was received from the Chairman of the MHAN in which the Chairman expressed concern with pipeline construction across the lake, potential impacts to plants and animals, and potential groundwater contamination.

6.3 Agencies, Organizations/Companies, Native American Tribes, and Persons Consulted

The following agencies, organizations/companies, individuals, and other entities were contacted during the public scoping process.

6.3.1 Agencies

Federal

Bureau of Land Management
U.S. Army Corps of Engineers
    Regulatory Office (Bismarck, North Dakota)
    Garrison Dam/Lake Sakakawea Project Office (Riverdale, North Dakota)
    Omaha District Office (Omaha, Nebraska)
U.S. Congress
U.S. Department of Agriculture - Natural Resources Conservation Service, North Dakota State Office
U.S. Fish and Wildlife Service - North Dakota Field Office
U.S. Forest Service - Dakota Prairie Grasslands
U.S. Forest Service - Little Missouri National Grassland, McKenzie Ranger District
U.S. Department of the Interior - Office of Surface Mining Reclamation and Enforcement
U.S. Senate

State

Dickinson State University
Dickinson State University Foundation
North Dakota Department of Health
North Dakota Forest Service
North Dakota Game and Fish Department
    Bismarck Office
    Williston Office
    Riverdale Office
North Dakota Industrial Commission - Oil and Gas Division
North Dakota Land Department
North Dakota Parks and Recreation Department
North Dakota State Historical Society
North Dakota State University - Department of Soil Science
North Dakota State Water Commission
North Dakota Tourism Division
State of North Dakota
State District #36
State District #39
State District #4

Local

McKenzie County Commissioners

McKenzie County Extension Agent
McKenzie County Park Board
McKenzie County Water Resource District
McKenzie County Weed Board
Williams County Commissioners
Williams County Water Resource Board

6.3.2 Organizations/Companies

Agassiz Basin Group Sierra Club
American Rivers
Amerada Hess Corp
Associated Press
Audubon Dakota
Badlands Conservation Alliance Field Office
Badlands Shooting Club
BakkenLink Western Services LLC
Banner Transportation Co LLC
Betaina Free Norg Lutheran Church
Blue Buttes Township
Bridger Pipeline LLC
Busy Bees Hot Oil Inc
Cliffhangers Four-wheeler Club
Condor Petroleum Inc.
Continental Resources, Inc.
Dakota Cyclery
Dakota Prairie Grasslands
Dakota Resource Council
Elm School District
Enbridge Pipelines Llc
FNAWAS Headquarters
Fargo National Bank and Trustee Co.
Farm Credit Services ND PCA
Farmers Union Oil Co of Sanish
Grail Township
Hamilton Enterprises Central LLC
Hamm and Phillps Service Company
Hawkeye School District #22
Hess Corporation
Independent Petroleum Association of Mountain States
JBS Trucking Inc.
Job Development Authority
KDAK, LLC.
Keene First Lutheran Church
Keene School District #6
Larry's Seed & Ag Supply Inc.
Lund Oil Inc.
McKenzie County Farmer
McKenzie County Grazing Association
McKenzie County Park Board
McKenzie County RFPD
McKenzie County Rural Fire District #1
McKenzie Electric Coop Inc.

Medora Grazing Association
MHA Elders Organization
Mule Deer Foundation
National Audubon Society State Office
National Wildlife Federation
North Dakota Council of Humane Societies
North Dakota Farm Bureau
North Dakota Petroleum Council
North Dakota Wildlife Federation
OPL, LLP
Pheasants Forever
Portal Pipe Line Co
Prairie Liquids, LLC
Public Lands Advocacy
Rangeland Terminals LLC
Redeemer Lutheran Church
Reservation Telephone Cooperative
Rutland Sportsman
Saddle Butte Pipeline LLC
Sierra Club, Teddy Roosevelt Group
Silent Cemetery Association
Tervita, LLC
Tesoro High Plains Pipeline Co
Tioga Gas Plant, Inc.
Trinity United Lutheran Church
Union Cemetery Association
WildWest Institute
Williams County
Williams Elec Coop

6.3.3 Tribal Contacts

Bureau of Indian Affairs
Bureau of Indian Affairs, Fort Berthold Agency
Bureau of Indian Affairs, Standing Rock
Cheyenne River Sioux Tribe
Crow Creek Sioux Tribe
Flandreau Santee Sioux Tribe
Fort Belknap Indian Community
Fort Peck Tribes
Lower Brule Sioux Tribe
Lower Sioux Indian Community
Northern Cheyenne Tribe
Oglala Sioux Tribe
Rosebud Sioux Tribe
Santee Sioux Tribe of Nebraska
Sisseton-Wahpeton Oyate Tribes
Spirit Lake Sioux Tribe
Standing Rock Sioux Tribe
Three Affiliated Tribes – Mandan, Hidatsa and Arikara Nation
Turtle Mountain Band of Chippewa Indians of North Dakota
Yankton Sioux Tribe

6.3.4 Individuals

Nancy Krogen Abel
Earl E. Abrahamson
Daniel J. Alexander
Grace Allex
Anderson Family Trust
Anderson Trust, Donald & Barb
Anderson Trust, Donald L
Curtis W. and Sharon D. Anderson
Lane Anderson
Melvin Anderson
Ronald and Myra Anderson
Rodger D. and Diane M. Auen
Baklenko Living Trust/Deborah/&
Betty Barden
Heather Rose Barta
Kathy L. Barta
Clinton H. and Vera M. Bergstrom
Carole L. and Loren Berwald
John Blegen and Stephanie Allgier
Raymond E. and Lois A. Blegen
Jane E. Boggs
Clark D. and Bonnie G. Bohmbach
Julie, Steffen, and Curtis Bohmbach
Steffen N. and Julie R. Bohmbach
Alice M. Boyko
Clayton and David Brenna
David and Tamera Brenna
Owen Brenna
Burton and Lorna Brown
Corey Brown
Dean and Paula Brown
Harry and Phyllis Brown
James J. Brown
Janice M. Brown
Marlin Brown
Keith and Penny Brunelle
Chad, Justin, and Diane Buckingham
Dennis R. and Alice Ann Burnett
Sandra Burr
Randle J. Cavanaugh
David T. and Virginia Ceynar
Bud Chapin Trust
Dixie Chapin
Dixie and Ruby Chapin
Richard and Ann Chornuk
Chad Christensen
Mary C. Davidson
Ryan M. and Jenice Davidson
Barbara Dehn
Gerald Dilland
Dilland Trust, John O
Raymond Dilland
Florence Dooley
Paula Eide
Wallace Eide
Ronald Wayne Ekren
Norman and Andrea Enderle
Brian L. Faucett
Layne D. and Malinda P. Ferguson
Dale and Beverly Filkowski
Ardelle E. Ford
Richard Ford
Patrick and Chantel Fretland
Steven M. Fretland
Marlene L. Friedt
Duane E. Frisinger
Carl and Bonnie Frisinger
Cheri Frye
Cody Frye
Elsie M. Gilbertson
Delores M. and Elmer D. Gilchrist
Raymond D. and Linda C. Gilstad
Raymond D. and Linda Gilstad
Kelley Gleave
Raymond Gleave Jr.
Grimestad Farm & Ranch, LLP
Shirley Groth
Gunhus Trust, Harms & Adleide
Darlean M. Hahn
Richard and Janene Halverson
Roger and Linda Halverson
Thomas John Halverson
Gerry Hammond
Brian Haugen
James E. and Carolyn Henderson
Jeff and Eva Hepper
Herfindahl, Helen (Life Estate)
Hove, Myrna (Life Estate)
Isaacson Trust, William B
Deon and Shana R. Iverson
James T. Iverson
Jason L. and Christina D. Iverson
Maynard P. and Joetta Iverson
Milo Iverson
Myron J. Iverson
Raymond Iverson
Iverson Trust Etal, Sally F
Leif and Nancy Jellesed
Matthew D. Johansen
Kathleen Johnson
Larry D. Jones
Laverne and Ardella Kerbaugh
Craig A. and Carol K. Kieson
Jeremy C. Kilen

John D. and Cleo Kirkland
Neil L. Knight
Koch/Gordon H/Trust
Betty Jean and William Kordonowy
Courtney R. Krenz
Darwin D. and Jean E. Krenz
Arnold and Dorothy Krogen Trust
Chris Kubal
Will and Rhonda Kulczyk
Adeline Kvam
Kvam Holdings LLLP
Myles Kummer
Grace Langved
Robert and Roberta Larson
Ione B. Leholm
Nick and Fern Leier
Frank Leppell
Chad and Adri Levang
Gary and Patsy Levang
Gordon Levang
Leroy and Jay Lillibridge
Oline Loomer
Loomer/Sigrid/Family Irrevocable
Donald T. and Bonnie Lovaas
Donald Lund
Madson/Alice M/Trust
Donald and Francis Maeyaert
Dennis L. Marmon
Frank and Rick Marmon
Linn H. Marmon
Virgil Marmom (Life Estate)
James G. McClintock
McGlasson Trust Etal
Lorraine Melby
Julianne E. and Norman M. Mell
Sylvia Mills
James and Lary Moberg
Eugene and Penny Moe
Jeffery A. and Eleanor M. Moe
Leon G. Moe
Wade L. Moe
Linda R. Moe (Living Trust)
Linda G. Mogen
J. D. Moore
Kimberly Murillo and Corrina Hammond
North Dakota Conference of Seventh Day
North Dakota Land Holdings LLC
Jeffrey and Keri Nehring
Carolyn J. Nelson
David A. Nelson
David A. and Carolyn J. Nelson
Donald A. and Steve Nelson
Richard L. Nelson Trust
Sandra M. Nelson
Nelson Land Holdings LLLP
Dwight Norby
Kelly R. and Lynette J. Norby
Micah and Cari Northington
OK Ranch LLLP
Helene H. Olson
Robert L. and Wanda Olson
Timothy OlsonCharles and Janice Ostberg
Viola Pennington and Milo W Sorenson
Bruce Quale
Darrel R. and Joanne M. Quale
Lillian P. Quale
Barry D. and Melissa R. Ramberg
Hazel Ramberg
Lorne Ramberg
Orel J. Ranum and Linda Hartigan
Cheri Rice and Wanda Radermacher
Delmer L. and Marcelline Rink
Shaun Rink
Ron and Marvel Ritzke
Amanda Rognas
Rolfsrud/Harold & Marilyn/Trusts &
John S. and Nancy G. Rolfsrud
Saasen Trust & Ida E Haugen
Robert M. and Eileen Sain
Maybelle Saunders
Dale Schantzen
Harold E. and Ione L. Schmidt
Linda Schmidt
Michelle P. and Ross A. Schoenwald
Janice M. Schroeder
Mary Schroeder
Schroef/Rosemary/Trustee
Alastair Bruce Scott
Robert and Sara Seelye
Maybelle Senger
Dale and Betty Shantzen
Sherven/Vern H/Trust And Glenn W &
Sherven/Vern H/Trustee
Eleanor Sigmon
Jason and Wade Signalness
Larry and Lois Signalness
Lorraine K. and James H. Sisson
Arnold Sivertson
Arnold and Cecilia Sivertson
Larry I. Skaare
Gary and Kathy Skarda
Gary J. Skarda
Jack and Joanne Skarda
Randy Skarda
Wayne and Kimberly Skarda
Reuben A. and Lila P. Skogberg
Russell E. Smith
Eleanor Sorenson

Gary and Martha Sorenson
Larry and Carla Sorenson
Perry and Regina Sorenson
Ardell Spiers
Stenehjem/Judith H/(Sls) Ltd Ptr
Antone L. Stockman
Randy L. Stockman
Richard L. Stockman
Robert L. and Genevieve Stockman
Royce L. Stockman
Kevin R. and Christine L. Svaleson
Woodrow J. Sveen
Gary and Amy Swenson
Lynn and Pearl Swenson
Timothy Swenson
Greggory G. and Tommie S. Tank
Tenacity Ranch Holdings LLLP
Harvey O. and Elizabeth Thompson
Kerry and Rachel Thompson
Mark and Lowell Thompson
Mark and Wayne Thompson
Marlene Thompson
Philip A. and Travis G. Thompson
Travis and Lisa Thompson
Wayne Thompson
Wayne and Wendi Thompson
Kelby Timmons
Joseph Trumpower
Mark Tudahl
Sara Udland
Gloria Van Dyke and Phyllis Yesel
David Gregory Van Hise
Ruth M. Van Hise (Trustee)
Van Wagner Living Trust
David A. Veeder
Emma Veeder
Larry Veeder
Rosalie C. Veeder
Karen J. and Michael K. Veseth
Chris A. Washburn
Lavonne Wedar
Robert D. Weerts
Marlys Patricia Weiss
Paulette J. Westrum
Rick and Dwan Williams
Allan Leroy Wilson
Shane and Wendy Wilson
Wisness Farm Account
Wisness/Milo/Spec Conservator For
Paul and Milo Wisness
Bernice Wolla
Wollan/George & Florence/Trust
Wright, Helen (Life Estate)
Larry and Amy Zimmiond

7.0 Preparers and Reviewers

Table 7-1 lists staff from various federal agencies and companies that contributed to the preparation and review of the EA.

Table 7-1 List of Preparers and Reviewers

Agency/Company	Name	Responsibility
BLM	Lowell Hassler	NEPA Project Lead
	Rick Rymerson	Field Office Manager
	Shannon Gilbert	Archaeologist
	Greg Liggett	Montana State Office Paleontologist
USFWS – North Dakota Ecological Field Office	Kevin Shelley	Deputy Supervisor
	Carol Aron	Fish and Wildlife Biologist
USFS – McKenzie Ranger District	Jay Frederick	District Ranger
	Kim Grotte	NEPA Review
	Libby Knotts	Vegetation, Special Status Plants, and Wetlands
	Gary Foli	Wildlife, Special Status Wildlife
USACE – Riverdale, North Dakota Office	Charles Sorensen	Natural Resource Specialist
	William Harlan	Natural Resource Specialist
	David Cain	Archaeologist
	Mike Morris	Natural Resource Specialist
USACE – Omaha District Office	Jason Wagner	Geologist
	Ross Cullin	Geotechnical Engineer
	John Shelman	Environmental Resource Specialist
	Brent Cossette	Natural Resource Specialist
	Jessica Rischling	Natural Resource Specialist
Stantec	Jon Alstad	Project Manager
	Matt Brekke	Assistant Project Manager, Geology and Minerals, Water, Wildlife and Fisheries, Special Status Wildlife, Recreation, Wilderness, Noise, Land Use, Public Safety, Hazardous Materials and Solid Waste
	Erin Bergquist	Soils, Vegetation Resources, Special Status Plants, Noxious Weeds and Invasive Species, Wetlands and Floodplains
	Dave Strohm	Air Quality
	Kim Munson	Paleontological Resources, Cultural Resources, Tribal Treaty Rights and Interests

Table 7-1 List of Preparers and Reviewers

Agency/Company	Name	Responsibility
Stantec (Continued)	Bernie Strom	Socioeconomics, Environmental Justice, Transportation
	Jeff Barber	GIS Specialist
	Brian Taylor	GIS Specialist
	Debbie Thompson	Document Production
Project Consulting Services, Inc.	Michael Istre	Professional Engineer
	Jarrett Davis	Project Manager
	Terry Oram	Construction Manager
	Adi Desai	Project Engineer
Bartlett & West	Jame Todd	Professional Engineer
	Zach Glueckert	Professional Engineer
	Bob Gnirk	Professional Engineer
Carlson McCain, Inc.	Todd Hartleben	Principal Engineer
	Miranda Meehan	Natural Resource Specialist

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Chapter 1

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