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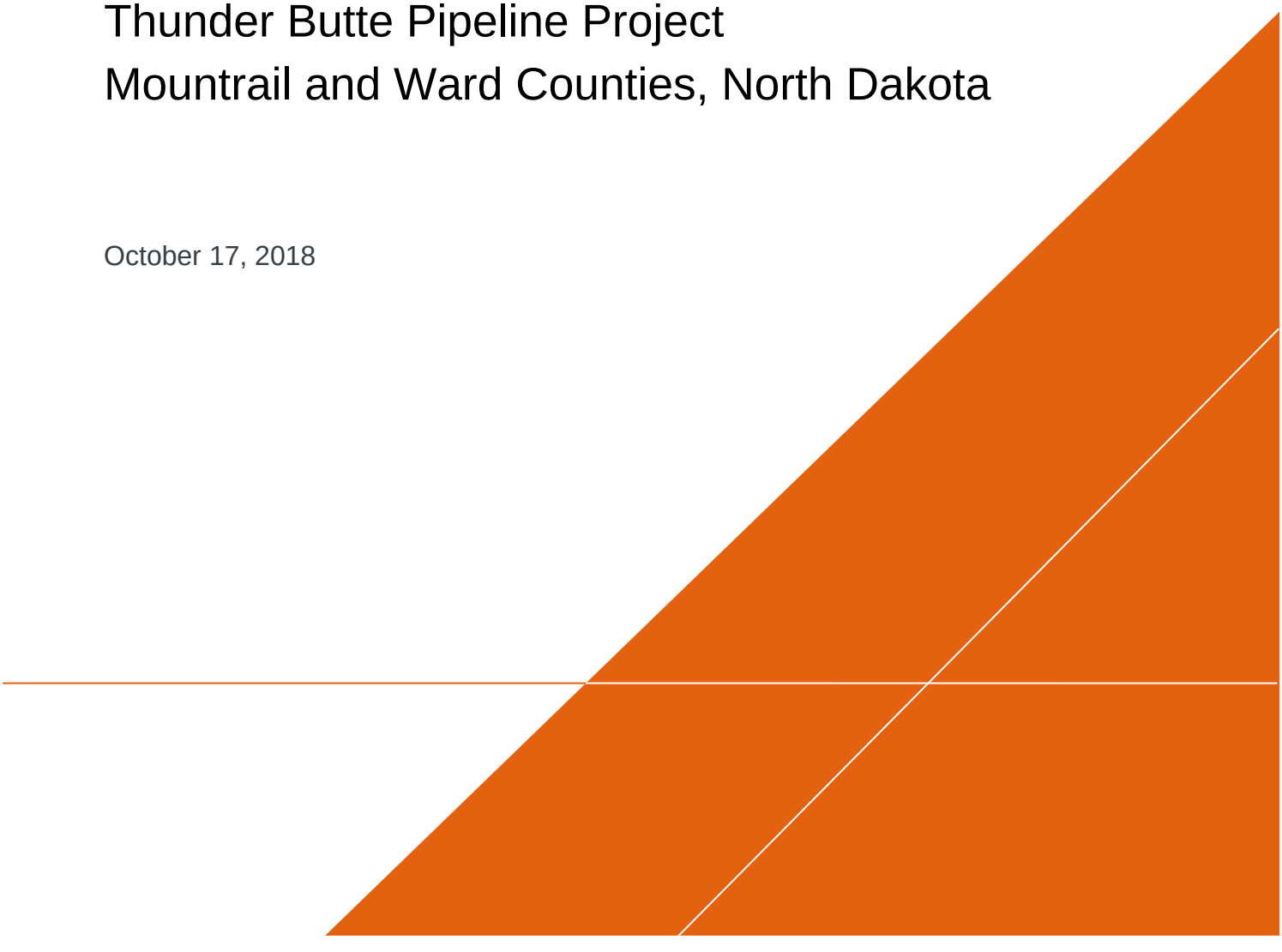
Thunder Butte Pipeline, LLC

WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

October 17, 2018



Stephen Chu, PWS
Senior Environmental Scientist

Douglas Anderson
Senior Environmental Scientist

David Gomes, PE, PMP
Certified Project Manager

WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties,
North Dakota

Prepared for:
Thunder Butte Pipeline, LLC
P.O Box 1227
New Town, ND 58763
701-726-5555

Prepared by:
Arcadis U.S., Inc.
126 North Jefferson Street
Suite 400
Milwaukee, Wisconsin 53202
Stephen.Chu@arcadis.com; 414.277.6228

Our Ref.:
CO002338.0001

Date:
October 17, 2018

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1 INTRODUCTION

This Wetland and Waterbody Delineation Report summarizes the results of a wetland and waterbody delineation survey conducted on August 7 and 8, 2018, by Arcadis U.S., Inc. (Arcadis) on behalf of Thunder Butte Pipeline, LLC. (Thunder Butte Pipeline) for the proposed construction of an approximately 3.84-mile-long crude oil pipeline and associated facilities in Mountrail and Ward Counties, North Dakota. The pipeline will originate at the existing Thunder Butte Petroleum Services Crude Storage and Loading Facility (TBPS Crude Facility) located approximately 2.7 miles northwest of Makoti, North Dakota and interconnect with the existing Enbridge crude oil pipeline at Plaza Station (**Figures 1-0** to **1-2**). The proposed pipeline and associated facilities are referred to as the Thunder Butte Pipeline Project (Project). The environmental survey area (ESA), approximately 96.85 acres, is located in Sections 18 and 19, Township 152 North, Range 87 West and Sections 2 and 11-14, Township 152 North, Range 88 West.

The proposed project involves the construction of an underground, 6-inch pipeline and associated facilities for the transport of crude oil. The ESA is comprised of the Project's 80-foot wide right-of-way (ROW) throughout the site. However, a 200-foot corridor (100 feet to each side of the center line) was surveyed to cover all potential wetland areas in the vicinity of the requested ROW. The purpose of the wetland and waterbody delineation survey was to assess the presence or absence of wetlands and other waters that may be affected by the proposed project, and to assess general ecological conditions within the ESA. Ten wetlands and one perennial stream (East Fork Shell Creek) were identified within the ESA.

2 STATEMENT OF QUALIFICATION

The wetland and waterbody delineation were performed and authored by Stephen W. Chu, Professional Wetland Scientist (PWS), Senior Environmental Scientist. Mr. Chu was the Lead Wetland Delineator for this project.

Mr. Stephen W. Chu, PWS (#1770) and Certified Senior Ecologist, earned a Master of Science degree in Natural Resources and Environmental Sciences from the University of Illinois at Urbana-Champaign. Mr. Chu has over 16 years of experience managing and completing complex ecological-related projects. His areas of expertise consist of wetland delineations, wetland mitigation design, wetland restoration, wetland and native area monitoring, habitat surveys, tree surveys, and threatened and endangered species surveys. Mr. Chu has extensive experience in fieldwork and permitting throughout the West and Midwest.

3 BACKGROUND INFORMATION

Prior to conducting the wetland and waterbody delineation survey, Arcadis reviewed the following resources to identify the potential location and extent of wetlands and waterbodies within the ESA:

- U.S. Geological Survey (USGS) topographic maps (Makoti, Wabek, Plaza, and Epworth SE quadrangle) (USGS, 2015).
- Aerial imagery (ESRI, 2016).
- USGS National Hydrography Dataset (NHD) mapped streams (USGS, 2018).
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (USFWS, 2018).
- U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) of Ward and Mountrail Counties, North Dakota (NRCS, 2018).

3.1 USGS Topographic Map

According to topographic mapping (**Figures 2-0 to 2-7**), one blueline stream, East Fork Shell Creek, is located within the central portion of the ESA. Topography was gently rolling, with elevations within the ESA ranging from 2054 to 2100 feet below sea level.

3.2 USGS NHD

The USGS NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and stream gauges. One NHD feature, East Fork Shell Creek, is mapped within the ESA. NHD mapping for the ESA is depicted in **Figures 3-0 to 3-7**.

The ESA lies within the Lake Sakakawea sub basin (HUC 10110101). The closest designated traditionally navigable waterway (TNW) to the ESA is Lake Sakakawea which flows into the Missouri River.

3.3 National Wetlands Inventory (NWI)

NWI maps are used as a guide, along with other data, to indicate the potential presence of wetlands. The information is often out of date and not necessarily field-verified. The presence of an NWI feature is not a definitive indicator that a wetland or waterbody is present. Conversely, the absence of an NWI feature is not a definitive indicator that a wetland or waterbody is not present.

The NWI data indicated a total of 13 mapped wetlands (**Figures 3-0 to 3-7**). The following below are the NWI indicated Wetlands:

- A wetland classified as a palustrine emergent (PEM)1Cd, approximately 1.87 acres (including offsite area) is located approximately half a mile northwest of the TBPS Crude Facility.
- Two Wetlands, one classified as a PEM1Cx, approximately 0.10 acres and the other classified as a PEM1Ad, approximately 0.15 acres is located approximately 0.65 miles northwest of the TBPS Crude Facility.

- Two Wetland, one classified as a PEM1A, approximately 0.21 acres and the other classified as PEM1Ad, approximately 0.40 acres is located approximately 0.10 miles northwest from NWI classified wetlands PEM1Cx and PEM1Ad.
- A wetland classified as PEM1C, approximately 0.39 acres is located approximately 0.17 miles northwest of the previous classified wetland PEM1A.
- A wetland classified as a PEM1C, approximately 1.16 acres is located approximately 0.20 miles northwest from NWI classified wetland PEM1A.
- Three wetlands, one classified as PEM1C approximately 0.76 acres and two classified as PEM1A, approximately 0.58 and 0.10 acres is located approximately 0.25 miles southeast of 66th Street.
- A wetland classified as PEM1A, approximately 0.82 acres is located approximately 0.17 miles northwest of the intersection of 66th Street and the railroad.
- A wetland classified as a PEM1A, approximately 59.13 acres (including offsite area) is located along the East Fork Shell Creek.
- A wetland classified as a PEM1A, approximately 0.67 acres is located approximately a quarter of a mile north east of intersection 62nd Avenue and 41st Street.

3.4 Aerial Imagery

A review of aerial imagery from 1995, 2003, 2005, 2006, 2009, 2010, 2013 (Google Earth Pro V 7.3.2.5487. 2018) and 2016 (ESRI 2016) shows the ESA as consisting of the railroad with adjacent agriculture and pasture land use. No other significant changes in the landscape were observed on the historic aerial imagery review.

3.5 USDA NRCS WSS of Ward and Mountrail Counties, North Dakota

According to the USDA NRCS WSS for Ward and Mountrail Counties, North Dakota, 15 soil map units, listed in **Table 1,** are mapped within the ESA. The soil units mapped were listed as:

- Predominantly nonhydric – no major component listed for a given map unit is rated hydric, and at least one contrasting minor component is rated hydric.
- Partially hydric - at least one major component listed for a given map unit is rated as hydric, and at least one other major component is not rated hydric.
- Predominantly hydric – all major components listed for a given map unit are rated as hydric, and at least one contrasting minor component is not rated hydric.

The location and extent of the soil units identified within the ESA are depicted in **Figure 4**.

Table 1 Soil Map Units Identified within the Environmental Survey Area

Soil Unit Symbol	Soil Unit Name	Hydric Rating
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly hydric
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly nonhydric
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly nonhydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly nonhydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly nonhydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly nonhydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly nonhydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly nonhydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly nonhydric
C424A	Minot silty clay, 0 to 2 percent slopes	Predominantly nonhydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly nonhydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly nonhydric

4 METHODOLOGY

A pedestrian survey was conducted within the ESA to identify wetlands and waterbodies on August 7 & 8, 2018. Wetland boundaries were field-delineated according to Section 404 of the Clean Water Act routine onsite methodology described in the Technical Report Y-87-1 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent guidance documents and the United States Army Corps of Engineers (USACE) 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2.0). The ESA is within the Northern Great Plains Land Resource Region (USACE 2012). National Wetland Indicator status and taxonomic nomenclature is referenced from The National Wetland Plant List (Lichvar 2016). Indicators of hydric soil are based on the Field Indicators of Hydric Soils in the United States guide Version 8.1 (Vasilas et al. 2017).

Wetland delineation data were recorded on the USACE Great Plains Regional Supplement wetland determination data forms. One representative data point was recorded for each wetland. Corresponding representative upland data points were recorded to document upland boundaries and conditions surrounding the wetlands within the ESA. In addition, data points were recorded in mapped NWI wetland polygons.

Streams were identified as those waters that possessed a defined “bed and bank” or ordinary high-water mark (OHWM) indicators and lacked a dominance of upland vegetation in the channel. Channels that parallel roadways or railroads were identified as upland drainage features and were not considered to be jurisdictional unless they had an identifiable OHWM, were identified on the USGS topographic map, or represented a presumed relocation of a natural channel.

The outer boundaries of each wetland and waterbody (determined by the OHWM) were delineated and recorded using a handheld Trimble Geo7X Global positioning system receiver, with submeter accuracy. As features were collected, they were given a unique feature identification (ID).

Precipitation data from approximately 90 days prior to the wetland and waterbody delineation survey were obtained from a weather station near the ESA and compared with 30-year average precipitation data obtained from the NRCS Wetlands (WETS) Table for Mountrail County to determine if antecedent hydrologic conditions at the time of the survey were normal, wetter, or drier than the normal range (Midwestern Regional Climate Center 2018).

5 SURVEY RESULTS

5.1 Antecedent Precipitation

Prior to conducting the field visit, antecedent precipitation data were analyzed. Data were obtained from a nearby weather station (PLAZA (ND) USC00327120) and compared to data from a nearby WETS station that had sufficient historical data (STANLEY 3 NNW, ND). The most recent rainfall event prior to the site visit occurred on July 10, 2018 with approximately 0.1 inches of precipitation. Precipitation for the 14 days prior to site visit was 0.0 inches. The precipitation data for the 90-day period prior to the field visit were entered into a WETS analysis worksheet to weight the information from each preceding month to analyze hydrologic conditions (**Appendix A**). Based on this analysis, the antecedent hydrologic conditions were considered to be within normal range, suggesting that climatic/hydrologic conditions were normal for this time of year.

5.2 Vegetative Communities

Vegetative communities observed within the ESA consisted of railroad ROW, agricultural land use, and PEM wetlands. Photographs of the ESA are provided in **Appendix B**.

Upland portions of the railroad ROW were dominated by smooth brome (*Bromus inermis*), common sow thistle (*Sonchus oleraceus*), sweet clover (*Melilotus officinalis*), Canada thistle (*Cirsium arvense*), quackgrass (*Elymus repens*), and Virginia wildrye (*Elymus virginicus*). The agriculture lands were planted with alfalfa (*Medicago sativa*), lentils (*Lens culinaris*), soy bean (*Glycine max*), and common wheat (*Triticum aestivum*). The PEM wetlands were dominated by reed canary grass (*Phalaris arundinacea*), broadleaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), foxtail barley (*Hordeum jubatum*), barnyard grass (*Echinochloa crus-galli*) and prairie cordgrass (*Spartina pectinata*).

5.3 Wetlands

As shown in **Figure 6**, a total of ten PEM wetlands (Wetlands W1 to W10) were identified within the ESA, for a total of 8.479 acres. USACE Wetland Determination Data Forms are provided in **Appendix C** and wetland characteristics are summarized in **Table 2**. It should be noted that the USACE make the final determination of wetland hydrologic connectivity and jurisdiction.

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W1	PEM	0.129 acres	47.981593°, -101.869972°	East Fork Shell Creek
W2	PEM	0.249 acres	47.983102°, -101.874448°	Isolated depression
W3	PEM	0.042 acres	47.983268°, -101.875925°	Isolated depression
W4	PEM	0.200 acres	47.983659°, -101.876094°	Isolated depression
W5	PEM	0.455 acres	47.984415°, -101.878144°	Isolated depression

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W6	PEM	1.695 acres	47.985850°, -101.883267°	Isolated depression
W7	PEM	1.767 acres	47.987734°, -101.888990°	Isolated depression
W8	PEM	0.276 acres	47.991424°, -101.896871°	Isolated depression
W9	PEM	3.551 acres	47.994401°, -101.901609°	East Fork Shell Creek
W10	PEM	0.115 acres	48.009752°, -101.911743°	Isolated depression

Notes:
1 The wetland may extend outside of the ESA; this acreage corresponds to the size of the feature located within the ESA.
2 The determinations of hydrologic connection are based on the boundary delineations and have not been formally approved by the USACE.

W1 is an emergent wetland that measures approximately 0.129 acres within the ESA, located northwest of the TBPS Crude Facility. One wetland data point (W01DP01) was taken within W1 and one upland data point (W01DP02) was taken in an adjacent upland area. W1 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W1 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland continues offsite to the north, via a 36-inch culvert under the railroad, and appears to eventually drain into the East Fork Shell Creek. As a result, W1 may be considered a Waters of the United States (WOUS).

W2 is an emergent wetland that measures approximately 0.249 acres within the ESA, located northwest of W1 along the railroad. One wetland data point (W02DP01) was taken within W2 and one upland data point (W02DP02) was taken in an adjacent upland area. W02 was dominated by foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Three secondary hydrology indicators observed within W2 consisted of surface soil cracks (B6), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W3 is an emergent wetland, approximately 0.042 acres within the ESA, located northwest of W2 along the railroad. One wetland data point (W03DP01) was taken within W3 and one upland data point (W03DP02) was taken in an adjacent upland area. W3 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W3 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W4 is an emergent wetland, approximately 0.200 acres within the ESA, located approximately 150 feet north of W3. One wetland data point (W04DP01) was taken within W4 and one upland data point (W03DP02) was taken in an adjacent upland area. W4 was dominated by reed canary grass. Hydric soil

indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W4 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W5 is an emergent wetland, approximately 0.455 acres within the ESA, located approximately 450 feet northwest of W4. One wetland data point (W05DP01) was taken within W5 and one upland data point (W05DP02) was taken in an adjacent upland area. W5 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W5 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W6 is an emergent wetland, approximately 1.695 acres within the ESA, located approximately 850 feet northwest of W5. One wetland data point (W06DP01) was taken within W6 and one upland data point (W06DP02) was taken in an adjacent upland area. W6 was dominated by barnyard grass and narrow-leaved cattail. Hydric soil indicator F6, redox dark surface, was observed within the wetland. One primary wetland hydrology indicator, oxidized rhizospheres on living roots (C3) was observed within the subject wetland. Two secondary hydrology indicators observed within W6 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W7 is an emergent wetland, approximately 1.767 acres within the ESA, located approximately 600 feet east of 66th Street. One wetland data point (W07DP01) was taken within W7 and one upland data point (W07DP02) was taken in an adjacent upland area. W7 was dominated by narrow-leaved cattail and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W7 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W8 is an emergent wetland, approximately 0.276 acres within the ESA, located approximately 800 feet to the west of 66th Street. One wetland data point (W08DP01) was taken within W8 and one upland data point (W08DP02) was taken in an adjacent upland area. W8 was dominated by barnyard grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Four secondary hydrology indicators observed within W8 consisted of surface soil cracks (B6), sparsely vegetated concave surface (B8), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W9 is an emergent wetland, approximately 3.551 acres within the ESA, located approximately a quarter of a mile northwest of W8. Two wetland data points (W09DP01 and W09DP03) were taken within W9 and two upland data points (W09DP02 and W09DP04) were taken in adjacent upland areas. W9 is subject to grazing pressure from cattle as the wetland is within an active cow pasture. W9 was dominated by

narrow-leaved cattail, reed canary grass, prairie cordgrass, and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W9 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to have a hydrologic surface connection with the East Fork Shell Creek and may be considered a WOUS.

W10 is an emergent wetland, approximately 0.115 acres within the ESA, located approximately a quarter of a mile north east of the intersection between 62nd Avenue and 41st Street. One Data point (W10DP01) was taken within W10 and one upland data point (W10DP02) was taken in an adjacent upland area. W10 was dominated by barnyard grass and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W10 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

5.4 Waterbodies

As shown in **Figure 5-4**, one NHD stream, the East Fork Shell Creek, was identified within delineated wetland W9, measuring approximately 246 linear feet. The waterbody is within a pasture and is subject to grazing pressure from cattle. The East Fork Shell Creek crosses through the ESA heading southwest before connecting with Lake Sakakawea. Due to the hydrologic connection between these streams and Lake Sakakawea, a TNW, they may be considered a WOUS by the USACE. It should be noted that the USACE make the final determination of significant nexus with a TNW.

6 CONCLUSIONS

A wetland and waterbody delineation survey was conducted on August 7 and 8, 2018, by Arcadis for the proposed Thunder Butte Pipeline Project in Mountrail and Ward Counties, North Dakota. Arcadis identified ten wetlands (totaling 8.479 acres) and one waterbody (East Fork Shell Creek) (totaling 246 linear feet) within the ESA. Wetland W1, W9 and the East Fork Shell Creek may be considered WOUS. Wetlands W2, W3, W4, W5, W6, W7, W8, and W10 may be considered isolated wetlands.

7 REFERENCES

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FIGURES

Midline Pump Station
Site #2 Boundary
- 1.88 acres

TB to Plaza
Route -
3.80 miles

Legend

Environmental Survey Area

0 1,000 2,000 4,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-0
OVERALL PROJECT LOCATIONS

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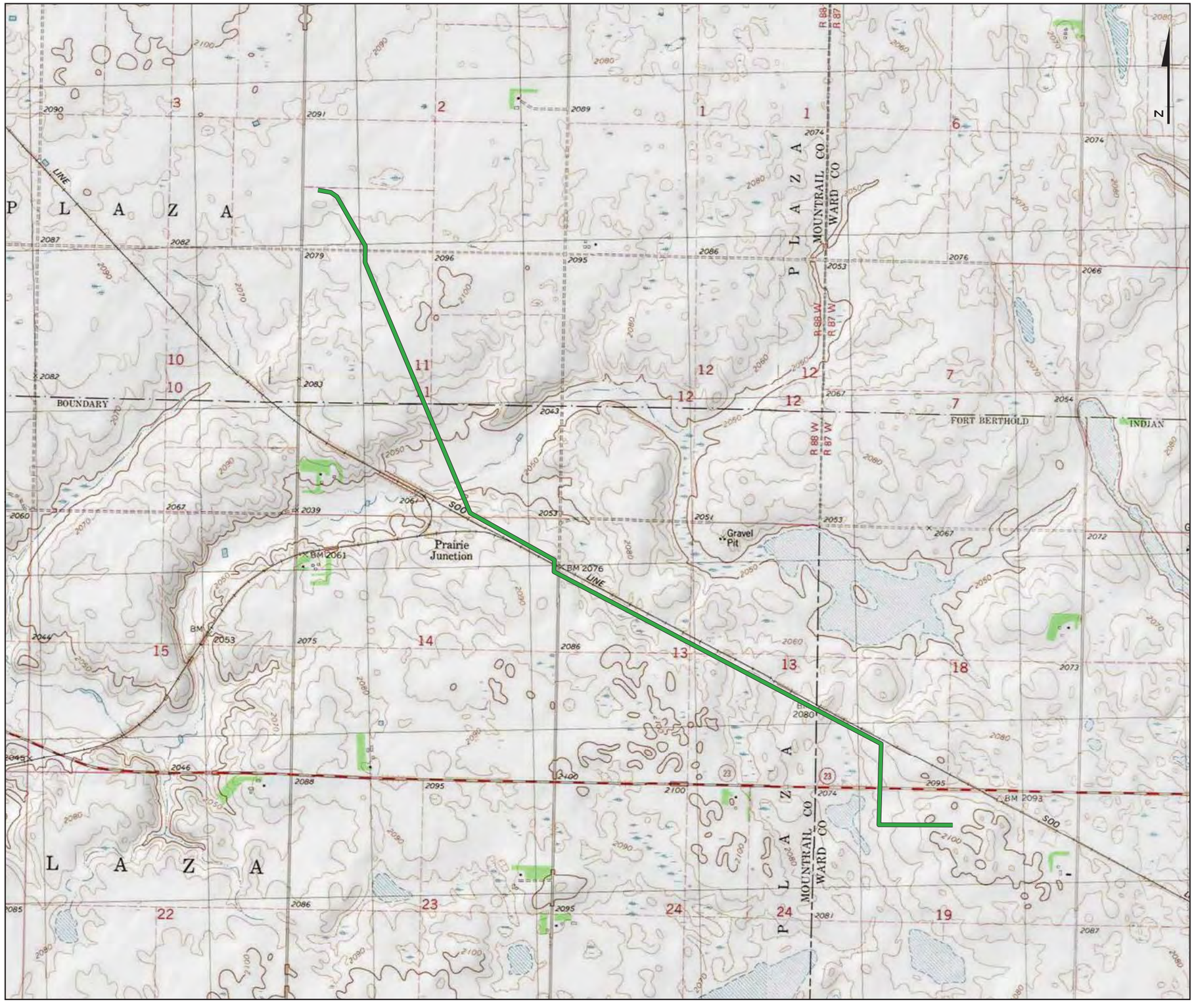

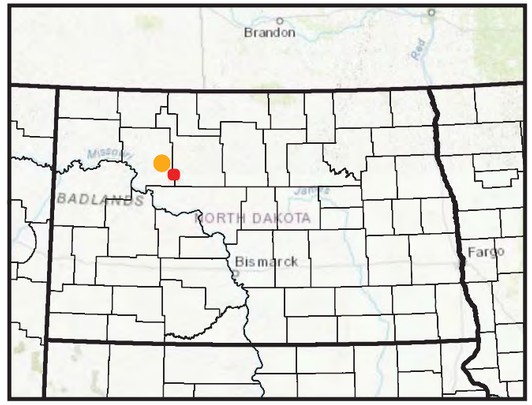

Legend

Environmental Survey Area

0 1,000 2,000 4,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-1
PROJECT LOCATION
TBPS CRUDE FACILITY TO PLAZA ROUTE

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Date: 10/8/2018	

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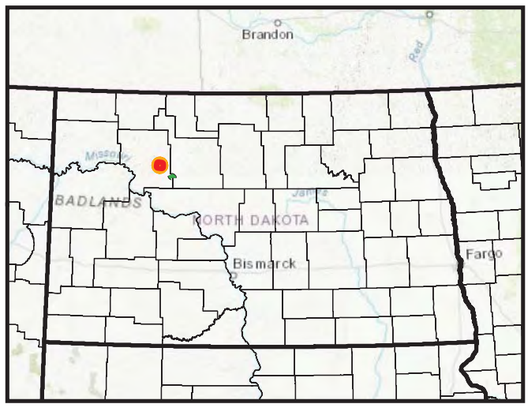
Midline Pump Station
Site #2 Boundary
- 1.88 acres



Legend

Environmental Survey Area

0 1,000 2,000 4,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-2
PROJECT LOCATION
MIDLINE PUMP STATION SITE

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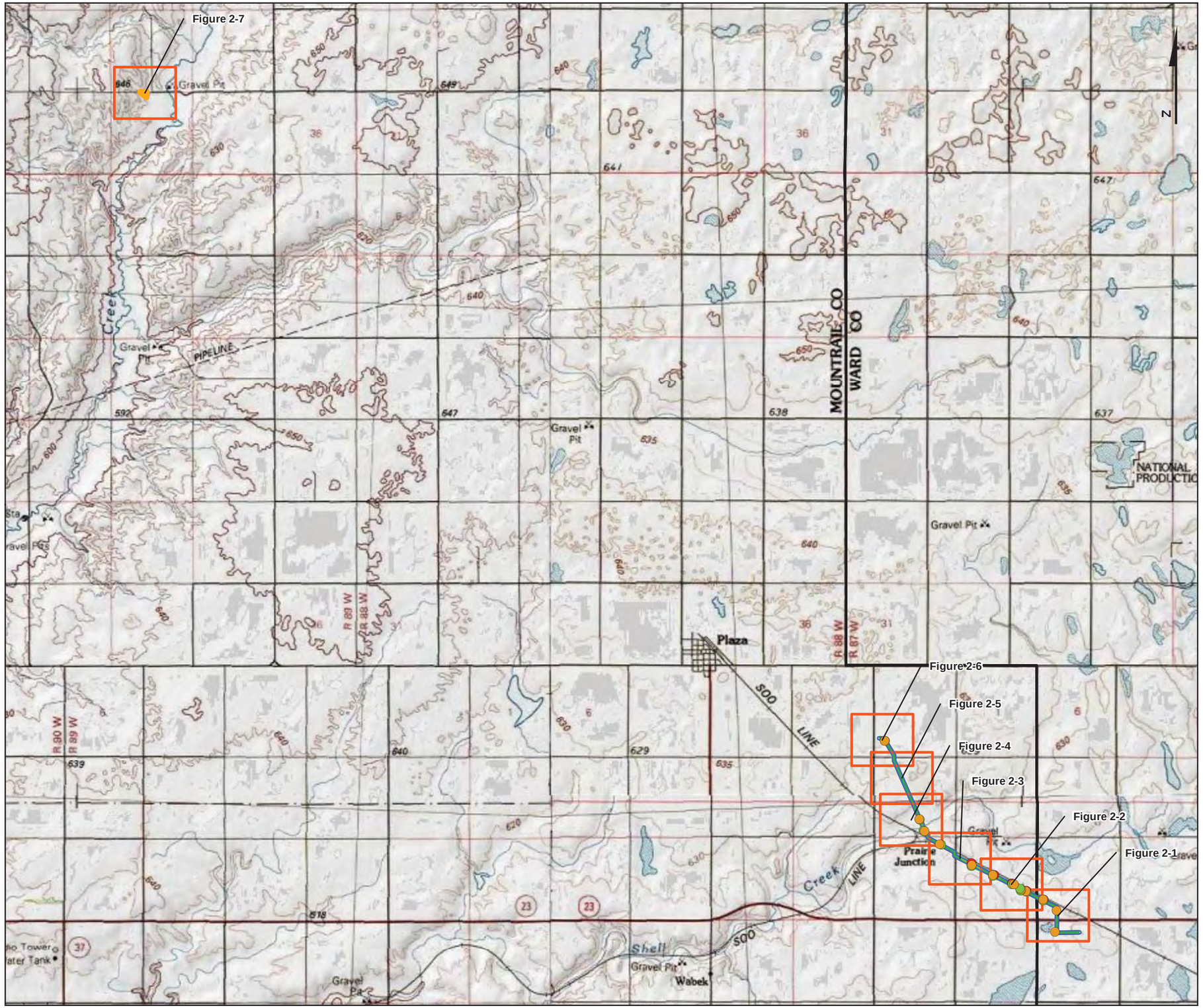

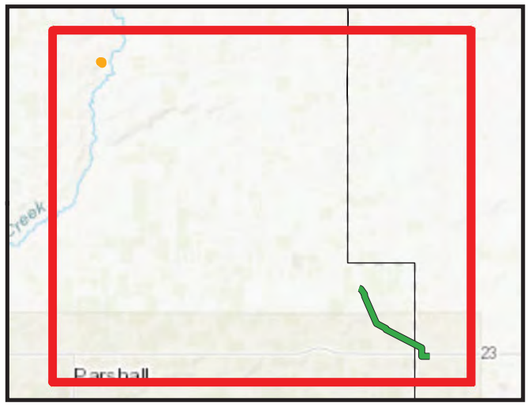

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- Extents6K
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

2500 0 2500 5000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota
FIGURE 2-0 TOPOGRAPHIC MAP	
PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
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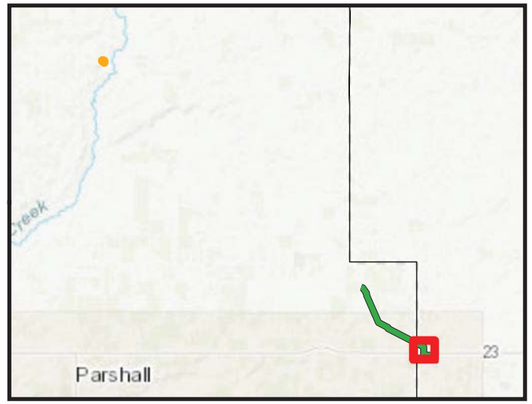


Legend

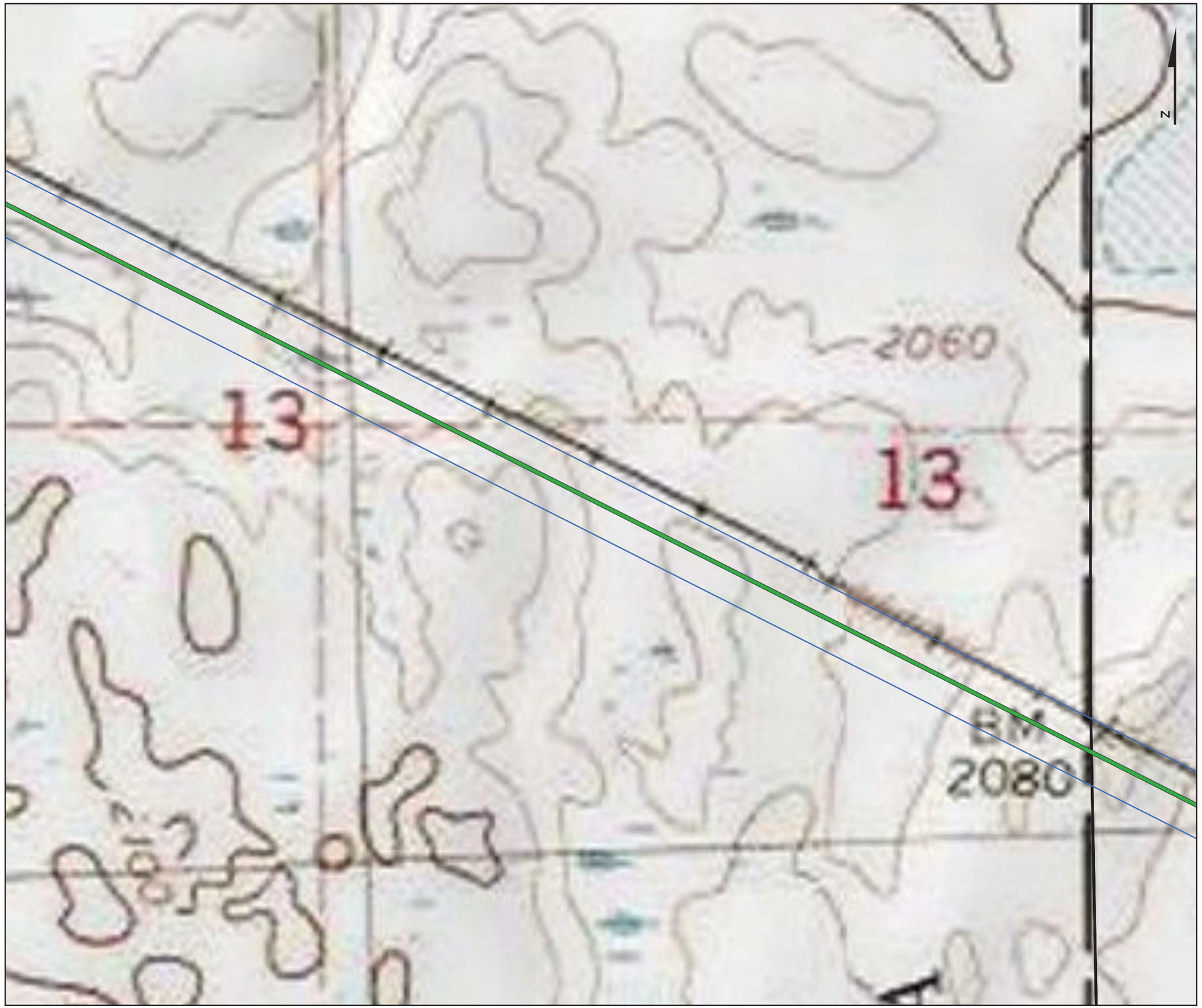
- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

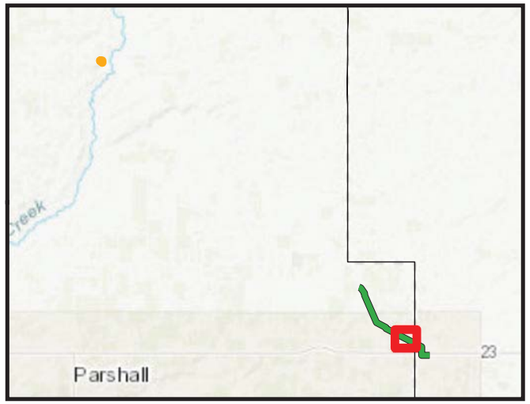
0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota
FIGURE 2-1 TOPOGRAPHIC MAP	
PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRIFig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

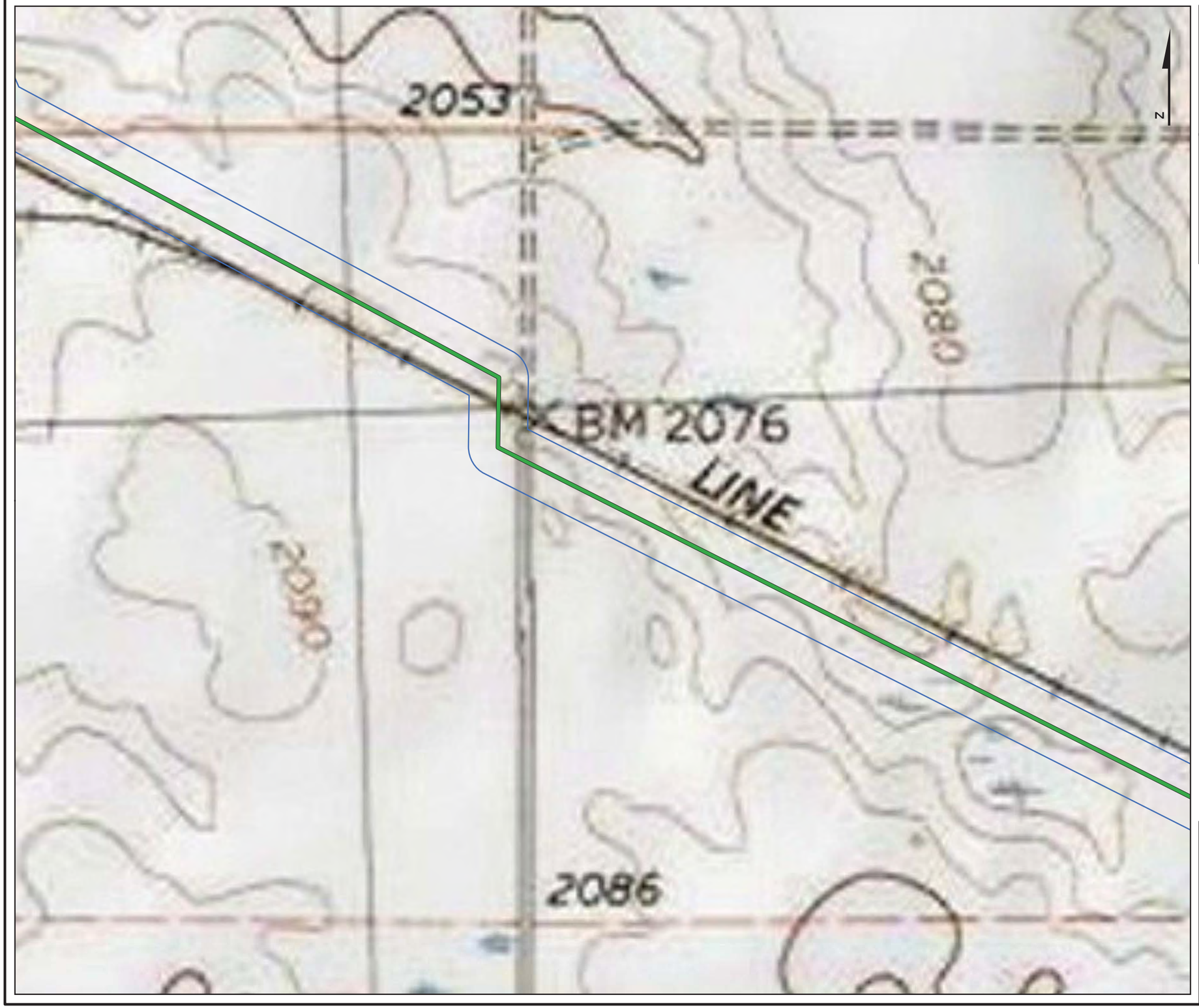
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

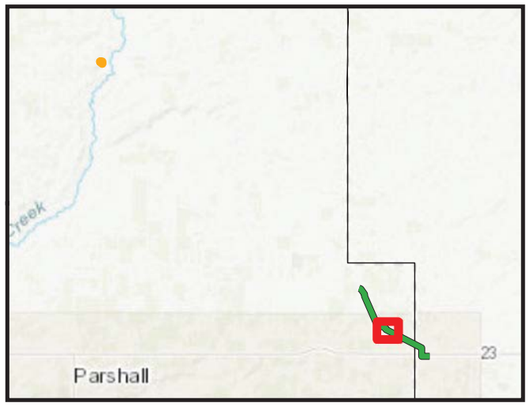
FIGURE 2-2
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

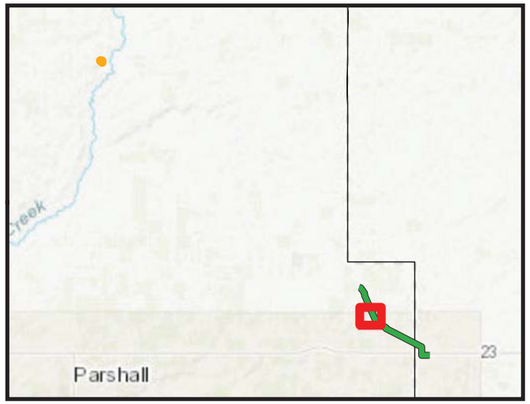
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-3
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd



Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

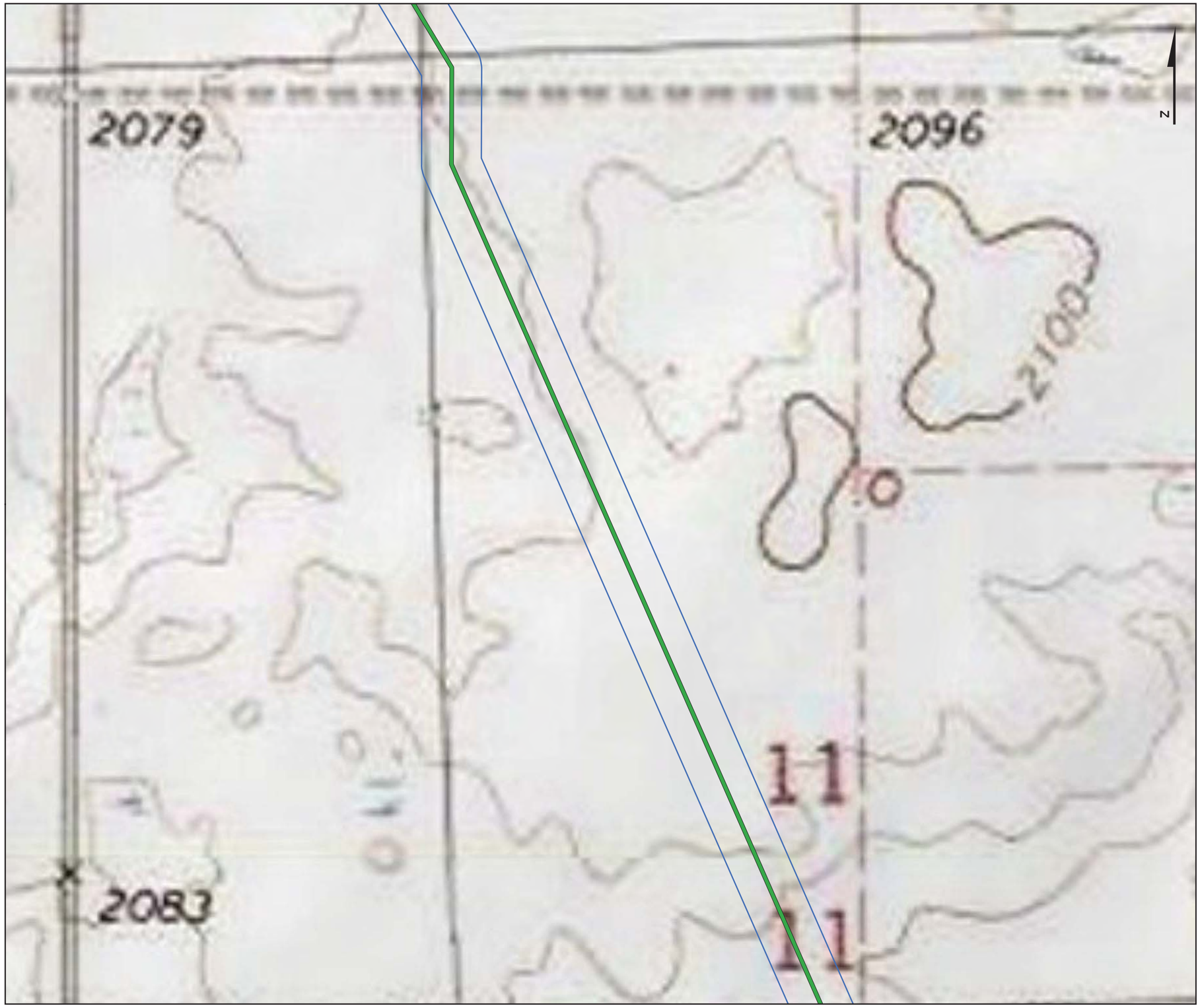
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

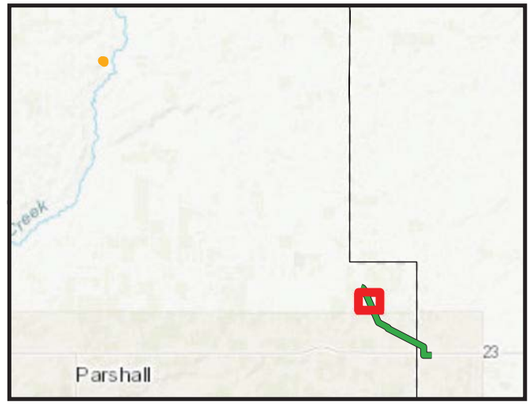
FIGURE 2-4
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

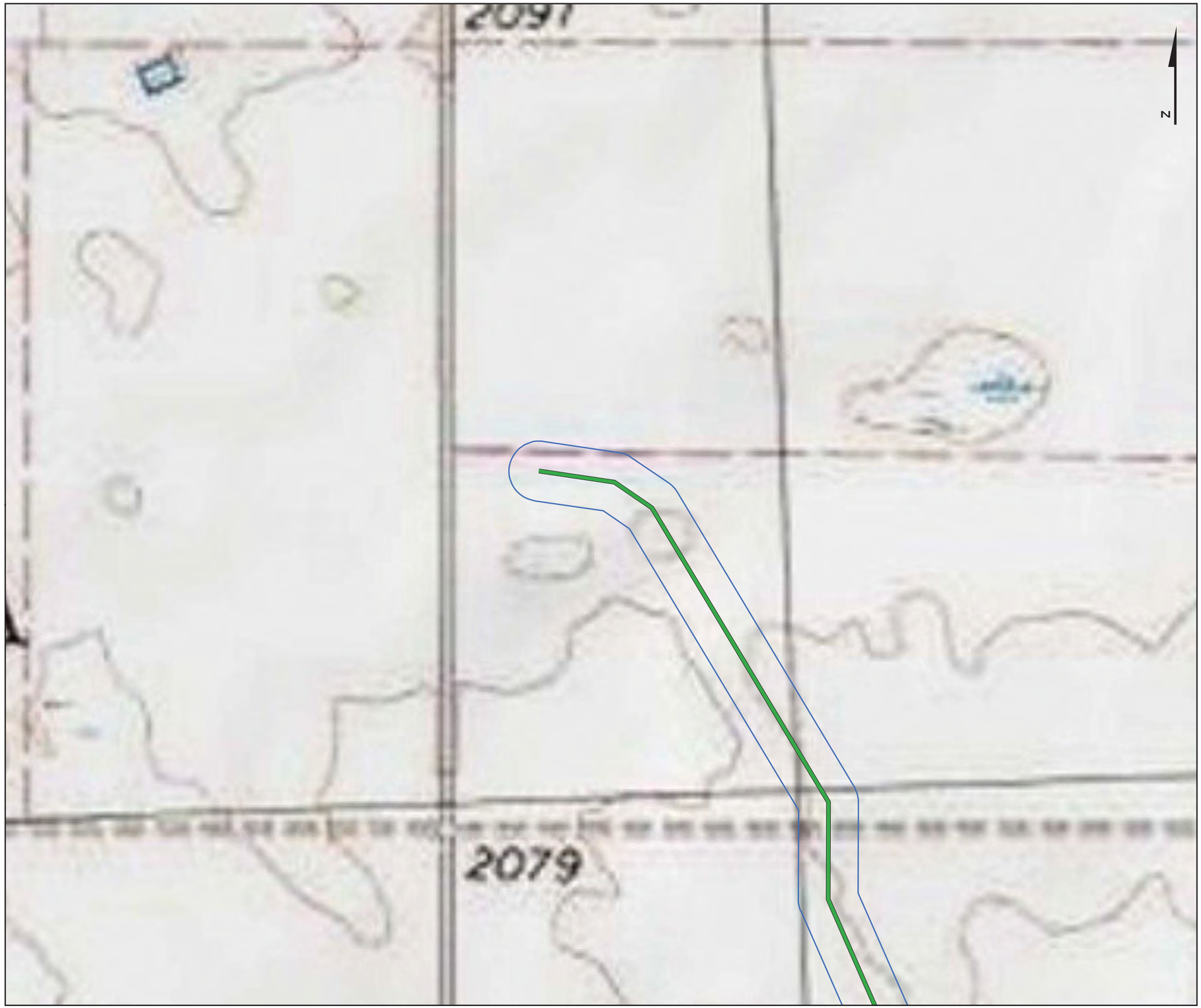
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

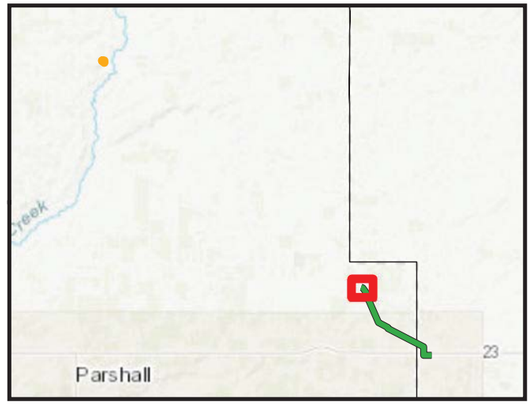
FIGURE 2-5
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GIS\Projects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

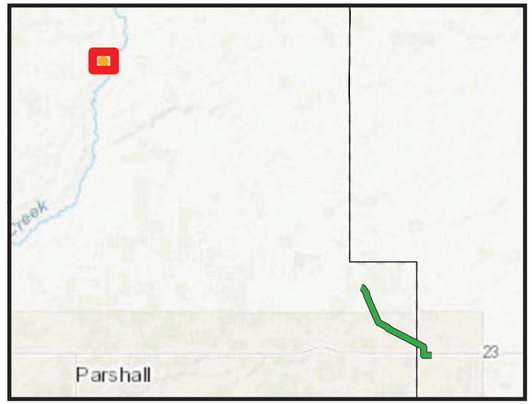
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-6
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd



Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

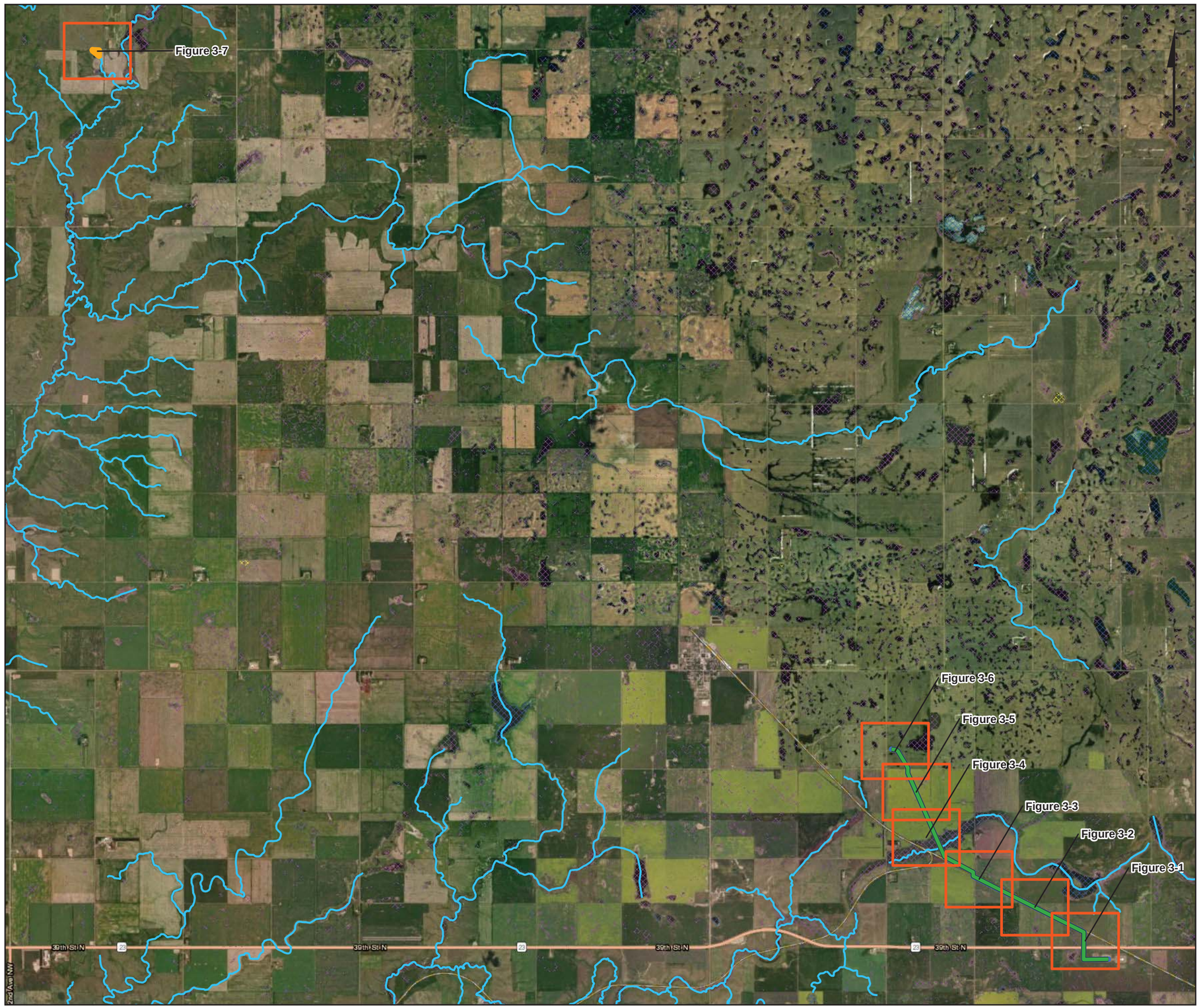
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

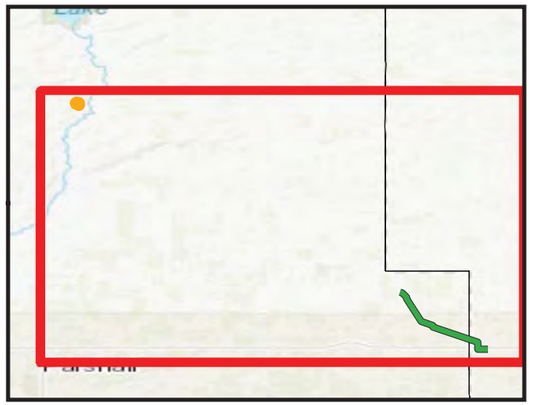
FIGURE 2-7
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- TB to Plaza Route - 3.80 miles, Proposed
- NHD Stream

NWI Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond/Lake/River
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

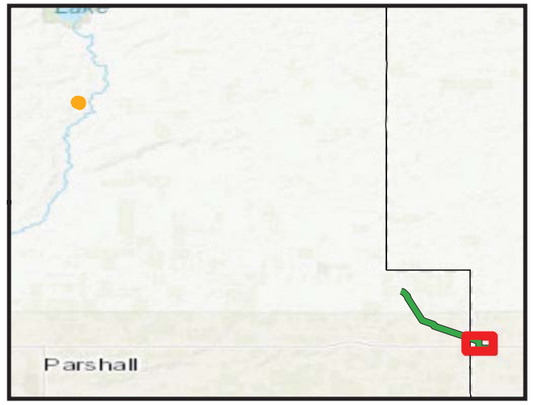
Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-0
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd



Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

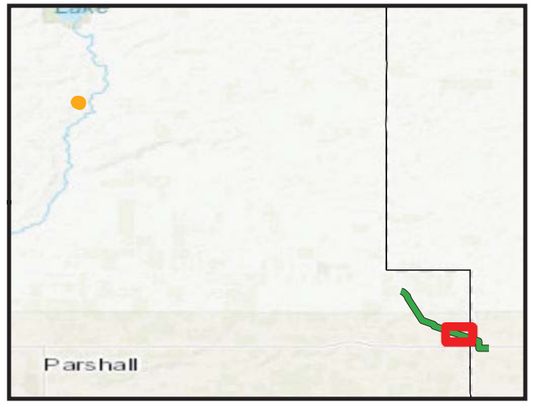
FIGURE 3-1
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd



Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-2
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: nvazquez
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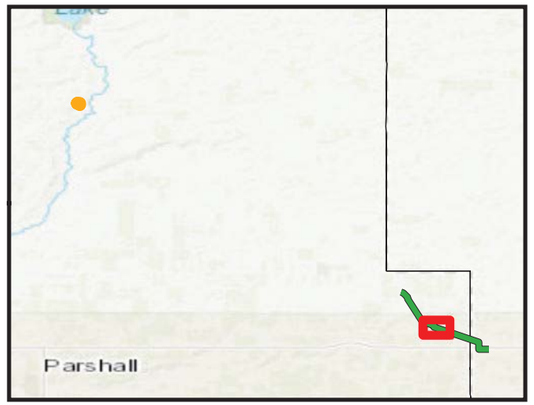


Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

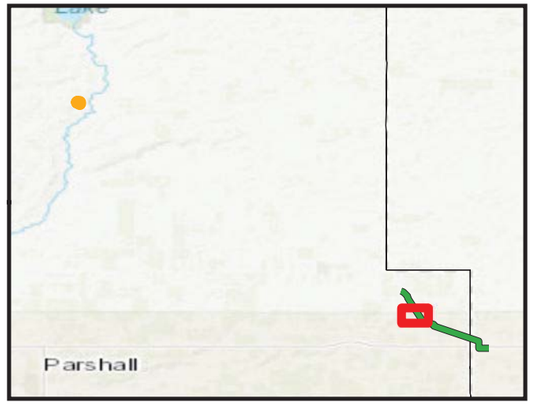
FIGURE 3-3
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd



Legend

TB to Plaza Route - 3.80 miles, Proposed

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-4
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

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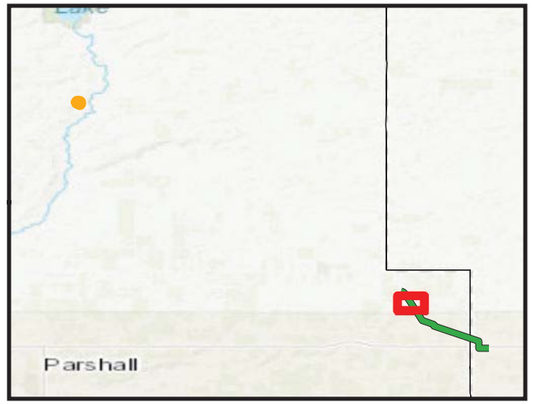

Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-5
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
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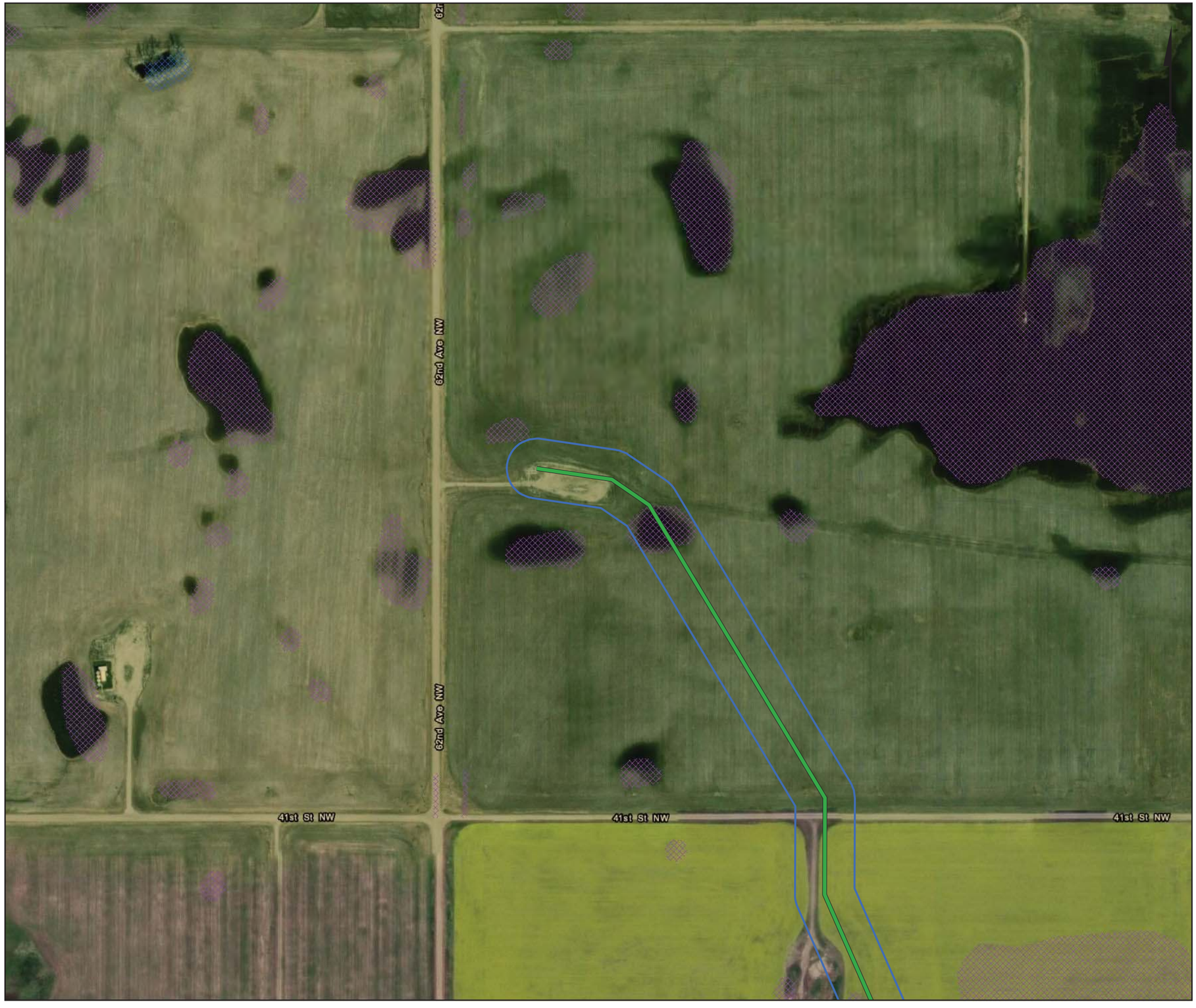
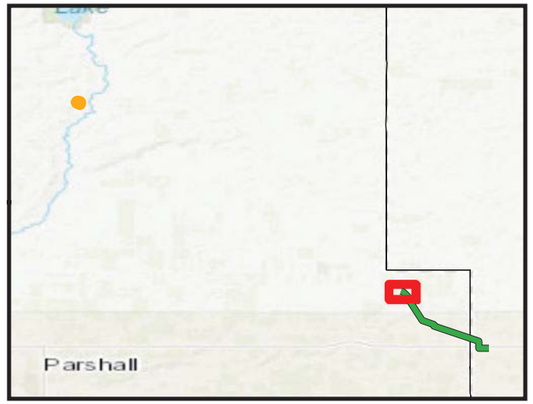




Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

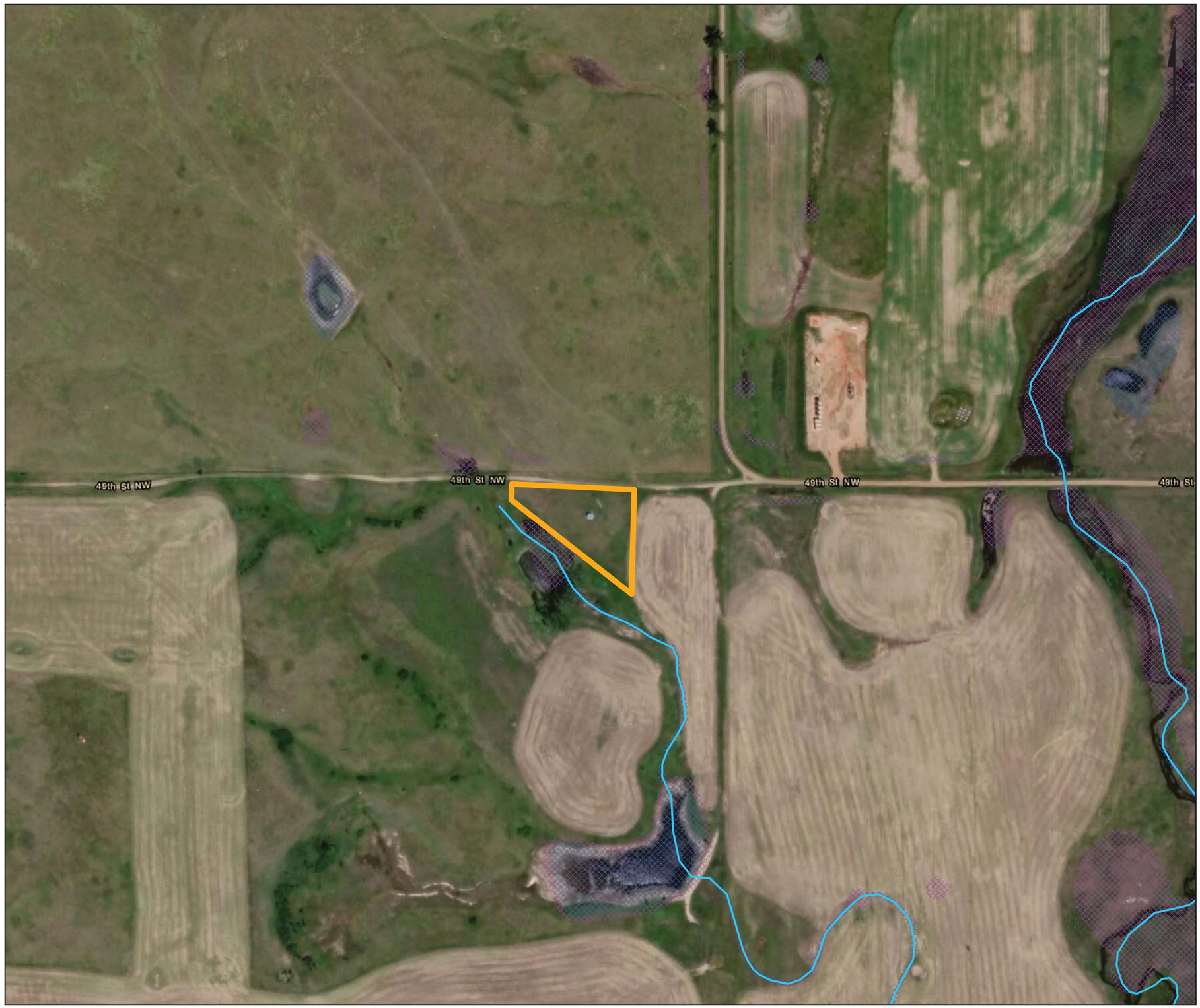
FIGURE 3-6
NWI, NHD, FEMA FLOODPLAIN MAP

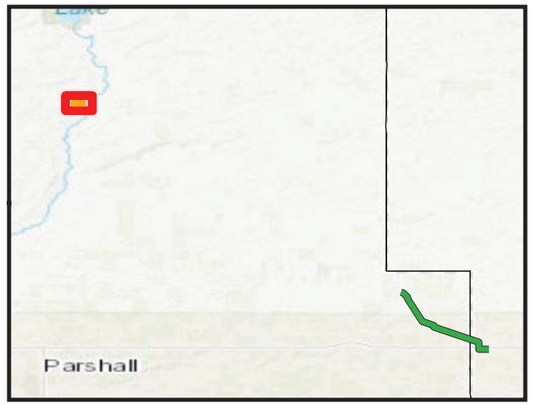
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Midline Pump Station Site #2 Boundary

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

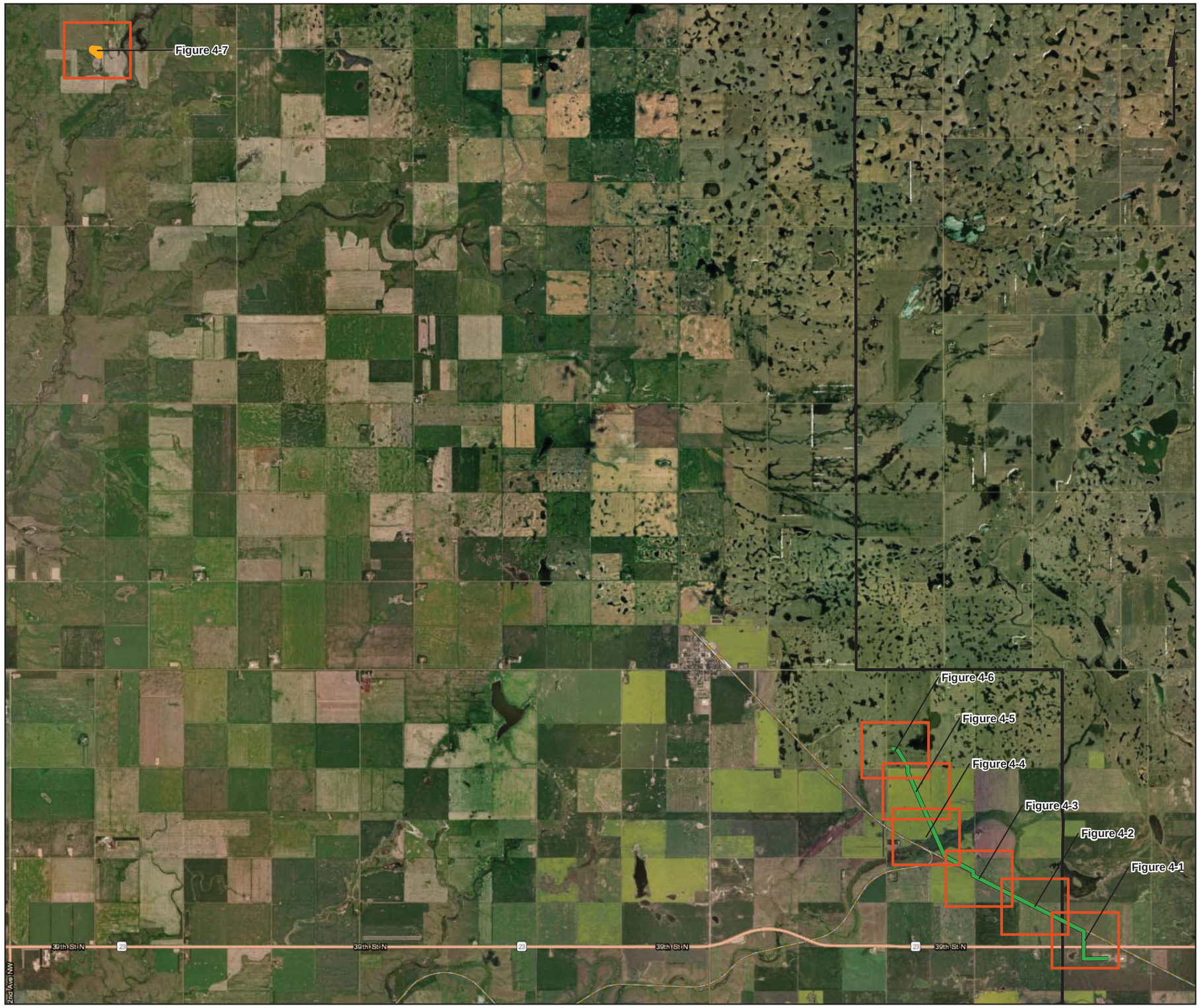
FIGURE 3-7
NWI, NHD, FEMA FLOODPLAIN MAP

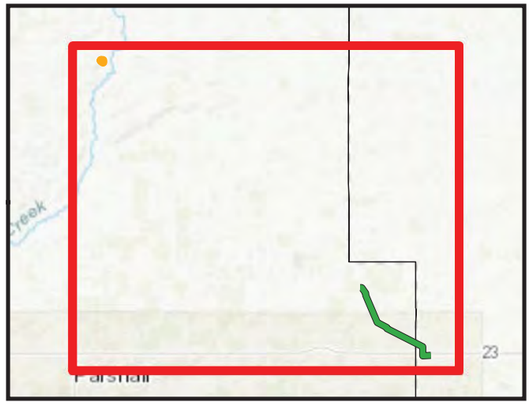
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GIS\Projects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

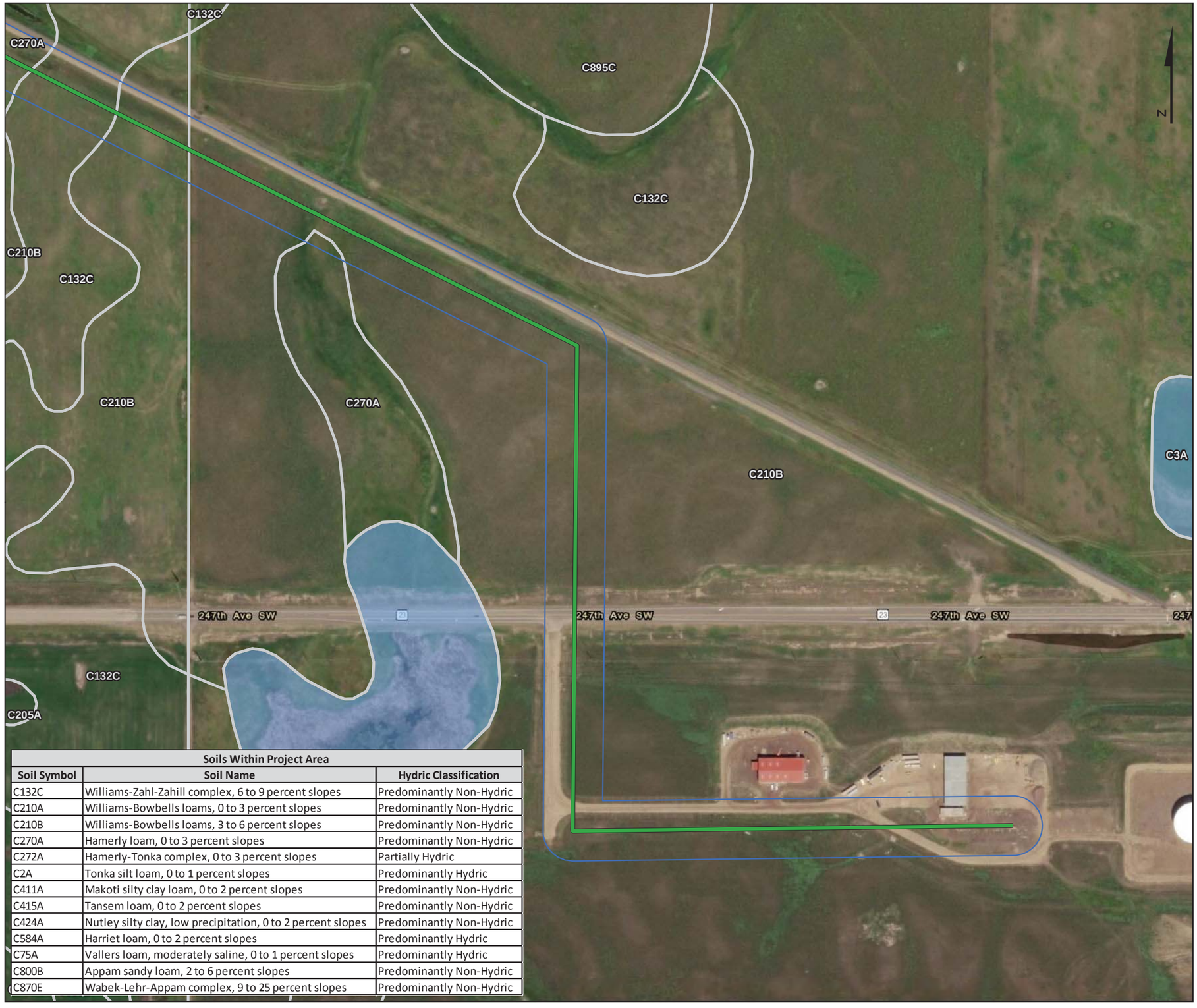
FIGURE 4-0
NRCS SOILS MAP

PN:CO002338.0001

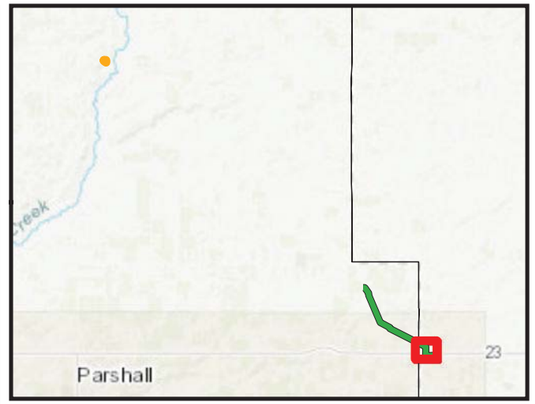
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd



Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-1
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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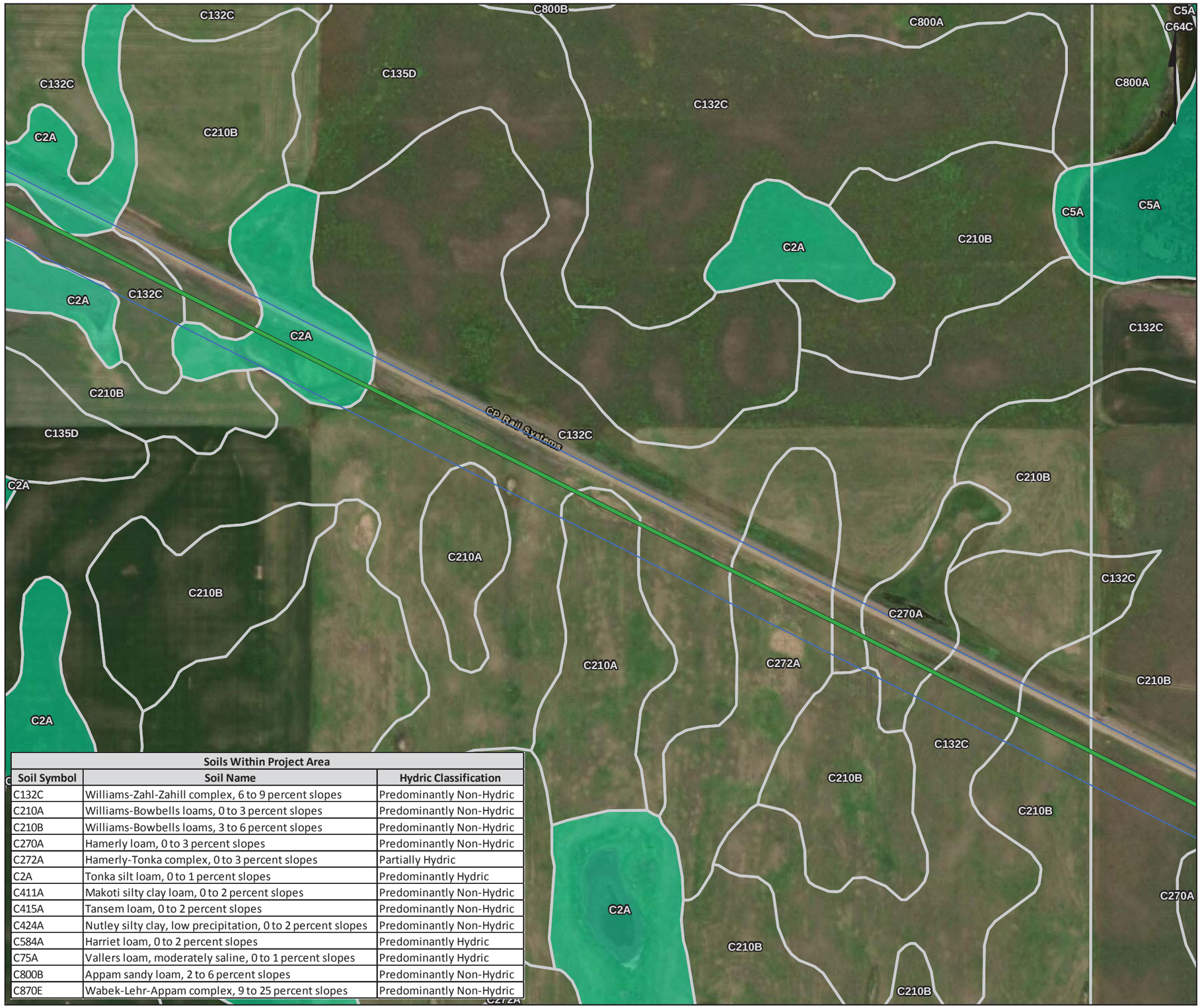
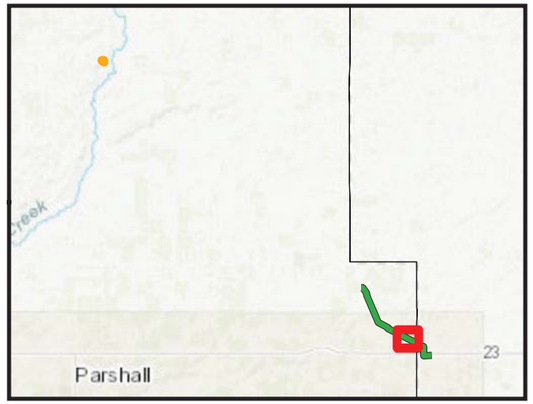
Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-2
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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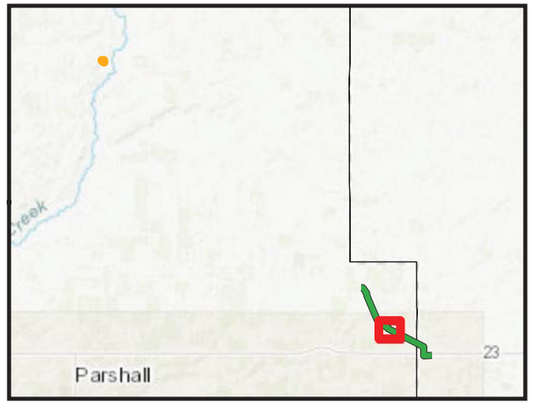
Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd



Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

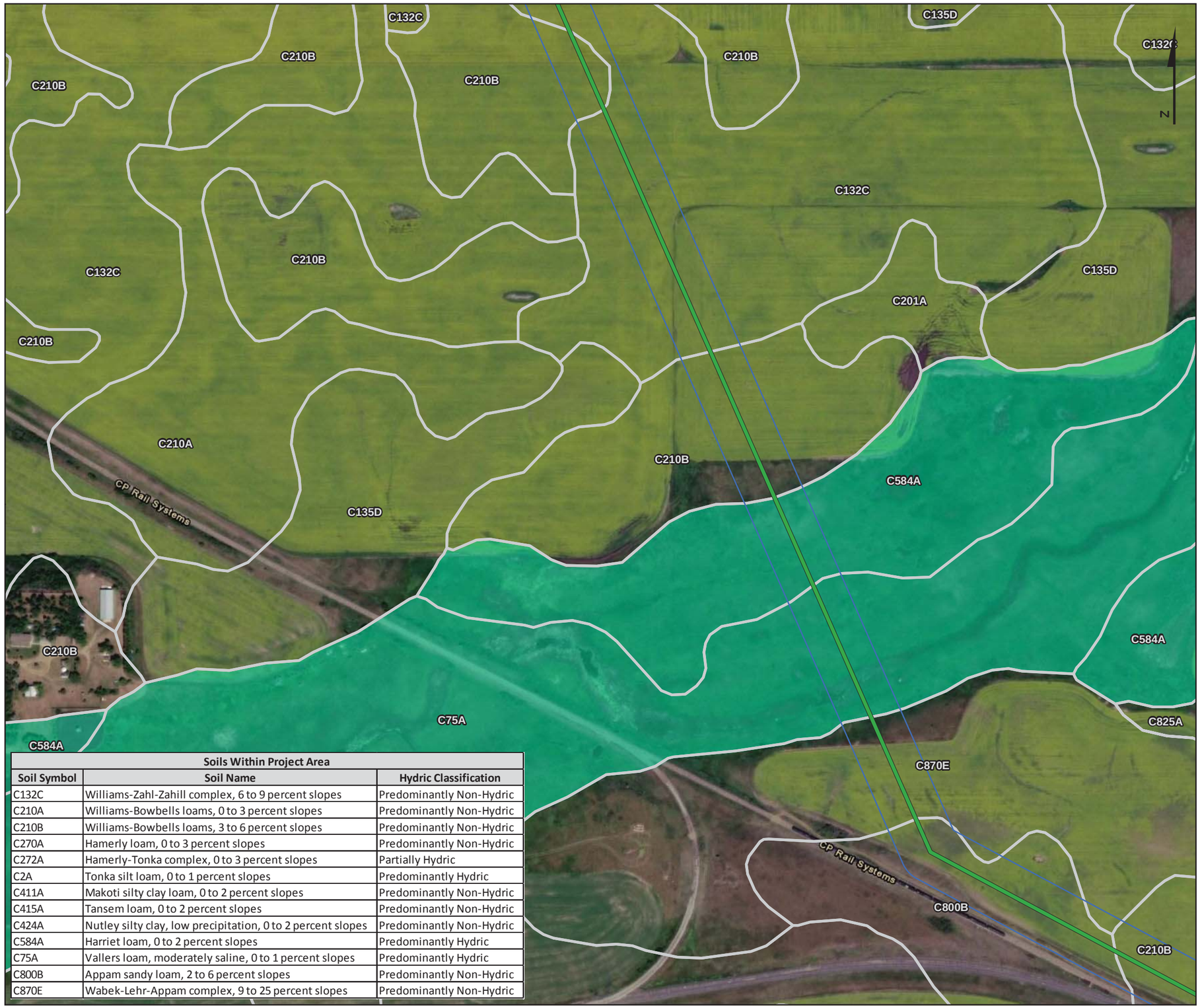
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

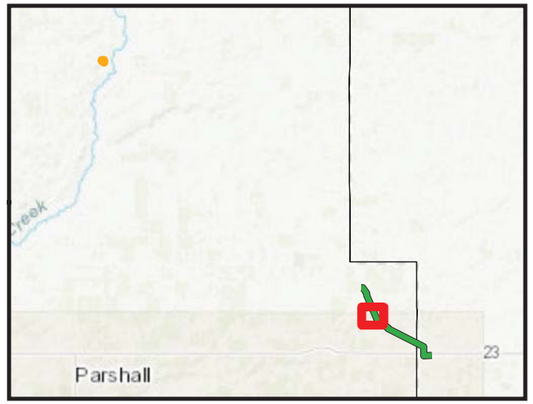
FIGURE 4-3
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

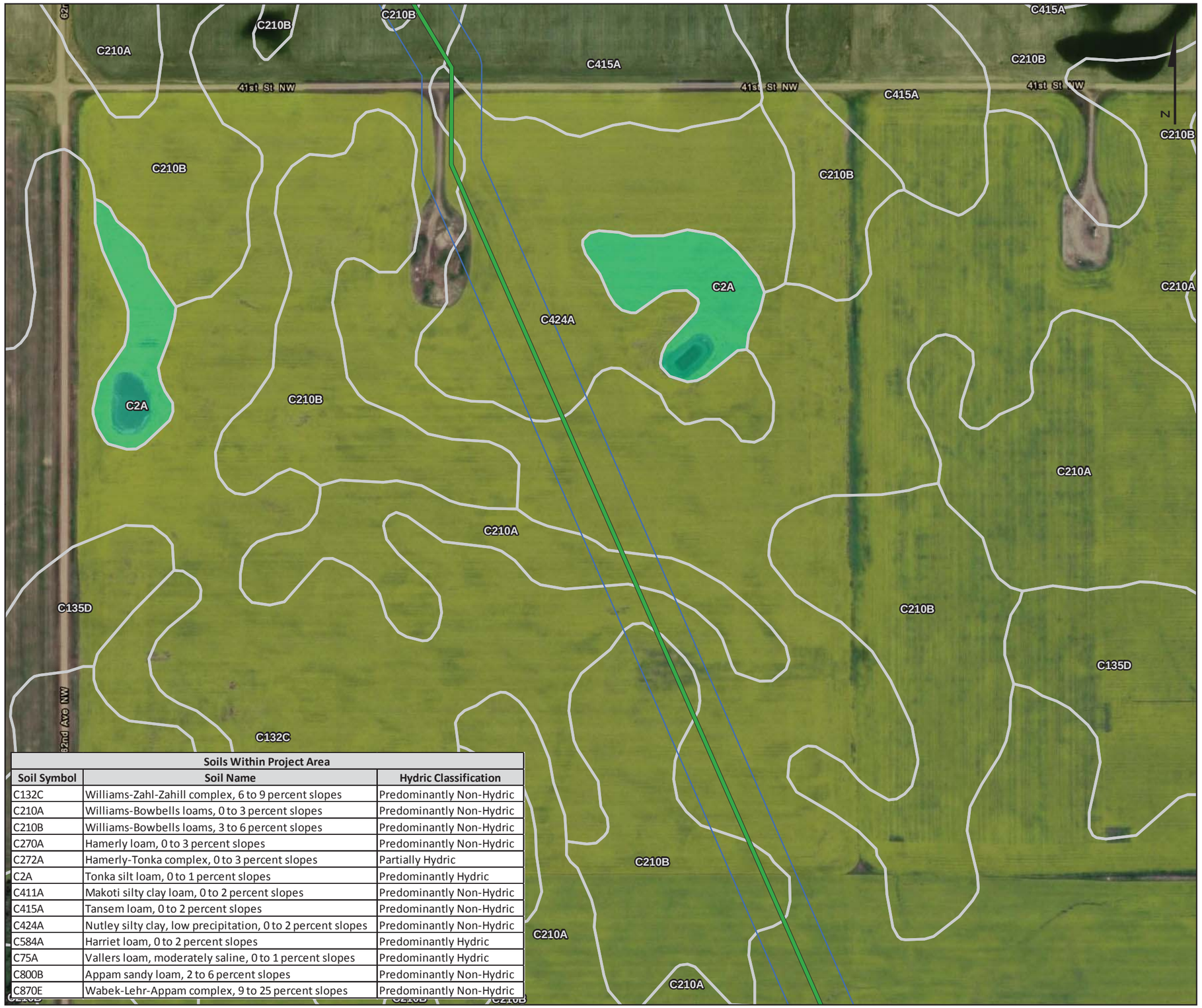
Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

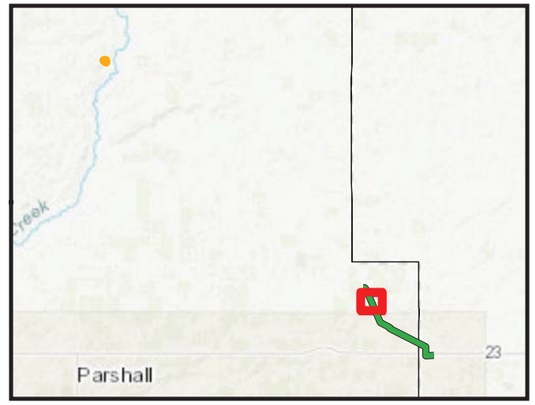
FIGURE 4-4
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-5
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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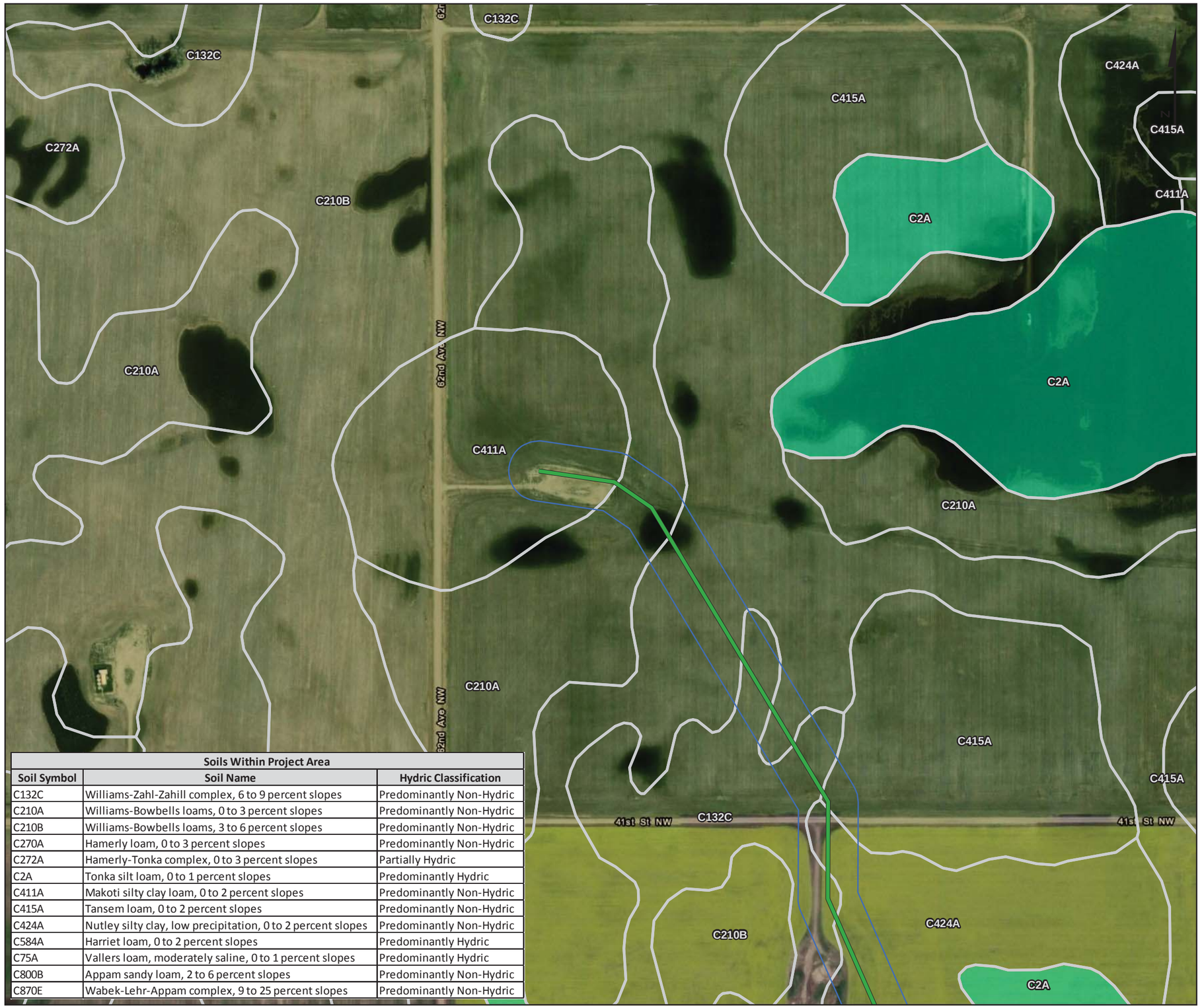
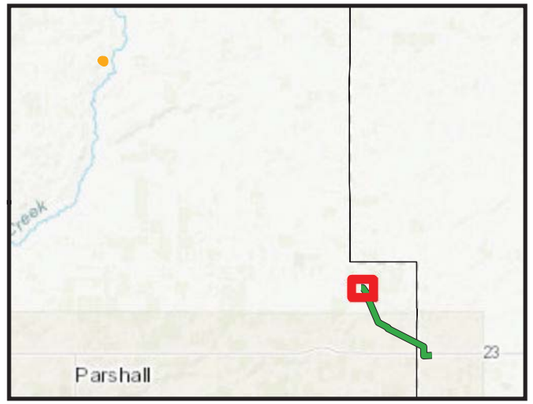
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-6
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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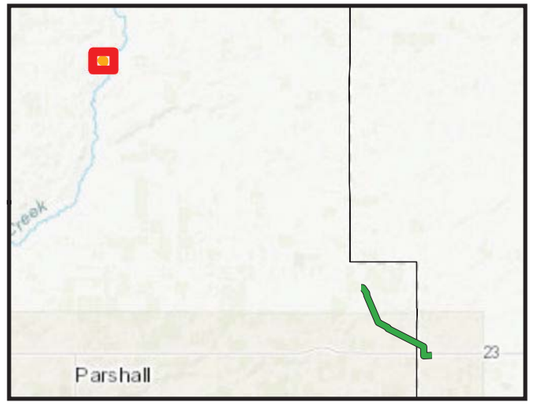
Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-7
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

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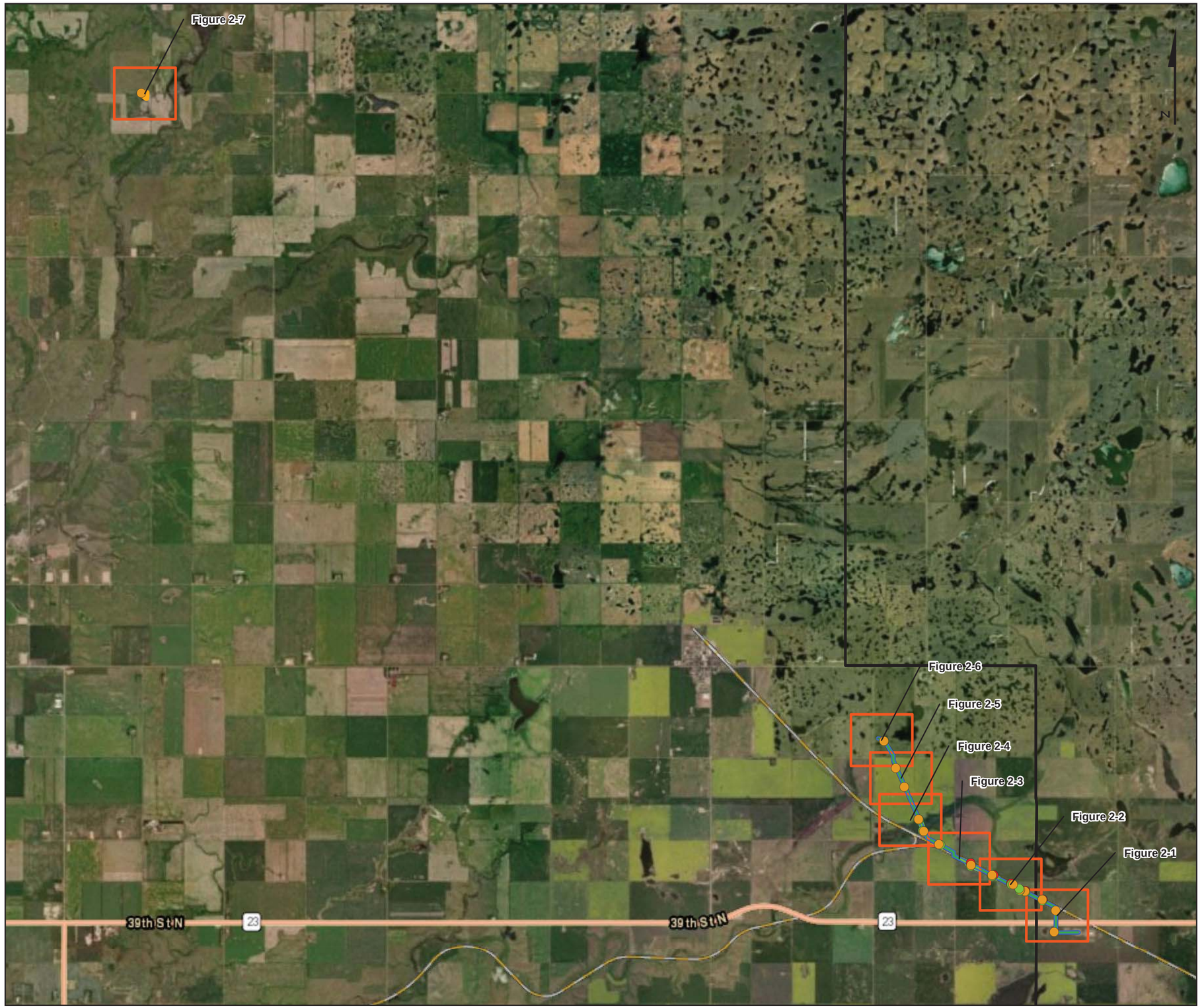

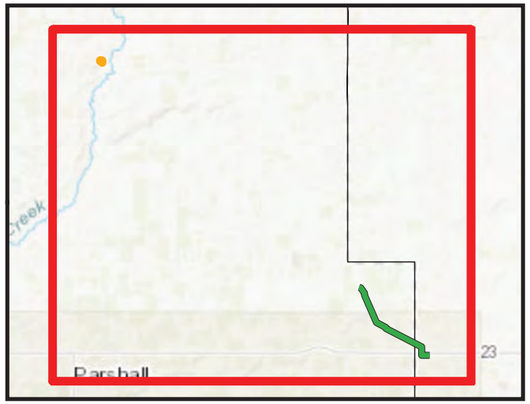

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-0
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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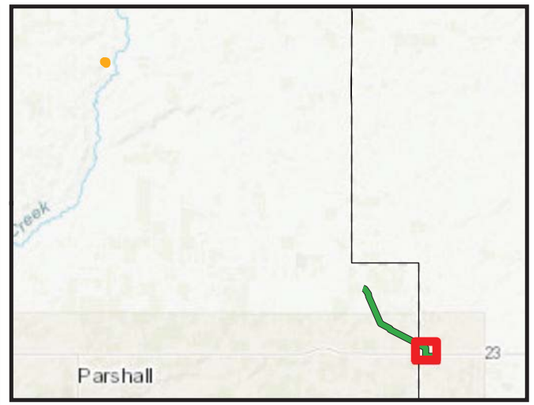

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-1
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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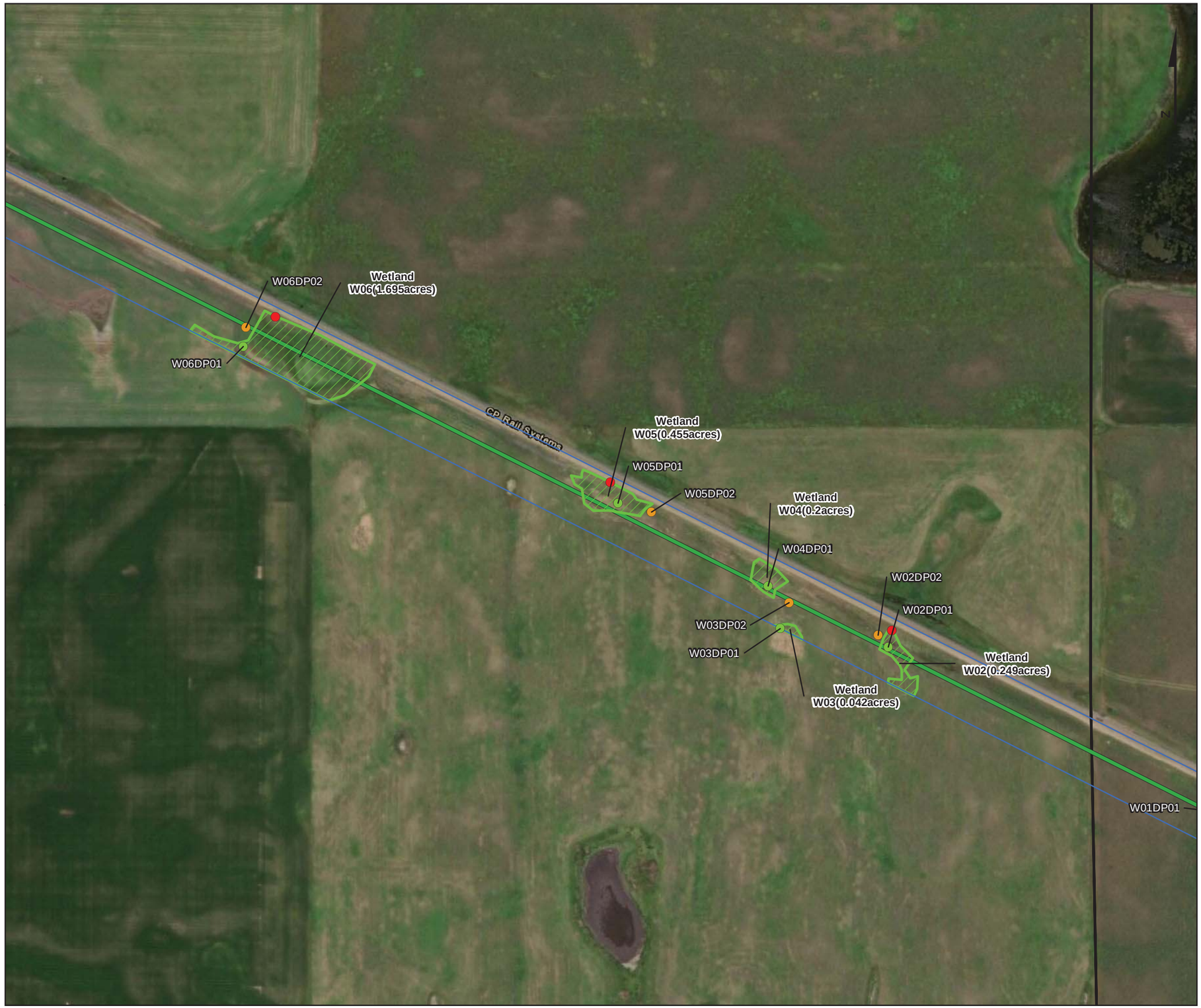

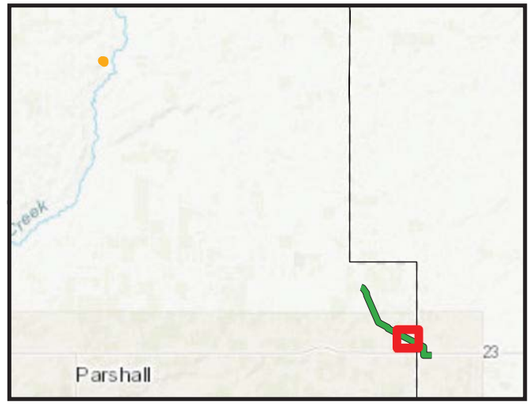

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-2
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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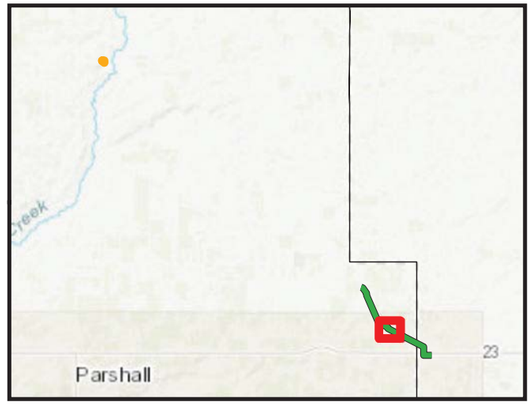

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-3
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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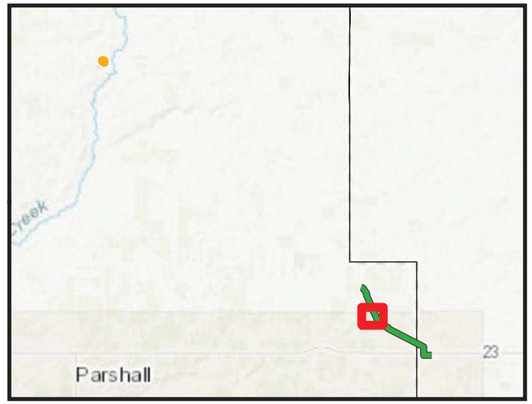

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-4
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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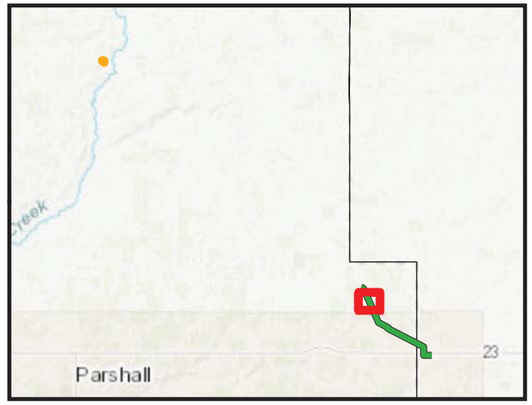

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-5
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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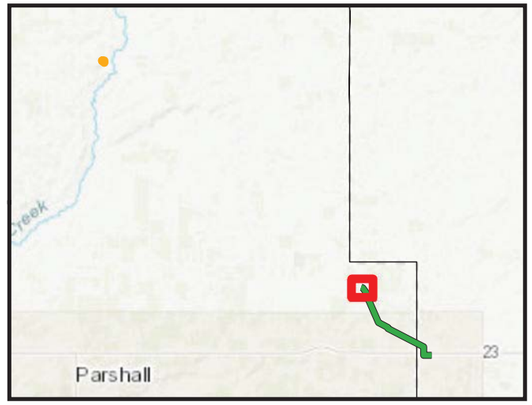

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-6
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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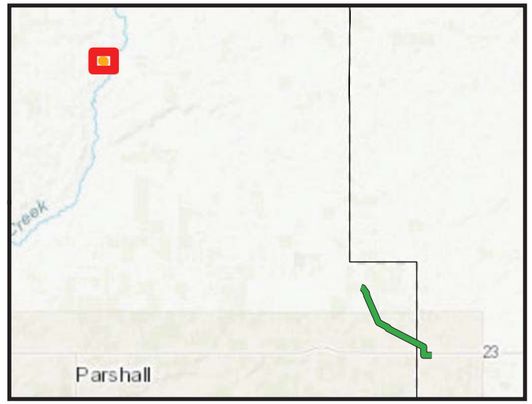

Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 5-7
DELINEATED WETLANDS AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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APPENDIX A

Antecedent Precipitation Tables

Antecedent Precipitation Data					
May 1, 2018 - July 31, 2018					
PLAZA (ND) USC00327120					
3rd Month Prior		**2nd Month Prior**		**1st Month Prior**	
Date	**PPT**	**Date**	**PPT**	**Date**	**PPT**
5/1/2018	0	6/1/2018	0	7/1/2018	0
5/2/2018	0	6/2/2018	1.25	7/2/2018	0
5/3/2018	0	6/3/2018	0	7/3/2018	0.45
5/4/2018	0	6/4/2018	0	7/4/2018	0
5/5/2018	0	6/5/2018	0	7/5/2018	0
5/6/2018	0	6/6/2018	0.4	7/6/2018	0
5/7/2018	0	6/7/2018	0	7/7/2018	0
5/8/2018	0	6/8/2018	0	7/8/2018	0
5/9/2018	0	6/9/2018	0	7/9/2018	0
5/10/2018	0	6/10/2018	1.06	7/10/2018	0.1
5/11/2018	0	6/11/2018	0	7/11/2018	0
5/12/2018	0	6/12/2018	0	7/12/2018	0
5/13/2018	0	6/13/2018	0	7/13/2018	0
5/14/2018	0	6/14/2018	1.35	7/14/2018	0
5/15/2018	0	6/15/2018	0	7/15/2018	0
5/16/2018	0	6/16/2018	0.68	7/16/2018	0
5/17/2018	0	6/17/2018	0	7/17/2018	0
5/18/2018	0	6/18/2018	0	7/18/2018	0
5/19/2018	0	6/19/2018	0	7/19/2018	0
5/20/2018	0	6/20/2018	0	7/20/2018	0
5/21/2018	0	6/21/2018	0	7/21/2018	0
5/22/2018	0	6/22/2018	0	7/22/2018	0
5/23/2018	0	6/23/2018	0	7/23/2018	0
5/24/2018	0.18	6/24/2018	0	7/24/2018	0
5/25/2018	0	6/25/2018	0.6	7/25/2018	0
5/26/2018	0	6/26/2018	0	7/26/2018	0
5/27/2018	0.5	6/27/2018	0	7/27/2018	0
5/28/2018	0	6/28/2018	M	7/28/2018	0
5/29/2018	0	6/29/2018	0.95	7/29/2018	0
5/30/2018	1.4	6/30/2018	0.15	7/30/2018	0
5/31/2018	0.1			7/31/2018	0
Total =	**2.18**	**Total =**	**6.44**	**Total =**	**0.55**

PPT - Precipitation in inches

T - Trace

WETS Analysis

Project Site: Makoti Pipeline
Period of interest: May 1, 2018 to July 31, 2018
County: Mountrail County, ND

Long-term rainfall records (from WETS table)

	Month	3 years in 10 less than	Normal	3 years in 10 greater than
1st month prior:	July	1.87	2.98	3.59
2nd month prior:	June	2.72	4.01	4.79
3rd month prior:	May	1.68	2.69	3.25
		Sum =	**9.68**	

Site determination

	Site Rainfall (in)	Condition Dry/Normal*/Wet	Condition** Value	Month Weight	Product
	0.55	Dry	1	3	3
	6.44	Wet	3	2	6
	2.18	Normal	2	1	2
Sum =	**9.17**			Sum*** =	**11**

*Normal precipitation with 30% to 70% probability of occurrence

Determination: Wet / Dry / X **Normal**

**Condition value:

Dry = 1
Normal = 2
Wet = 3

***If sum is:

6 to 9	then period has been drier than normal
10 to 14	then period has been normal
15 to 18	then period has been wetter than normal

Precipitation data source: PLAZA (ND) USC00327120

WETS Station: STANLEY 3 NNW, ND

Reference: Donald E. Woodward, ed. 1997. *Hydrology Tools for Wetland Determination* , Chapter 19. Engineering Field Handbook. U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, TX.

APPENDIX B

Representative Photographs

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 1

Date: 8/7/2018

Description:
Upland data point OBDP01 within a stormwater basin (facing south).

Location:
OBDP01

Photo: 2

Date: 8/7/2018

Description:
Upland data point OBDP02 (facing north).

Location:
OBDP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 3

Date: 8/7/2018

Description:
Wetland W1 and representative data point W01DP01 (facing west).

Location:
W01DP01

Photo: 4

Date: 8/7/2018

Description:
Upland data point W01DP02 (facing east).

Location:
W01DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 5

Date: 8/7/2018

Description:
Wetland W2 and representative wetland data point W02DP01. Facing west

Location:
W02DP01

Photo: 6

Date: 8/7/2018

Description:
Representative upland data point W02DP02 (facing West).

Location:
W02DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 7

Date: 8/7/2018

Description:
Wetland W3 and representative data point W03DP01 (facing west).

Location:
W03DP01

Photo: 8

Date: 8/7/2018

Description:
Upland data point W03DO02, representative upland data point for wetlands W3 and W4 (facing west).

Location:
W03DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 9

Date: 8/7/2018

Description:
Wetland W4 and representative wetland data point W04DP01 (facing south)

Location:
W04DP01

Photo: 10

Date: 8/7/2018

Description:
Wetland W5 and representative wetland data point W05DP01 (facing west).

Location:
W05DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 11

Date: 8/7/2018

Description:
Representative upland data point W05DP02 (facing east).

Location:
W05DP02

Photo: 12

Date: 8/7/2018

Description:
Wetland W6 and representative wetland data point W06DP01 (facing east).

Location:
W06DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 13

Date: 8/7/2018

Description:
Upland data point W06DP02 (Facing north).

Location:
W06DP02

Photo: 14

Date: 8/7/2018

Description:
Wetland W7 and representative wetland data point W07DP01 (facing east)

Location:
W07DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 15

Date: 8/7/2018

Description:
Upland data point W07DP02 (facing north).

Location:
W07DP02

Photo: 16

Date: 8/7/2018

Description:
Wetland W8 and representative wetland data point W08DP01 (facing north).

Location:
W08DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 17

Date: 8/7/2018

Description:
Upland data point W08DP02 (facing north).

Location:
W08DP02

Photo: 18

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP01 (facing north)

Location:
W09DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 19

Date: 8/7/2018

Description:
Upland data point W09DP02 (facing south).

Location:
W09DP02

Photo: 20

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP03 (facing south).

Location:
W09DP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 21

Date: 8/7/2018

Description:
Upland data point W09DP04 (facing north).

Location:
W09DP04

Photo: 22

Date: 8/7/2018

Description:
Upland data point OBDP03 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 23

Date: 8/7/2018

Description:
Upland data point OBDP04 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP04

Photo: 24

Date: 8/7/2018

Description:
Upland data point OBDP05 (facing south).

Location:
OBDP05

APPENDIX C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.97605219 | Long: -101.8668214 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point located in a constructed stormwater basin that is actively mowed. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	60	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3 *Melilotus officinalis*	15	N	FACU
4			
5			
6			
7			
8			
9			
10			
	105 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column totals	105 (A)		420 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The data point located within a stormwater basin that is actively mowed. Representative vegetation was recorded at a reference location approximately 180 feet north of the data point. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/2	100					Silt Loam	
5-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 47.97982993 | Long: -101.8663736 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Elymus repens*	10	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/2	100					Silt Loam	
4-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98159258 | Long: -101.8699723 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: PEM1Cd

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W01

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	3	N	UPL
3 *Sonchus asper*	3	N	FAC
4 *Cirsium arvense*	3	N	FACU
5			
6			
7			
8			
9			
10			
	109	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	3	x 3 =	9	
FACU species	3	x 4 =	12	
UPL species	3	x 5 =	15	
Column totals	109	(A)	236	(B)

Prevalence Index = B/A = 2.17

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W01DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 5-Mar

Subregion (LRR): F | Lat: 47.98171766 | Long: -101.8699476 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?			
Hydric soil present?		**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	40	Y	FAC
3 *Cirsium arvense*	25	Y	FACU
4 *Bromus inermis*	10	N	UPL
5 *Sonchus oleraceus*	5	N	UPL
6			
7			
8			
9			
10			
	120 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	40	x 3 =	120	
FACU species	65	x 4 =	260	
UPL species	15	x 5 =	75	
Column totals	120	(A)	455	(B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W01DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98310165 | Long: -101.8744484 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: PEM1Cx, PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W02

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Hordeum jubatum*	90	Y	FACW
2 *Melilotus officinalis*	5	N	FACU
3 *Sonchus asper*	5	N	FAC
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	90	x 2 =	180	
FAC species	5	x 3 =	15	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column totals	100	(A)	215	(B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W02DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	97	10YR 4/4	3	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%):

Subregion (LRR): F | Lat: 47.98320827 | Long: -101.8745875 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Elymus repens*	80	Y	FACU
2 *Melilotus officinalis*	25	N	FACU
3 *Bromus inermis*	10	N	UPL
4 *Cirsium arvense*	10	N	FACU
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	135	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	115	x 4 =	460	
UPL species	20	x 5 =	100	
Column totals	135	(A)	560	(B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W02DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-17	10YR 2/1	100					Silt Loam	
17-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98326846 | Long: -101.8759252 | Datum: WGS 84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W03

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Typha angustifolia*	10	N	OBL
3 *Scirpus cyperinus*	3	N	OBL
4			
5			
6			
7			
8			
9			
10			
	113	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	13	x 1 =	13	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	113	(A)	213	(B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W03DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-12	120YR 2/1	98	10YR 4/6	2	C	M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): Convex | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98350686 | Long: -101.8758045 | Datum: WGS84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland. The data point is the representative upland data point for wetlands W03 and W04.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Melilotus officinalis*	60	Y	FACU
2 *Elymus repens*	30	Y	FACU
3 *Cirsium arvense*	20	N	FACU
4 *Hordeum jubatum*	5	N	FACW
5			
6			
7			
8			
9			
10			
	115	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	5	x 2 =	10	
FAC species	0	x 3 =	0	
FACU species	110	x 4 =	440	
UPL species	0	x 5 =	0	
Column totals	115	(A)	450	(B)

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W03DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W04DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98365946 | Long: -101.8760945 | Datum:

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W04

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2			
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W04DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	85	10YR 4/6	15	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes ___	No X	Depth (inches): ___		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___		

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98441539 | Long: -101.8781437 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W05

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	5	N	UPL
3 *Melilotus officinalis*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column totals	110 (A)		245 (B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W05DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/1	100					Silt Loam	
5-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 4-Feb

Subregion (LRR): F | Lat: 47.98433642 | Long: -101.8776857 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	30	Y	FAC
3 *Bromus inermis*	30	Y	UPL
4 *Melilotus officinalis*	20	N	FACU
5 *Cirsium arvense*	10	N	FACU
6			
7			
8			
9			
10			
	130	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	30	x 3 =	90	
FACU species	70	x 4 =	280	
UPL species	30	x 5 =	150	
Column totals	130	(A)	520	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W05DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-15	10YR 2/1	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98585047 | Long: -101.8832666 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W06

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	60	Y	FAC
2 *Typha angustifolia*	30	Y	OBL
3 *Alisma subcordatum*	20	N	OBL
4 *Schoenoplectus tabernaemontani*	10	N	OBL
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	130	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	60	x 1 =	60	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	0	x 4 =	0	
UPL species	10	x 5 =	50	
Column totals	130	(A)	290	(B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W06DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-12	10YR 2/1	98	10YR 4/4	2	C	PL/M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:
The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.98602342 | Long: -101.8832301 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Sonchus oleraceus*	80	Y	UPL
2 *Medicago sativa*	30	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	110	x 5 =	550	
Column totals	110	(A)	550	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W06DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-16	10YR 2/2	100					Silt Loam	
16-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98765022 | Long: -101.8889406 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes), Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A, PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W07

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	60	Y	OBL
2 *Hordeum jubatum*	20	Y	FACW
3 *Helianthus grosseserratus*	10	N	FACW
4 *Juncus effusus*	10	N	OBL
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	70	x 1 =	70	
FACW species	30	x 2 =	60	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	130	(B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W07DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-3	10YR 2/1	100					Silt Loam	
3-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.98780184 | Long: -101.8887884 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A reference location was utilized for determining unmanged vegetation condition. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	75	Y	FACU
2 *Sonchus oleraceus*	25	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	25	x 5 =	125
Column totals	100 (A)		425 (B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A refernce location approximately 100 feet north was utilized to determine unmanaged condition of vegetation.

SOIL

Sampling Point: W07DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP01

Investigator(s): Stephen W. Chu. PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99142408 | Long: -101.8968711 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W08

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	25	Y	FAC
2			
3			
4			
5			
6			
7			
8			
9			
10			
	25	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	25 (A)		75 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Unvegetated concave surface.The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W08DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/4	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99149797 | Long: -101.8973578 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location was utilized to determine the unmanged condition of vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	95	Y	UPL
2 *Sonchus oleraceus*	15	N	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	110	x 5 =	550
Column totals	110 (A)		550 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location, approximately 60 feet south of the data point, was utilized to determine the unmanged condition of vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W08DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99392793 | Long: -101.9016233 | Datum:

Soil Map Unit Name: Vallers loam, moderately saline (0 to 1 percent slope) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	50	Y	OBL
2 *Phalaris arundinacea*	40	Y	FACW
3 *Cirsium arvense*	20	N	FACU
4 *Schoenoplectus tabernaemontani*	5	N	OBL
5 *Heracleum maximum*	5	N	FAC
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	55	x 1 =	55	
FACW species	40	x 2 =	80	
FAC species	5	x 3 =	15	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column totals	120	(A)	230	(B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W09DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches):		
Water table present?	Yes ___	No X	Depth (inches):		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches):		

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99377312 | Long: -101.9013401 | Datum: WGS84

Soil Map Unit Name: Wabek-Lehr-Appam complex(9 to 25 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	75	Y	UPL
2 *Cirsium arvense*	25	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	25	x 4 =	100	
UPL species	75	x 5 =	375	
Column totals	100	(A)	475	(B)

Prevalence Index = B/A = 4.75

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-15	10YR 2/2	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concane | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.99578757 | Long: -101.9025466 | Datum: WGS84

Soil Map Unit Name: Harriet loam (0 to 2 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Spartina pectinata*	80	Y	FACW
2 *Hordeum jubatum*	25	Y	FACW
3 *Sonchus oleraceus*	5	N	UPL
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column totals	110 (A)		235 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-2	10YR 2/1	100					Silt Loam	
2-20	10YR 2/1	98	10YR 4/4	2	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.99596295 | Long: -101.9027162 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Cirsium arvense*	90	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column totals	120 (A)		480 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-9	10YR 2/1	100					Silt Loam	
9-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.001867° | Long: -101.906264° | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	60	Y	UPL
2 *Elymus repens*	40	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	60	x 5 =	300
Column totals	100 (A)		460 (B)

Prevalence Index = B/A = 4.60

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.005308° | Long: -101.908983° | Datum: WGS84

Soil Map Unit Name: Minot silty clay, 0 to 2 percent slopes | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	70	Y	UPL
2 *Elymus repens*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	30	x 4 =	120
UPL species	70	x 5 =	350
Column totals	100 (A)		470 (B)

Prevalence Index = B/A = 4.70

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 48.0097522 | Long: -101.9117429 | Datum:

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?		If yes, optional wetland site ID:	W10

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (*Glycine max*) rotation. Based on the presence of all three parameters, this area is a wetland. The subject wetland is a farmed wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	70	Y	FAC
2 *Hordeum jubatum*	25	Y	FACW
3			
4			
5			
6			
7			
8			
9			
10			
	95 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	25	x 2 =	50	
FAC species	70	x 3 =	210	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	95	(A)	260	(B)

Prevalence Index = B/A = 2.74

Hydrophytic Vegetation Indicators:

- Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)
The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W10DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): F | Lat: 48.00984974 | Long: -101.9118519 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location was utilized to determine the unmanaged condition of the vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Taraxacum officinale*	5	N	FACU
3 *Setaria pumila*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location, approximately 50 feet northwest of the data point, was utilized to determine the unmanaged condition of the vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W10DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-10	10YR 2/1	100					Silt Loam	
10-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP05

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T154N, R89W, Section 34

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Convex | Slope (%): 3-Jan

Subregion (LRR): F | Lat: 48.124224° | Long: -102.108232° | Datum: WGS84

Soil Map Unit Name: Zahl-Max-Arnegard loams, 15 to 60 percent slopes | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Poa pratensis*	20	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	110 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	90	x 5 =	450
Column totals	110 (A)		530 (B)

Prevalence Index = B/A = 4.82

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-14	10YR 2/2	100					Silt Loam	
14-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None

Depth (inches):

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes		No	X	Depth (inches):	
Water table present?	Yes		No	X	Depth (inches):	
Saturation present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

Arcadis U.S., Inc.

126 North Jefferson Street

Suite 400

Milwaukee, Wisconsin 53202

Tel 414 276 7742

Fax 414 276 7603

www.arcadis.com

Thunder Butte Pipeline, LLC

Aquatic Resource Delineation Report

Thunder Butte Pipeline Project
Mountrail County, North Dakota

August 2024

Aquatic Resource Delineation Report

Thunder Butte Pipeline Project, Mountrail County, North Dakota

August 26, 2024

Prepared By:
Arcadis U.S., Inc.
225 W. Wacker Drive, Suite 2015
Chicago, Illinois 60606

Prepared For:
Mr. Jake Richardson
Managing Partner, Project Execution
Gap Midstream, LLC
jake@gapmidstream.com

Our Ref:
30189594

Christian Kammel
Environmental Scientist

Katie Mageland, WPIT
Wetland Biologist

Stephen W. Chu, SPWS
Principal Ecologist

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Figures

Appendices

Acronyms and Abbreviations

AGOL	ArcGIS Online
AJD	Approved Jurisdictional Determination
APT	Antecedent Precipitation Tool
Arcadis	Arcadis U.S., Inc.
CWA	Clean Water Act
Enbridge Storage Facility	Enbridge Stanley Pump Station and Terminal
EPND	Enbridge Pipelines North Dakota
FBIR	Fort Berthold, Indian Reservation
FEMA	Federal Emergency Management Agency
Existing Gathering Pipeline	existing 30.8-mile-long collector/gathering pipeline to a transmission pipeline
Gap	Gap Midstream, LLC
GPS	Global Positioning System
HUC	Hydrologic Unit Code
ID	Identification
MHA Nation	Mandan, Hidatsa, and Arikara Nation
New Pipeline	new 3.84-mile-long underground pipeline
NHD	National Hydrography Dataset
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OHWM	Ordinary High-Water Mark
PABF	Palustrine Aquatic Bed
PEM	Palustrine Emergent Wetland
PF	Palustrine Farmed
PPT	Parts Per Thousand
Project	Thunder Butte Pipeline Project
R	Riverine
Study Area	the aboveground 2-acre midline pump station and existing gathering pipeline portion of the Project
TAT	Three Affiliated Tribes

TBPL	Thunder Butte Pipeline, LLC
TBPS	Thunder Butte Petroleum Services, Inc.
TBPS Facility	TBPS Crude Storage and Loading Facility
TNW	Traditionally Navigable Water
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the United States
2018 Delineation	WETLAND AND WATERBODY REPORT Thunder Butte Pipeline Project, Mountrail and Ward Counties, North Dakota
2023 Rule	Revised Definition of Waters of the United States

1 Introduction

This Aquatic Resource Delineation Report summarizes the results of a wetland and waters delineation survey conducted on August 5-8, 2024, by Arcadis U.S., Inc. (Arcadis) at the request of Thunder Butte Pipeline, LLC (TBPL) for the Thunder Butte Pipeline Project (Project). The Study Area for the Project is approximately 187-acres and includes 92 parcels located in Mountrail County, North Dakota (**Figure 1-1**). The Study Areas is further classified into 20 Arcadis Segments (segments; A1 – A20), which contain multiple parcels across the Study Area (**Figures 1-2** through **1-6**).

1.1 Background

TBPL proposes the Project to transport crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), approximately 2.6 miles northwest of Makoti, North Dakota, to the existing Enbridge Stanley Pump Station and Terminal (Enbridge Storage Facility) in Stanley, North Dakota. The Project is a joint venture between Gap Midstream, LLC (Gap) and the Mandan, Hidatsa, and Arikara Nation (MHA Nation) doing business as TBPL. The MHA Nation/Three Affiliated Tribes (TAT) owns the TBPS Facility, and Enbridge Pipelines North Dakota (EPND) owns the Enbridge Storage Facility. The overall Project consists of two primary components:

- Construction of a new 3.84-mile-long underground pipeline (new pipeline), and
- Conversion of an existing 30.8-mile-long collector/gathering pipeline to a transmission pipeline (existing gathering pipeline) and an aboveground 2-acre midline pump station.

The new pipeline will commence at the TBPS Facility and terminate at the interconnection with the existing gathering pipeline in Section 2, T152N, R88W. The existing gathering pipeline was previously owned by EPND (Line 82-111). From the interconnection point with the existing gathering pipeline approximately 2.1 miles southeast of Plaza, North Dakota, the existing gathering pipeline will transport crude oil to the Enbridge Facility. All but the southern 3.84 miles of the Project is an existing gathering pipeline.

The new pipeline portion of the Project was previously delineated by Arcadis in 2018 (Arcadis 2018), as presented in the wetland and waterbody delineation entitled “WETLAND AND WATERBODY REPORT Thunder Butte Pipeline Project, Mountrail and Ward Counties, North Dakota (2018 delineation).” The Waters of the United States (WOTUS) from the 2018 delineation were confirmed by the United States Army Corps of Engineers (USACE) under an Approved Jurisdictional Determination (AJD; NOW-2018-01825-BIS), dated April 22, 2024 (USACE 2024a). The 2018 delineation report and AJD are provided **Appendix E**.

The purpose of the wetland and waters delineation survey was to assess the presence or absence of wetlands and other waters only within Study Area (the aboveground 2-acre midline pump station and existing gathering pipeline portion of the Project) that may be affected by proposed activities and to evaluate general ecological conditions within the Study Area.

2 Location

The Study Area consists of the existing gathering pipeline project corridor (30.8-mile-long with a 50-foot-wide corridor) and an aboveground 2-acre midline pump station. The northernmost portion of the Study Area is located at latitude 48.303936° and longitude -102.373165° (Arcadis Segment A1) to the east of Route 8 in Stanely, North Dakota. From the northern-most portion of the Study Area, the existing pipeline generally extends down to the southeast, traversing multiple municipalities including, Stanely, Palermo, and Plaza. The southernmost portion of the Study Area is located at latitude 48.010298° and longitude -101.914650° (Arcadis Segment A20) to the east of 67th Avenue Northwest) in Plaza, North Dakota. The aboveground 2-acre midline pump station is located at latitude 48.108837° and longitude -102.073277° (Arcadis Segment A14), directly east of 67th Avenue Northwest in Plaza, North Dakota.

The Study Area is characterized by a rural landscape with gently sloping hills, open fields, and actively farmed cropland; streams and other waters, including prairie pothole wetlands and linear wetland drainages, are common features observed throughout the Study Area. Multiple roads and residential parcels also intersect the Study Area. The proposed Study Area consists of 92 parcels totaling approximately187-acres in size.

The Study Area includes the following segments, parcels, sections, townships, ranges, and acreages listed in **Table 1**. The Arcadis segments are depicted in **Figures 1-2** through **1-6**.

Table 1 Study Area location details.

Arcadis Segment ID	Parcel ID	Approximate Acreage of Parcels within the Study Area[1]	Section	Township	Range
A1	38061-180014305	0.002	26	156	91
	38061-180015100	1.587	27	156	91
	38061-180015300	1.563	27	156	91
	38061-180017002	0.717	27	156	91
	38061-610053550	0.799	27	156	91
	38061-610053551	0.954	27	156	91
A2	38061-180014300	2.337	26	156	91
	38061-180014305	0.253	26	156	91
	38061-180022300	4.339	35	156	91
	38061-180022600	3.788	35	156	91
	38061-250000600	0.336	2	155	91
A3	38061-240002500	1.753	6	155	90
	38061-240003000	0.017	7	155	90
	38061-250000100	2.675	1	155	91
	38061-250000300	2.557	1	155	91
	38061-250000301	2.296	1	155	91
	38061-250000600	0.003	2	155	91
A4	38061-240003000	3.185	7	155	90
	38061-240003200	1.998	7	155	90
	38061-240003300	2.424	7	155	90
	38061-240007100	0.002	17	155	90
	38061-240007500	0.248	18	155	90

Table 1 Study Area location details.

Arcadis Segment ID	Parcel ID	Approximate Acreage of Parcels within the Study Area[1]	Section	Township	Range
A5	38061-240007000	0.008	17	155	90
	38061-240007100	4.154	17	155	90
	38061-240007101	0.023	17	155	90
	38061-240007300	4.005	17	155	90
	38061-240008800	0.715	20	155	90
A6	38061-240008800	0.019	20	155	90
	38061-240009000	4.011	21	155	90
	38061-240009100	0.023	21	155	90
	38061-240009300	4.141	21	155	90
	38061-240009500	0.024	21	155	90
	38061-240009800	0.456	22	155	90
	38061-240011800	0.069	27	155	90
A7	38061-240011600	0.004	26	155	90
	38061-240011800	3.782	27	155	90
	38061-240011900	3.762	27	155	90
	38061-240012100	0.433	27	155	90
A8	38061-240011600	0.385	26	155	90
	38061-240015400	3.996	35	155	90
	38061-240015700	3.628	35	155	90
	38061-240015800	0.164	35	155	90
	38061-310000700	2.02	2	154	90
A9	38061-310000100	0.172	1	154	90
	38061-310000200	3.402	1	154	90
	38061-310000300	4.136	1	154	90
	38061-310000700	0.072	2	154	90
A10	38061-300002500	0.28	6	154	89
	38061-300002900	2.616	7	154	89
	38061-300003100	1.025	7	154	89
	38061-300003200	3.657	7	154	89
	38061-310000300	0	1	154	90
A11	38061-300002900	0.007	7	154	89
	38061-300003500	2.16	8	154	89
	38061-300006700	3.123	17	154	89
	38061-300006800	3.772	17	154	89
	38061-300006900	0.413	17	154	89
	38061-300008200	0.741	20	154	89
A12	38061-300008200	0	20	154	89
	38061-300008500	3.402	21	154	89
	38061-300008700	1.554	21	154	89
	38061-300008710	1.557	21	154	89
	38061-300011900	3.789	27	154	89

Table 1 Study Area location details.

Arcadis Segment ID	Parcel ID	Approximate Acreage of Parcels within the Study Area[1]	Section	Township	Range
	38061-300012000	0.181	28	154	89
	38061-300012100	3.44	28	154	89
	38061-300012200	1.452	28	154	89
A13	38061-300011900	0.02	27	154	89
	38061-300014500	0.955	34	154	89
	38061-300014900	3.251	34	154	89
	38061-300015000	2.799	35	154	89
	38061-300015100	0.302	35	154	89
	38061-300015200	1.736	35	154	89
	38061-300015400	2.019	35	154	89
	38061-370000500	0.652	2	153	89
A14	38061-360002500	3.207	7	153	88
	38061-360002600	2.388	7	153	88
	38061-360002800	1.09	7	153	88
	38061-370000100	4.92	1	153	89
	38061-370000200	2.537	1	153	89
	38061-370000400	1.336	1	153	89
	38061-370000500	0.11	2	153	89
	38061-370005300	3.236	12	153	89
A15	38061-360002500	0.005	7	153	88
	38061-360002900	0.001	8	153	88
	38061-360003000	3.168	8	153	88
	38061-360006400	0.004	16	153	88
	38061-360006600	0.049	17	153	88
	38061-360006800	3.761	17	153	88
	38061-360006900	1.258	17	153	88
A16	38061-360006400	3.109	16	153	88
	38061-360008800	2.492	21	153	88
	38061-360008900	1.456	21	153	88
	38061-360009200	1.797	21	153	88
A17	38061-360009200	0.006	21	153	88
	38061-360009400	3.665	22	153	88
	38061-360009500	0.007	22	153	88
	38061-360011300	4.189	27	153	88
	38061-360011600	0.031	27	153	88
A18	38061-360010900	2.752	26	153	88
	38061-360011000	0.715	26	153	88
	38061-360011100	2.722	26	153	88
	38061-360011300	0.005	27	153	88
	38061-360015100	1.627	35	153	88

Table 1 Study Area location details.

Arcadis Segment ID	Parcel ID	Approximate Acreage of Parcels within the Study Area[1]	Section	Township	Range
A19	38061-360015100	0.006	35	153	88
	38061-360015400	3.523	36	153	88
	38061-360015500	2.111	36	153	88
	38061-420001100	2.27	3	152	88
	38061-420001200	3.106	3	152	88
	38061-420001400	2.088	3	152	88
A20	38061-420000900	0.299	2	152	88
	38061-420001400	0.005	3	152	88

Notes:
1 Area was rounded to the nearest thousandth.

2.1 Desktop Assessment

Before initiating field surveys, Arcadis conducted an environmental desktop assessment to preliminary identify sensitive aquatic resources within the Study Area, utilizing publicly available resources. The resource maps reviewed included a U.S. Geological Survey (USGS) topographic quadrangle map for Stanley, North Dakota (USGS 2024a), National Hydrography Dataset (NHD; USGS 2024b), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI; USFWS, 2024), Federal Emergency Management Agency (FEMA) National Flood Hazard Layers (FEMA 2024), and U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey for Mountrail County, North Dakota (NRCS 2024). Results of the desktop assessment is provided in **Section 4.2.1** to **Section 4.2.4** of this report.

2.2 Antecedent Precipitation

The USACE developed the Antecedent Precipitation Tool (APT; USACE 2024b) to assist in determining the conditions of a typical year for a given location and date. The APT draws on multiple publicly available resources and provides summarized outputs to use in determining the climatic conditions of the typical year. Arcadis ran the APT for the Study Area for the dates of the survey at the northernmost and southernmost portions of the Study Area. Based on the results of the APT, the field event was completed in predominantly direr than normal or normal conditions. The results of the APT output are included in **Appendix A** and summarized in **Table 2**.

Table 2 Field Event APT Output and Precipitation Summary

Survey Date	APT Result	Season Type	Precipitation Occurrence (inches)[1]	14-Days Prior Precipitation Amount (inches)[1]
Northernmost Portion of Study Area: 48.303936, -102.373165				
August 5, 2024	Drier than Normal (9)	Dry Season	0.16	0.73
August 6, 2024	Normal (12)	Dry Season	0.51	0.73
August 7, 2024	Normal (12)	Dry Season	0.00	0.22
August 8, 2024	Normal (12)	Dry Season	0.00	0.06
Southernmost Portion of Study Area 48.010298, -101.914650				
August 5, 2024	Drier than Normal (9)	Dry Season	0.16	0.73
August 6, 2024	Drier than Normal (9)	Dry Season	0.51	0.73
August 7, 2024	Normal (11)	Dry Season	0.00	0.22
August 8, 2024	Normal (14)	Dry Season	0.00	0.06

Notes:

1 Precipitation data obtained from the MINOT INTL AP (ND) Weather Station (USW00024013) (Midwestern Regional Climate Center 2024).

3 Methodology

A pedestrian survey was conducted within the Study Area to identify wetlands and waters, including streams, on August 5-8, 2024. Wetland boundaries were field-delineated according to routine onsite methodology described in the Technical Report Y-87-1 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent guidance documents and the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2.0; USACE 2010). National wetland indicator status and taxonomic nomenclature is referenced from The National Wetland Plant List (NWPL; USACE 2023). Indicators of hydric soil are based on *the Field Indicators of Hydric Soils in the United States* (Version 8.2; Vasilas et al. 2018). Streams were delineated in accordance with the *OHWM Regulatory Guidance Letter No. 05-05* (USACE 2005).

As wetland features were delineated, they were given a unique Feature Identification (ID). Wetland delineation data were recorded on the USACE Great Plains Regional Supplement wetland determination data forms. In general, representative data points were recorded for each wetland. Corresponding representative upland data points were recorded to document upland boundaries and conditions surrounding the wetlands within the Study Area. Additional data points were recorded in suspect areas, including but not limited to different vegetation types, areas that appeared to be potentially farmed wetlands (e.g., contained wet signatures on aerial imagery review [Google Earth 2024]), North Dakota wetland data (North Dakota 2023), and NWI features (USFWS 2024). Wetland Determination Data Forms are provided in **Appendix B**. Aquatic features, including wetlands, identified within the Study Area were further described in accordance with the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). Wetland data points and boundaries were recorded using Juniper Geodes, Trimble® TDC650, and Trimble® R1 global positioning system (GPS) units capable of sub-meter accuracy and connected to tablets running ArcGIS Online (AGOL) ESRI Field Maps software. Representative photographs were taken of the delineated wetlands and are provided in **Appendix D**.

As water features were delineated, they were given a unique Feature ID. Streams were identified as those waters that possessed a defined “bed and bank” or ordinary high-water mark (OHWM) indicators and lacked a dominance of upland vegetation in the channel. Channels that parallel roadways were identified as upland drainage features and were not considered to be aquatic features unless they had an identifiable OHWM, were identified on the USGS topographic map, or represented a presumed relocation of a natural channel. The OHWM is used to delineate non-tidal waters in the absence of wetlands. The OHWM may be indicated by the presence of a defined streambed with bank shelving, flow lines, sediment deposition or scour, mineral staining, salt deposits, deep or surficial cracking, or other indicators as outlined in guidance documents. Field personnel collected data to delineate the OHWM in channelized areas that exhibited one or more OHWM indicators on initial visual inspection and/or were included on NHD or USGS topographic maps. Arcadis biologists determined stream flow duration as perennial, intermittent, or ephemeral based on field observations. Arcadis Stream Forms are provided in **Appendix B**. Water boundaries, including streams, were recorded using Juniper Geodes, Trimble® TDC650, and Trimble® R1 GPS units capable of sub-meter accuracy and connected to tablets running AGOL ESRI Field Maps software. Representative photographs were taken of the delineated waterbodies and are provided in **Appendix D**.

A farmed wetland slide review within the Study Area was completed utilizing historic Google Earth aerial imagery to determine potential farmed wetlands within areas that were actively under agriculture production (Google Earth 2024; **Appendix C**). The review was conducted using the guidelines described in Lake County, Illinois’ Regulatory Guidance Memorandum #2022-01 Guidance for Agricultural Land Wetland Determinations (Lake County Stormwater Management Commission 2022). Google Earth historic aerial imagery were used in determining wetness signature consisting of crop damage, drown out, soil wetness signatures, standing water,

and crop stress Area (Google Earth 2024). Due to site access restrictions data points were not recorded within each potential farmed wetland area within the Study Area.

Access to portions of the Study Area under active agriculture production was restricted. Pedestrian surveys were restricted in these areas to avoid damaging crops at the request of landowners. If wetlands or waters were observed during the desktop assessment and/or in the field in these restricted areas, observations were made at the closest point within the Study Area and the location of potential features was recorded. Any visible qualitative data (i.e., plant species, hydrology indicators) were documented and photographs were taken if feasible. These areas were further investigated during the farmed wetland slide review.

The regulatory framework that defines WOTUS subject to jurisdiction under Section 404 of the Clean Water Act (CWA) has undergone and continues to be subject to revision. The final "Revised Definition of Waters of the United States" rule (2023 Rule) was published in the Federal Register on January 18, 2023 (United States Environmental Protection Agency [USEPA] 2023a) and took effect on March 20, 2023. Following the Supreme Court's decision in the case of Sackett v. Environmental Protection Agency on May 26, 2023 (U.S. Supreme Court 2023), the USACE and USEPA developed a rule that amends the 2023 Rule to conform to the Sackett decision. The USACE and USEPA issued a final revised rule, "*Revised Definition of 'Waters of the United States'; Conforming*" (2023 Conforming Rule), on August 29, 2023, which became effective on September 8, 2023 (USEPA 2023b). The Conforming Rule eliminates certain provisions of the 2023 Revised Definition of WOTUS inconsistent with the U.S. Supreme Court's May 25, 2023, decision in Sackett v. USEPA (U.S. Supreme Court 2023).

As a result of ongoing litigation on the 2023 Rule, the agencies are only implementing the 2023 Conforming Rule in certain states. In the remaining states, including North Dakota, the 2023 Conforming Rule is currently not in effect, and the pre-2015 regulatory definition of WOTUS and the Sackett decision are being implemented instead. As of the date of this Report, the operative definition of WOTUS in North Dakota is consistent with the pre-2015 regulatory definition of WOTUS and the Sackett decision (USEPA 2023a,b).

The pre-2015 regulations are commonly referred to as the 1986/198822 regulations and defines WOTUS (USEPA 2023a,b; USEPA 2024a) as:

1. *All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;*
2. *All interstate waters including interstate wetlands;*
3. *All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:*
    a. *Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
    b. *From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or*
    c. *Which are used or could be used for industrial purposes by industries in interstate commerce;*
4. *All impoundments of waters otherwise defined as waters of the United States under this definition;*
5. *Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;*
6. *The territorial sea;*
7. *Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.*

4 Results

4.1 Landscape Setting

The Study Area is within the Level I Ecoregion 9 Great Plains, Level II Ecoregion 9.3 West Central Semi-Arid Prairies, and Level III Ecoregion 42 Northwestern Glaciated Plains (USEPA 2024b). Ecoregion 42 is characterized as a transitional area that marks the western extent of glaciation across the country and the beginning of the expansive Great Plains region. Typically, the landscape ranges from hilly to level topography, with some irregularities, and a distinctively higher moisture content than neighboring regions. Prairie pothole wetlands frequent the landscape due to the wetter conditions and favorable topography (i.e., flat land or lower, depressional areas at the base of hills). Ranching and dry-land farming are common practices in the region (USEPA 2024b).

The Study Area is in the following 12-digit hydrologic unit codes (HUCs) described in **Table 3** (USGS 2024c).

Table 3 Study Area HUCs[1]

12-Digit HUC	Name	Arcadis Segment ID
101101011702	Town of Stanley-Little Knife River	A1 and A2
101101011703	N/A; 101101011703	A2 through A6
101101012302	N/A; 101101012302	A6 through A8
101101012303	Shell Lake	A8 through A11
101101012304	Upper Shell Creek	A11 through A14
101101012401	N/A; 101101012401	A14 through A18
101101012601	Town of Prairie Junction	A19 through A20
101101012602	Town of Plaza-East Fork Shell Creek	A18

Notes:
1 Data is from the USGS Watershed Boundary Dataset (USGS 2024c).

4.2 Aquatic Resources

4.2.1 Desktop Review: NWI

The NWI identified 87 wetlands within the Study Area: four freshwater ponds (palustrine aquatic bed [PABF]), 52 freshwater emergent wetlands (palustrine emergent [PEM]; PEM1A, PEM1Ad, PEM1C, and PEM1Ch), 20 “other” wetlands (palustrine farmed [Pf]), and 11 riverine wetlands (riverine [R]; R2UBF, R4SBA, and R4SBC; USFWS 2024).

Palustrine wetlands include all nontidal wetlands or low salinity tidal wetlands (tidal freshwater; less than 0.5 parts per thousand [PPT] salinity) dominated by trees, shrubs, and persistent emergent plants. PABF is a palustrine wetland with an aquatic bed that is semi-permanently flooded. An aquatic bed includes wetlands and deepwater habitat with aquatic vegetation.

PEM1A is a palustrine wetland dominated by persistent, erect hydrophytes rooted in the herbaceous stratum (less than 3 feet tall). The hydrologic regime is temporarily flooded. PEM1Ad is the same classification as PEM1A; however, it is modified by drainage or by a ditch. PEM1C is also palustrine wetland dominated by persistent, erect hydrophytes rooted in the herbaceous stratum; however, the hydrologic regime is seasonally flooded. PEM1Ch is the same classification as PEM1C; however, it is modified by dike or it is impounded. Pf wetlands have a special

"farmed" modifier; these wetlands have been disturbed from agricultural activities. If agricultural activities were to stop in these areas, hydrophytic vegetation would reestablish and become dominant (Cowardin et al. 1979).

Riverine wetlands typically consist of stream or rivers but include all wetland and deepwater habitats within a channel unless the wetland is dominated by vegetation or ocean water influences the hydrologic regime (higher salinity). R2UBF is a lower perennial, riverine resources with an unconsolidated bottom that is semi-permanently flooded. R4SBA is an intermittent riverine resource with a streambed that is temporarily flooded. R4SBC is an intermittent riverine resource with a streambed that is seasonally flooded (Cowardin et al. 1979).

Additional information on NWI features within the Study Area is provided in **Table 4** and depicted on **Figures 2-0** through **2-16**.

Table 4 Mapped NWI Data within the Study Area[1]

Cowardin Class	Wetland Type	Latitude	Longitude	Area Within the Study Area (acres)[2]
PABF	Freshwater Pond	48.250343	-102.283011	0.314
PABF	Freshwater Pond	48.23758	-102.265951	0.291
PABF	Freshwater Pond	48.232916	-102.256156	0.172
PABF	Freshwater Pond	48.233601	-102.259211	0.377
PEM1A	Freshwater Emergent Wetland	48.044974	-101.962969	0.014
PEM1A	Freshwater Emergent Wetland	48.043696	-101.959706	0.031
PEM1A	Freshwater Emergent Wetland	48.048912	-101.973453	0.027
PEM1A	Freshwater Emergent Wetland	48.050412	-101.974653	0.001
PEM1A	Freshwater Emergent Wetland	48.057945	-101.989544	0.118
PEM1A	Freshwater Emergent Wetland	48.081917	-102.022304	0.007
PEM1A	Freshwater Emergent Wetland	48.082703	-102.026837	0.118
PEM1A	Freshwater Emergent Wetland	48.082858	-102.027934	0.316
PEM1A	Freshwater Emergent Wetland	48.09646	-102.06041	0.105
PEM1A	Freshwater Emergent Wetland	48.256857	-102.292657	0.157
PEM1A	Freshwater Emergent Wetland	48.257389	-102.29326	0.025
PEM1A	Freshwater Emergent Wetland	48.260213	-102.297076	0.014
PEM1A	Freshwater Emergent Wetland	48.261526	-102.298715	0.046
PEM1A	Freshwater Emergent Wetland	48.26484	-102.302154	0.051
PEM1A	Freshwater Emergent Wetland	48.266696	-102.303821	0.012
PEM1A	Freshwater Emergent Wetland	48.245222	-102.275506	0.079
PEM1A	Freshwater Emergent Wetland	48.248108	-102.279434	0.038
PEM1A	Freshwater Emergent Wetland	48.286394	-102.337521	0.024
PEM1A	Freshwater Emergent Wetland	48.284482	-102.333846	0.153
PEM1A	Freshwater Emergent Wetland	48.280353	-102.325501	0.041
PEM1A	Freshwater Emergent Wetland	48.304009	-102.366257	0.101
PEM1A	Freshwater Emergent Wetland	48.205075	-102.215404	0.164
PEM1A	Freshwater Emergent Wetland	48.201739	-102.211079	0.125
PEM1A	Freshwater Emergent Wetland	48.153314	-102.140335	less than 0.001
PEM1A	Freshwater Emergent Wetland	48.148452	-102.134758	0.154
PEM1A	Freshwater Emergent Wetland	48.169756	-102.157208	0.024
PEM1A	Freshwater Emergent Wetland	48.100721	-102.065259	0.096

Table 4 Mapped NWI Data within the Study Area[1]

Cowardin Class	Wetland Type	Latitude	Longitude	Area Within the Study Area (acres)[2]
PEM1A	Freshwater Emergent Wetland	48.120778	-102.099251	0.012
PEM1A	Freshwater Emergent Wetland	48.120881	-102.099403	0.067
PEM1A	Freshwater Emergent Wetland	48.109859	-102.075296	0.218
PEM1Ad	Freshwater Emergent Wetland	48.242585	-102.272018	0.065
PEM1C	Freshwater Emergent Wetland	48.033067	-101.941887	0.248
PEM1C	Freshwater Emergent Wetland	48.064711	-101.999097	0.063
PEM1C	Freshwater Emergent Wetland	48.250728	-102.283789	0.144
PEM1C	Freshwater Emergent Wetland	48.263725	-102.301018	0.041
PEM1C	Freshwater Emergent Wetland	48.265377	-102.302568	0.195
PEM1C	Freshwater Emergent Wetland	48.268737	-102.305881	0.026
PEM1C	Freshwater Emergent Wetland	48.272095	-102.309509	0.405
PEM1C	Freshwater Emergent Wetland	48.257972	-102.294089	0.105
PEM1C	Freshwater Emergent Wetland	48.236986	-102.265319	0.069
PEM1C	Freshwater Emergent Wetland	48.237613	-102.266005	0.073
PEM1C	Freshwater Emergent Wetland	48.230019	-102.250257	0.296
PEM1C	Freshwater Emergent Wetland	48.233846	-102.260234	0.132
PEM1C	Freshwater Emergent Wetland	48.304017	-102.364812	0.711
PEM1C	Freshwater Emergent Wetland	48.282069	-102.328817	0.140
PEM1C	Freshwater Emergent Wetland	48.255643	-102.291246	0.001
PEM1C	Freshwater Emergent Wetland	48.207828	-102.21908	0.026
PEM1C	Freshwater Emergent Wetland	48.206459	-102.217385	0.16
PEM1C	Freshwater Emergent Wetland	48.18743	-102.187579	0.007
PEM1C	Freshwater Emergent Wetland	48.106282	-102.070747	0.327
PEM1C	Freshwater Emergent Wetland	48.205723	-102.216386	0.082
PEM1Ch	Freshwater Emergent Wetland	48.19316	-102.203995	0.050
Pf	Other	48.014958	-101.920605	0.076
Pf	Other	48.012087	-101.91689	0.003
Pf	Other	48.041579	-101.954706	0.046
Pf	Other	48.054939	-101.980994	0.005
Pf	Other	48.049743	-101.974287	0.034
Pf	Other	48.050948	-101.975164	0.055
Pf	Other	48.060722	-101.993458	0.017
Pf	Other	48.062241	-101.995851	0.017
Pf	Other	48.024748	-101.934383	0.261
Pf	Other	48.027372	-101.936758	0.074
Pf	Other	48.028569	-101.937741	0.013
Pf	Other	48.067579	-102.001959	0.082
Pf	Other	48.086222	-102.042999	0.140
Pf	Other	48.083192	-102.030799	0.024
Pf	Other	48.240838	-102.269674	0.014
Pf	Other	48.279718	-102.324186	0.037

Table 4 Mapped NWI Data within the Study Area[1]

Cowardin Class	Wetland Type	Latitude	Longitude	Area Within the Study Area (acres)[2]
Pf	Other	48.182711	-102.180903	0.091
Pf	Other	48.179775	-102.175976	0.002
Pf	Other	48.144621	-102.132061	0.273
Pf	Other	48.209259	-102.22083	0.040
R2UBF	Riverine	48.120841	-102.099286	0.008
R4SBA	Riverine	48.084792	-102.039416	0.008
R4SBA	Riverine	48.076984	-102.014818	0.071
R4SBA	Riverine	48.301824	-102.352439	0.009
R4SBA	Riverine	48.192878	-102.202725	0.009
R4SBA	Riverine	48.198313	-102.207109	0.011
R4SBA	Riverine	48.165017	-102.152182	0.009
R4SBA	Riverine	48.114486	-102.086171	0.008
R4SBC	Riverine	48.096376	-102.060254	0.008
R4SBC	Riverine	48.172834	-102.16242	0.008
R4SBC	Riverine	48.132266	-102.122329	0.009
			Total	**8.323**

Notes:
1 Wetland type information obtained from the USFWS (USFWS 2024).
2 Some features may continue offsite. Area was rounded to the nearest thousandth.

4.2.2 Desktop Review: NHD

The NHD identified 12 streams within the Study Area totaling approximately 1,114.343 linear feet (USGS 2024b). Additional information on NHD features within the Study Area is provided in **Table 5** and depicted on **Figures 2-0** through **2-16**.

Table 5 Mapped NHD Resources within the Study Area[1]

NHD ID	USGS Reach Code	Latitude	Longitude	Length Within the Study Area (feet)[2]
143700976	10110101000107	48.096416	-102.060331	54.982
143703946	10110101000913	48.077139	-102.015008	476.466
143718692	10110101002875	48.164964	-102.152138	52.842
143718740	10110101002882	48.193157	-102.204092	60.007
143718803	10110101002887	48.172832	-102.162417	50.074
143718853	10110101002890	48.132198	-102.122231	56.558
143732102	10110101011866	48.304028	-102.363941	53.591
143732111	10110101011874	48.302967	-102.357651	102.093
143732435	10110101012175	48.198151	-102.207	55.003
143732454	10110101012190	48.192872	-102.202694	50.215
143732678	10110101012395	48.114462	-102.086118	52.259
143734192	10110101000112	48.120803	-102.099125	50.255

Table 5 Mapped NHD Resources within the Study Area[1]

NHD ID	USGS Reach Code	Latitude	Longitude	Length Within the Study Area (feet)[2]
143700976	10110101000107	48.096416	-102.060331	54.982
			Total	**1,114.343**

Notes:
1 NHD information obtained from the USGS (USGS 2024b).
2 Some features may continue offsite. Length was rounded to the nearest thousandth.

4.2.3 Desktop Review: Flood Hazard Layer

According to the FEMA National Flood Hazard Layer dataset, no FIRM data is available for the Study Area as depicted on **Figures 2-0** through **2-16** (FEMA 2024).

4.2.4 Desktop Review: NRCS Soils Map

According to the USDA NRCS Web Soil Survey (NRCS 2024), the Study Area contains 31 soil map units listed in **Table 6** and depicted on **Figures 3-0** through **3-16**. The soil units mapped were listed as:

- Hydric: all major and minor components listed for a given map unit are rated as being hydric.
- Predominantly hydric: all major components listed for a given map unit are rated as hydric, and at least one contrasting minor component is not rated hydric.
- Predominantly non-hydric: no major component listed for a given map unit is rated as hydric, and at least one contrasting minor component is rated hydric.
- Non-hydric: no major or minor components for the map unit are rated hydric. The assumption is that the map unit is non-hydric even if none of the components within the map unit have been rated.

Generally, soil units identified as hydric contain soils that develop under reducing conditions (i.e., oxygen poor), which are a result of inundation and/or saturation by water.

Table 6 Soil Map Units Identified within the Study Area[1]

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Non-Hydric
C149B	Williams-Bowbells-Tonka complex, 0 to 6 percent slopes	Predominantly Non-Hydric
C153E	Zahl-Max loams, 15 to 25 percent slopes	Predominantly Non-Hydric
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Non-Hydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Non-Hydric
C165F	Zahl-Max-Parnell complex, 0 to 35 percent slopes	Predominantly Non-Hydric
C201A	Bowbells loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C205A	Bowbells-Tonka complex, 0 to 3 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric

Table 6 Soil Map Units Identified within the Study Area[1]

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C418B	Tansem-Sakakawea loams, 2 to 6 percent slopes	Non-Hydric
C424A	Minot silty clay, 0 to 2 percent slopes	Predominantly Non-Hydric
C424B	Minot silty clay, 2 to 6 percent slopes	Predominantly Non-Hydric
C477B	Wyola silty clay loam, 2 to 6 percent slopes	Non-Hydric
C480C	Shambo loam, 6 to 9 percent slopes	Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C593E	Dogtooth-Janesburg-Werner complex, 3 to 25 percent slopes	Predominantly Non-Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C816B	Lehr loam, 2 to 6 percent slopes	Non-Hydric
C825A	Divide loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Predominantly Non-Hydric

Notes:

1 Soil Map Units information obtained from USDA Web Soil Survey (NRCS 2024).

5 Survey Results

5.1 Farmed Wetland Slide Review

Google Earth historic aerial imagery from 2024, 2020, 2016, 2013, 2009, 2006, 2003, 1997, and 1995 (Google Earth 2024) were utilized to determine potential wetness signatures within the Study Area, as the dates of the respected aerial imagery were determined to be taken during normal precipitation conditions based on historic APT data (**Appendix C**). A total of 11 potential farmed wetland areas were identified based on consistent wetness signatures. All 11 potential farmed wetlands were determined to be present, based on the results of the farmed wetland slide review and field observations of the potential farmed wetland polygons. As previously noted, access to the locations of the potential farmed wetlands was restricted, and observations were made from afar as feasible. **Table 7** summarizes the results of the Farmed Wetland Slide Review for the Study Area.

Table 7 Farmed Wetland Slide Review Summary[1]

Potential Farmed Wetlands	No. of Normal Years[2]	Normal Years Displaying Wetness Signature(s)	Hydric Soils Present[3]	Farmed Wetland Present
WA03FW01	5	100%	C874C[4]	Farmed Wetland Present
WA05FW01	5	100%	C132B[4]	Farmed Wetland Present
WA05FW02	5	100%	C3A[5]	Farmed Wetland Present
WA08FW01	5	100%	C132B[4]	Farmed Wetland Present
WA08FW02	4	80%	C132C[4]	Farmed Wetland Present
WA10FW01	4	50%	C132B[4]	Farmed Wetland Present
WA16FW01	5	100%	C272A[6]	Farmed Wetland Present
WA16FW02	5	100%	C205A[4]	Farmed Wetland Present
WA19FW01	5	80%	C132C[4]	Farmed Wetland Present
WA19FW02	5	100%	C3A[5]	Farmed Wetland Present
WA19FW03	5	60%	C149B[4]	Farmed Wetland Present

Notes:
1 Farmed Wetlands as determined by aerial crop slide review (Appendix C).
2 Number of Normal Years utilized APT data for the Study Area.
3 Access to portions of the Study Area was restricted; therefore, the soil was not analyzed.
4 Soil map unit is classified as predominantly non-hydric.
5 Soil map unit is classified as hydric.
6 Soil map unit is classified as partially hydric.

5.2 Delineated Wetlands

A total of 34 PEM wetlands were delineated within the Study Area. The delineated wetlands totaled a combined 5.08-acres. The 11 potential farmed wetlands (totaling 1.23 acres) as identified in **Table 7** were included with the delineated wetland classification as other/PF. Of the 34 delineated wetlands, 12 wetlands displayed a visible hydrologic surface connections to relatively permanent waters and may be considered a WOTUS. The remaining

22 delineated wetlands appear to be hydrologically isolated. Out of the 11 potential farmed wetlands, four appeared to be hydrologically isolated. Determinations of visible surface connectivity were based off field observations and aerial imagery review and are only an estimate of potential connectivity and jurisdictional status. It should be noted that jurisdictional determination status of the delineated features can only be completed by the USACE. **Table 8** summarizes the wetland type, size, and anticipated jurisdictional status. Spatial representation of the delineated wetlands is depicted on **Figures 4-0** through **4-43**. Wetland Determination Data Forms are provided in **Appendix B**. Representative photographs of the delineated wetlands are presented in **Appendix D**.

Table 8 Delineated Wetland Summary

Feature ID	Wetland Type (Cowardin Class)	Area[1] (acres)	Anticipated Jurisdictional Status[2]
WA1RJ01	PEM	0.84	Hydrologically Connected; abuts stream SA1RJO1
WA3SJ01	PEM	0.13	Isolated
WA3SJ02	PEM	0.42	Isolated
WA4SJ01	PEM	0.05	Isolated
WA4SJ02	PEM	0.20	Isolated
WA4SJ03	PEM	0.03	Isolated
WA4SJ04	PEM	0.10	Isolated
WA4SJ05	PEM	0.10	Isolated
WA4SJ06	PEM	0.04	Isolated
WA05RJ01	PEM	0.08	Isolated
WA05RJ03	PEM	0.04	Isolated
WA06RJ01	PEM	0.36	Isolated
WA06RJ02	PEM	0.07	Isolated
WA06RJ05	PEM	0.51	Isolated
WA06RJ08	PEM	0.17	Isolated
WA06RJ10	PEM	0.30	Hydrologically Connected
WA8KM01	PEM	0.03	Hydrologically Connected
WA08SC01	PEM	0.22	Hydrologically Connected
WA08SC04A	PEM	0.05	Isolated
WA08SC04B	PEM	0.15	Isolated
WA08SC05	PEM	0.12	Isolated
WA10CK01	PEM	0.13	Hydrologically Connected
WA11TN01	PEM	0.01	Hydrologically Connected
WA11TN02	PEM	0.03	Hydrologically Connected
WA12SJ01	PEM	0.07	Hydrologically Connected
WA12TN05	PEM	0.08	Hydrologically Connected
WA13CK01	PEM	0.12	Hydrologically Connected; abuts stream SA13CK01
WA14TN01	PEM	0.34	Hydrologically Connected
WA14TN02	PEM	0.11	Hydrologically Connected; abuts stream SA14TN01
WA17SC01	PEM	0.01	Isolated
WA17SC02	PEM	0.03	Isolated
WA18SJ01	PEM	0.05	Isolated
WA18SJ02	PEM	0.06	Isolated

Table 8 Delineated Wetland Summary

Feature ID	Wetland Type (Cowardin Class)	Area[1] (acres)	Anticipated Jurisdictional Status[2]
WA18SJ03	PEM	0.05	Isolated
	Total	**5.08**	
Potential Farmed Wetlands			
WA03FW01	Other/PF	0.01	Isolated
WA05FW01	Other/PF	0.02	Hydrologically Connected
WA05FW02	Other/PF	0.27	Hydrologically Connected
WA08FW01	Other/PF	0.03	Hydrologically Connected
WA08FW02	Other/PF	0.01	Hydrologically Connected
WA10FW01	Other/PF	0.01	Hydrologically Connected
WA16FW01	Other/PF	0.07	Hydrologically Connected
WA16FW02	Other/PF	0.50	Hydrologically Connected
WA19FW01	Other/PF	0.05	Isolated
WA19FW02	Other/PF	0.20	Isolated
WA19FW03	Other/PF	0.05	Isolated
	Total	**1.23**	
	Total With Potential Farmed Wetlands	**6.31**	

Notes:

1 Wetland area only includes portions that are within the Study Area. Some features may continue offsite. Area was rounded to the nearest hundredth.

2 Final jurisdictional determination can only be made by the USACE. Indication of delineated features as isolated or hydrologically connected to a WOTUS in this report are estimations and may be subject to change.

5.3 Delineated Streams

A total of 3 perennial streams spanning approximately 171.01 linear feet were delineated within the Study Area. **Table 9** summarizes details of each of the delineated streams. The delineated stream designated as SA1RJ01 within the northwestern portion of the Study Area appears to be Little Knife River. The stream designated as SA13CK01 within the central portion of the Study Area appears to be Shell Creek. The stream designated as SA14TN01 appears to be an unnamed tributary to Shell Creek. Both the Little Knife River and Shell Creek are tributaries to the Missouri River, which is considered a Traditionally Navigable Water (TNW; Dakota 2015). Spatial representation of the delineated streams is depicted on **Figures 4-0** through **4-43**. Arcadis Stream Data Forms are provided in **Appendix B**. Representative photographs of the delineated streams are presented in **Appendix D**.

Table 9 Delineated Streams Summary

Feature ID	Stream Type	Ordinary High Water Mark Width (feet)	Top of Bank (feet)	Stream Length[1] (feet)	Stream Area[1] (acres)
SA13CK01	Perennial	15	20	63.38	0.02
SA14TN01	Perennial	25	25	58.50	0.05
SA1RJ01	Perennial	97	828	49.13	0.11
			Totals	**171.01**	**0.18**

Notes:

1 Delineated stream length and area only includes portions that are within the Study Area. Some features may continue offsite. Length and Area was rounded to the nearest hundredth.

6 Conclusions

An aquatic resource delineation survey was conducted by Arcadis for the proposed Study Area on August 5-8, 2024. A total of 34 PEM wetlands were delineated within the Study Area. The delineated wetlands totaled a combined 5.08-acres. The 11 potential farmed wetlands (totaling 1.23 acres) were included with the delineated wetland classification as other/PF. Of the 34 delineated wetlands, 12 wetlands displayed a visible hydrologic surface connections to relatively permanent waters and may be considered a WOTUS. The remaining 22 delineated wetlands appear to be hydrologically isolated. Out of the 11 potential farmed wetlands, four appeared to be hydrologically isolated. Determinations of visible surface connectivity were based off field observations and aerial imagery review and are only an estimate of potential connectivity and jurisdictional status. It should be noted that jurisdictional determination status of the delineated features can only be completed by the USACE

A total of 3 perennial streams spanning approximately 171.01 linear feet were delineated within the Study Area. The delineated stream designated as SA1RJ01 within the northwestern portion of the Study Area appears to be Little Knife River. The stream designated as SA13CK01 within the central portion of the Study Area appears to be Shell Creek. The stream designated as SA14TN01 appears to be unnamed tributary to Shell Creek. Both the Little Knife River and Shell Creek are tributaries to the Missouri River, which is considered a TNW (Dakota 2015).

7 References

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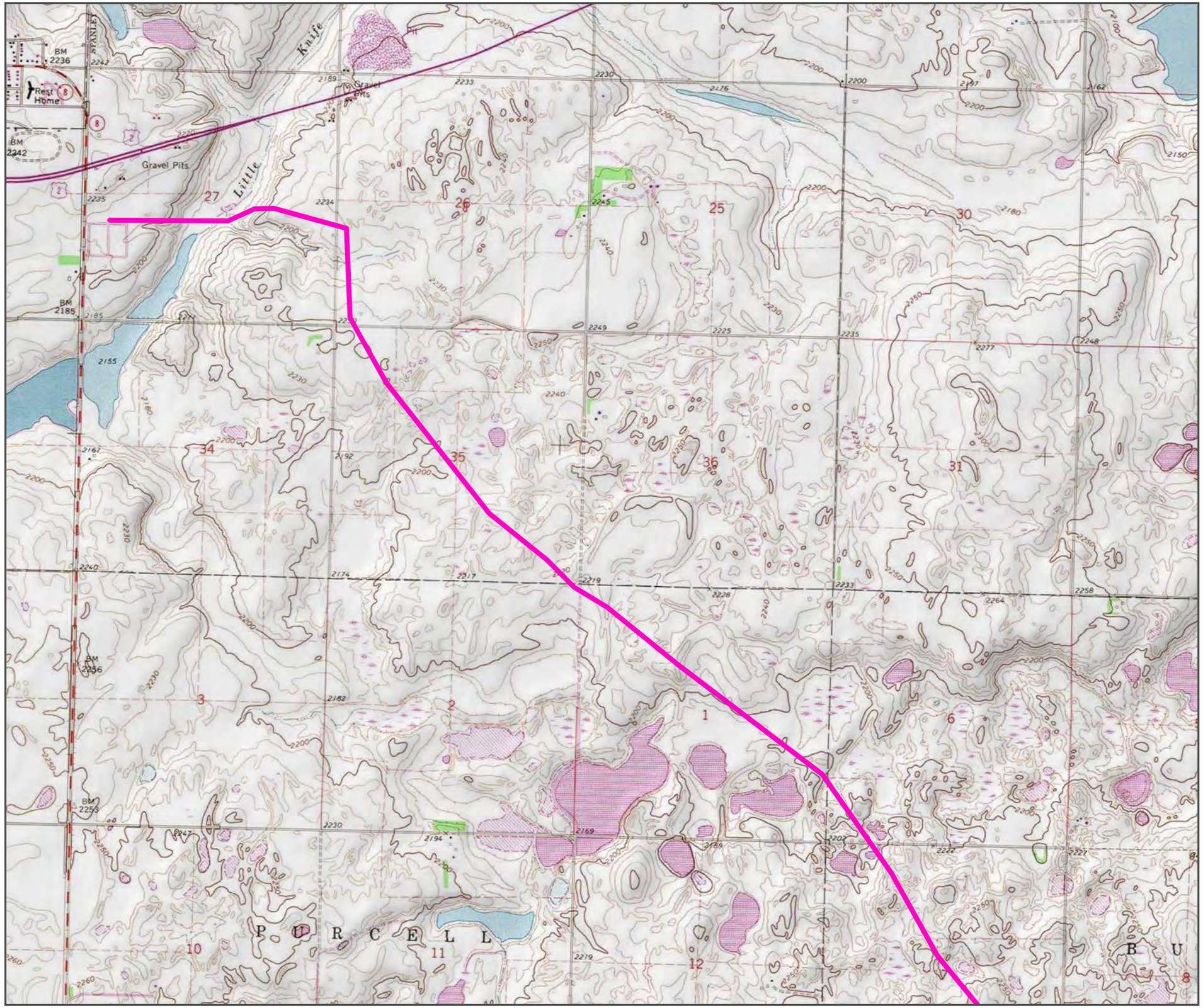
Figures



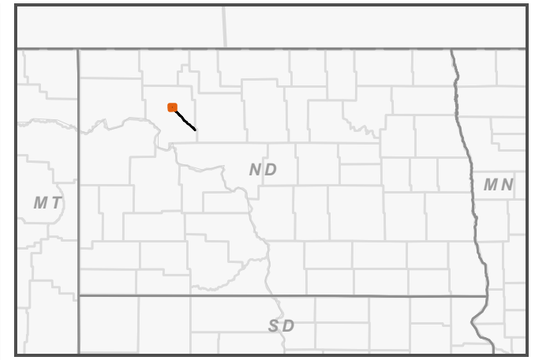


FIGURE 1-1
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Stanley SE obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
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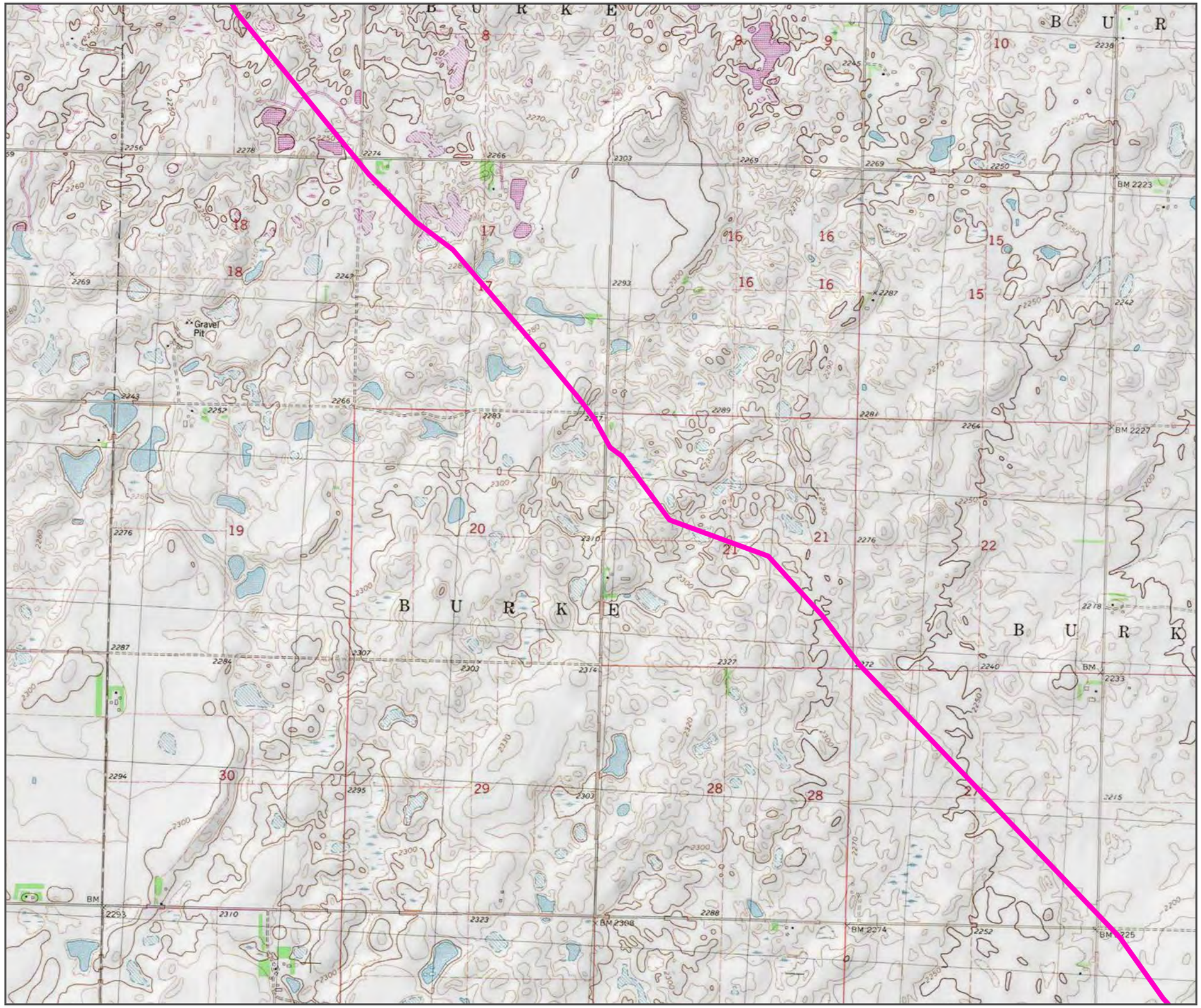
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 1-1 Topographic Map
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



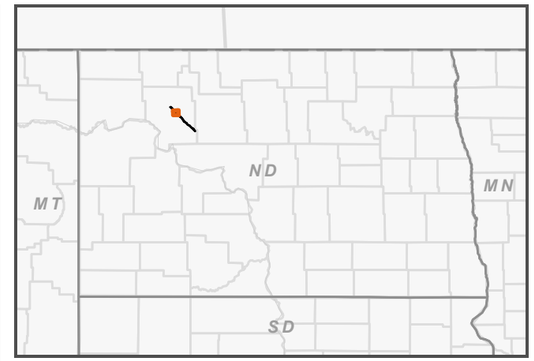


FIGURE 1-2
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Stanley SE, Belden, Epworth NW obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS

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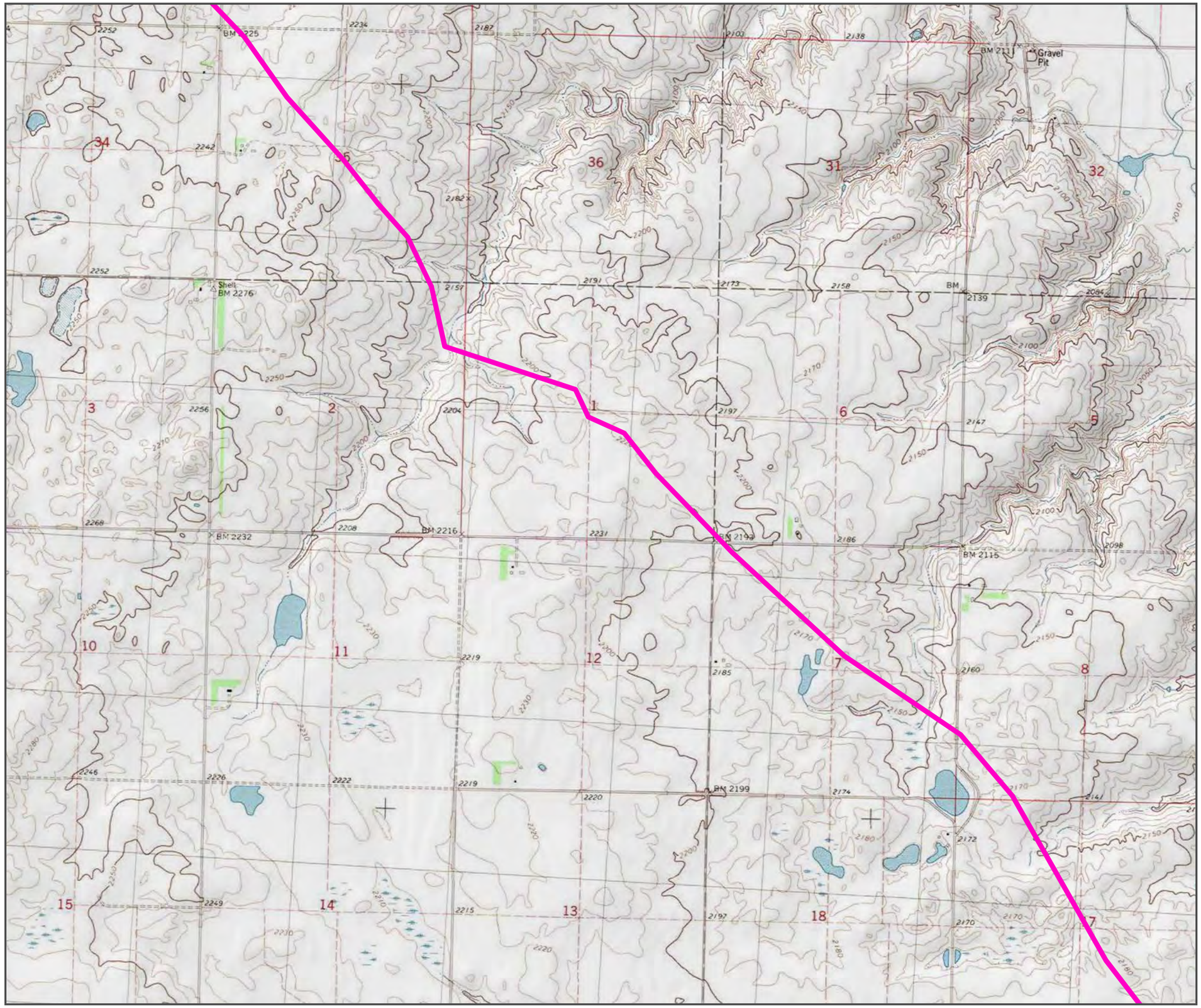
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



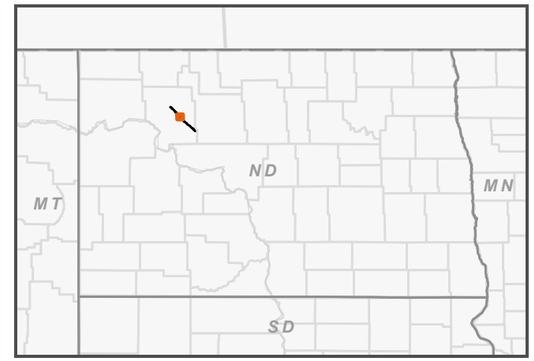


FIGURE 1-3
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth NW obtained through ArcGIS Online streaming service.

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0 250 500 1,000 m

ARCADIS

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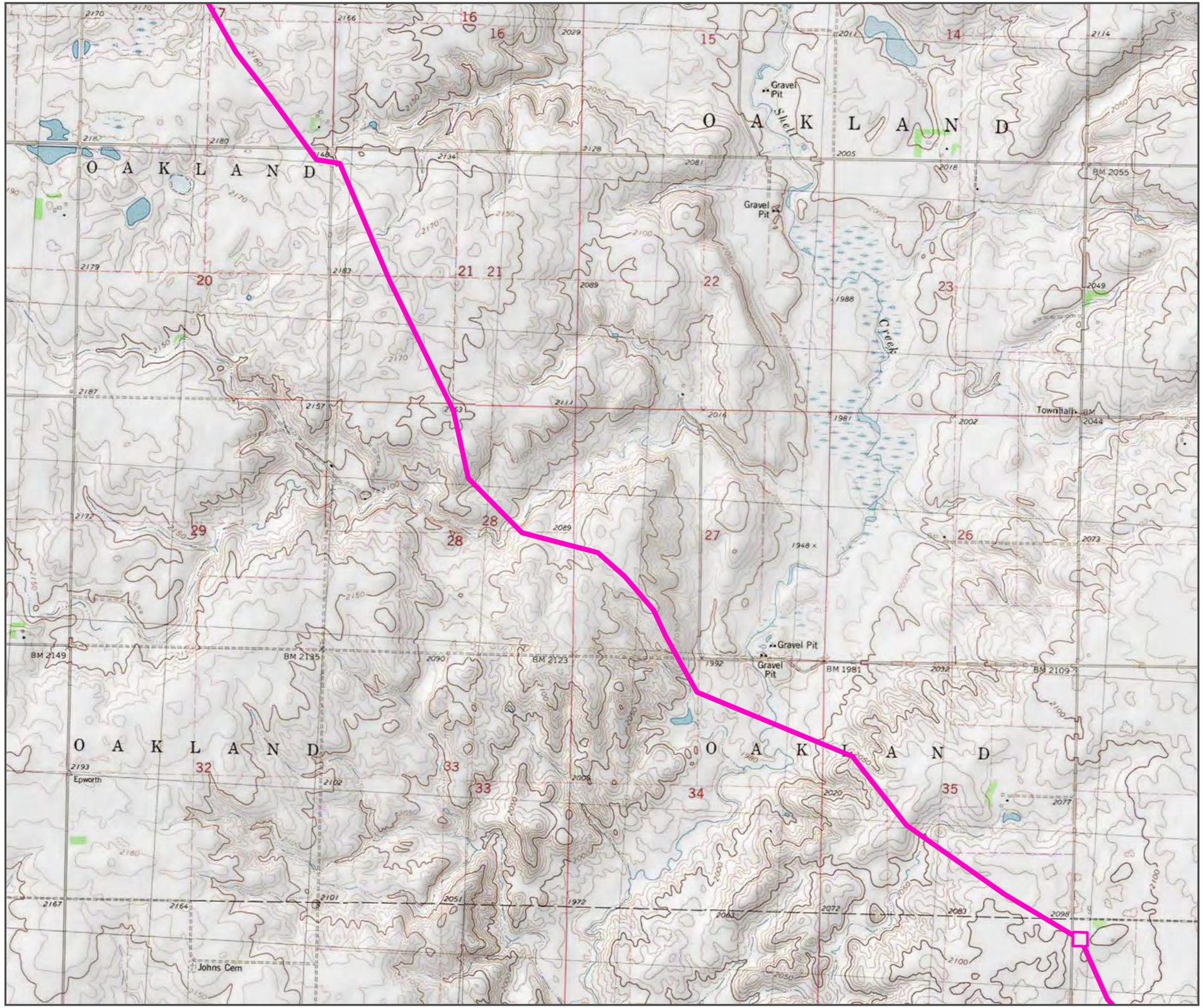
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



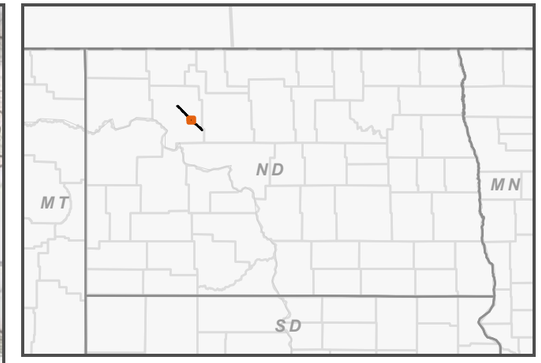


FIGURE 1-4
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth NW, Shell Lake, Epworth SE obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

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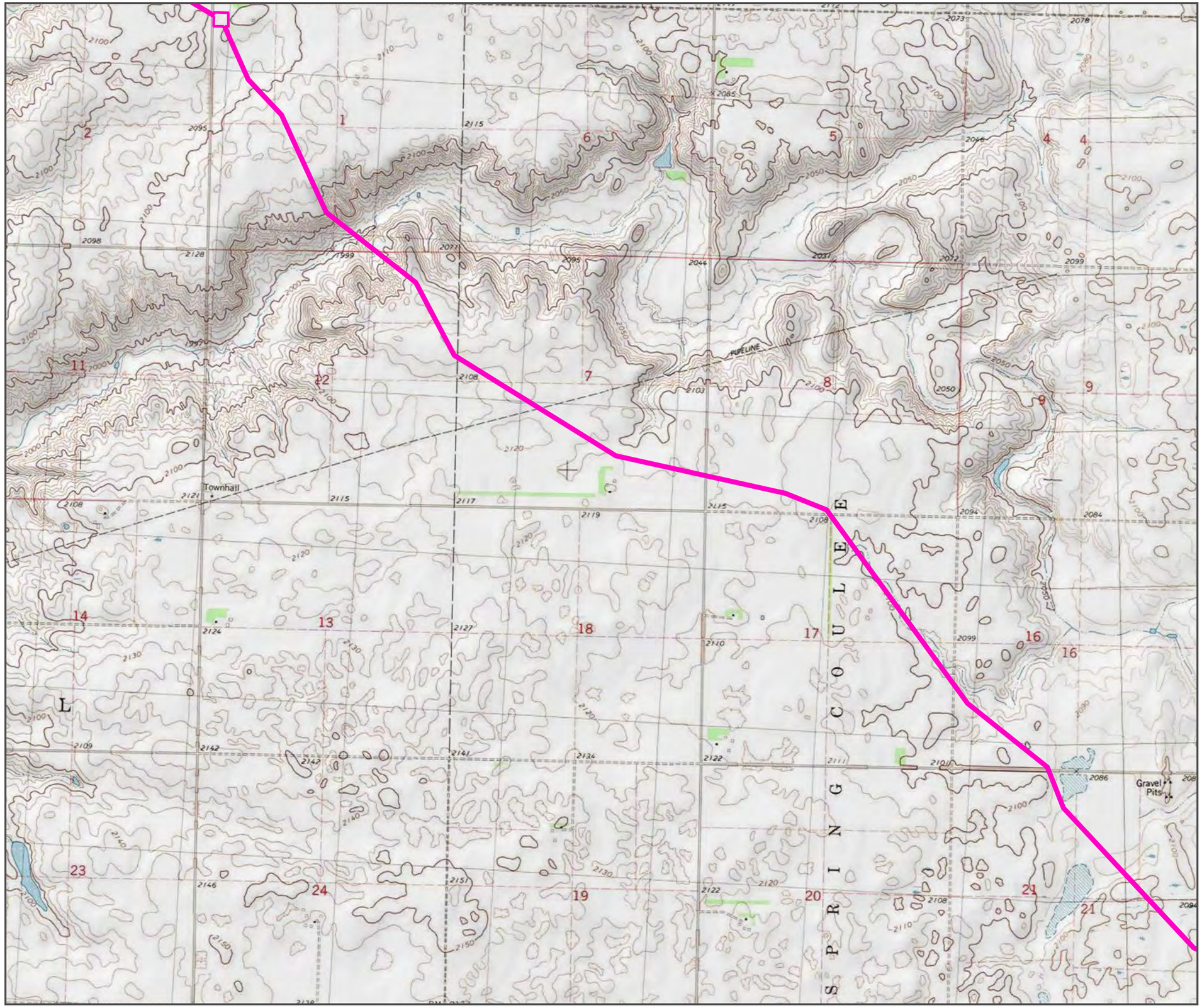
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



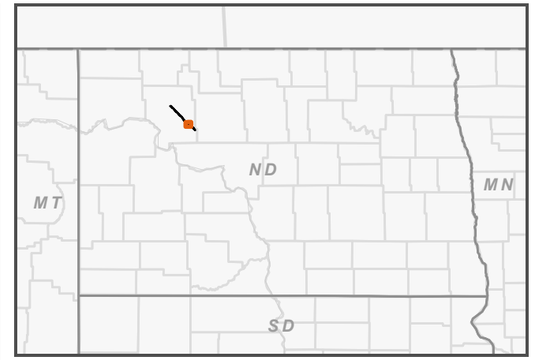


FIGURE 1-5
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth SE, Plaza obtained through ArcGIS Online streaming service.

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0 250 500 1,000 m

ARCADIS

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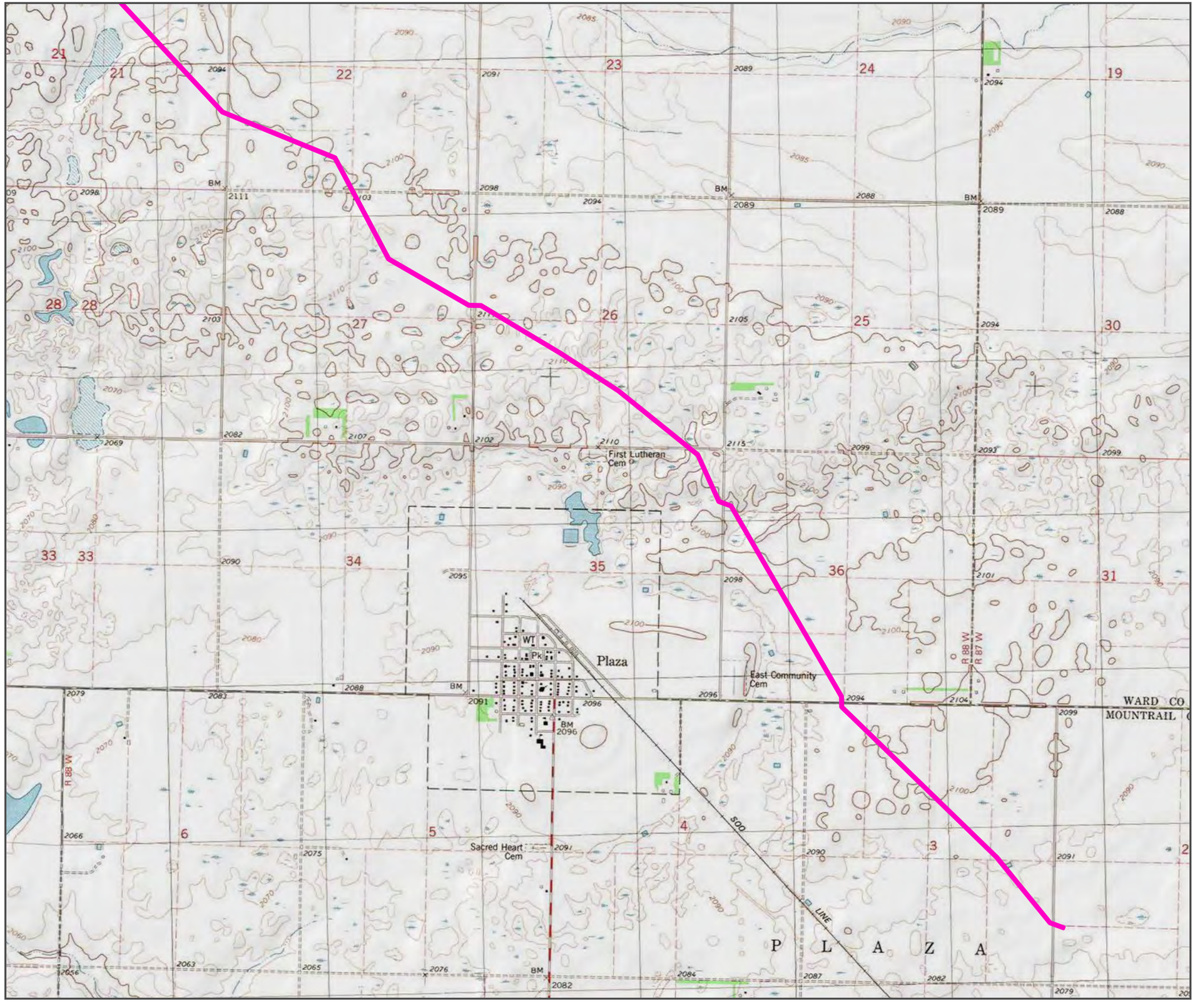
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 1-1 Topographic Map
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



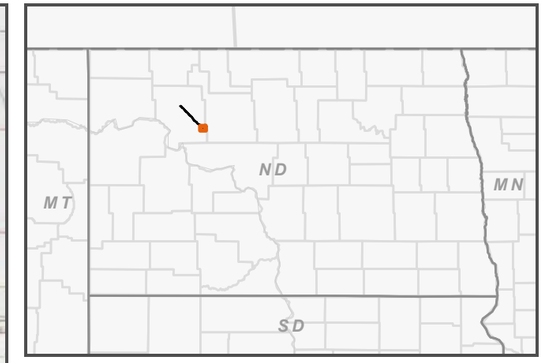


FIGURE 1-6
TOPOGRAPHIC MAP
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

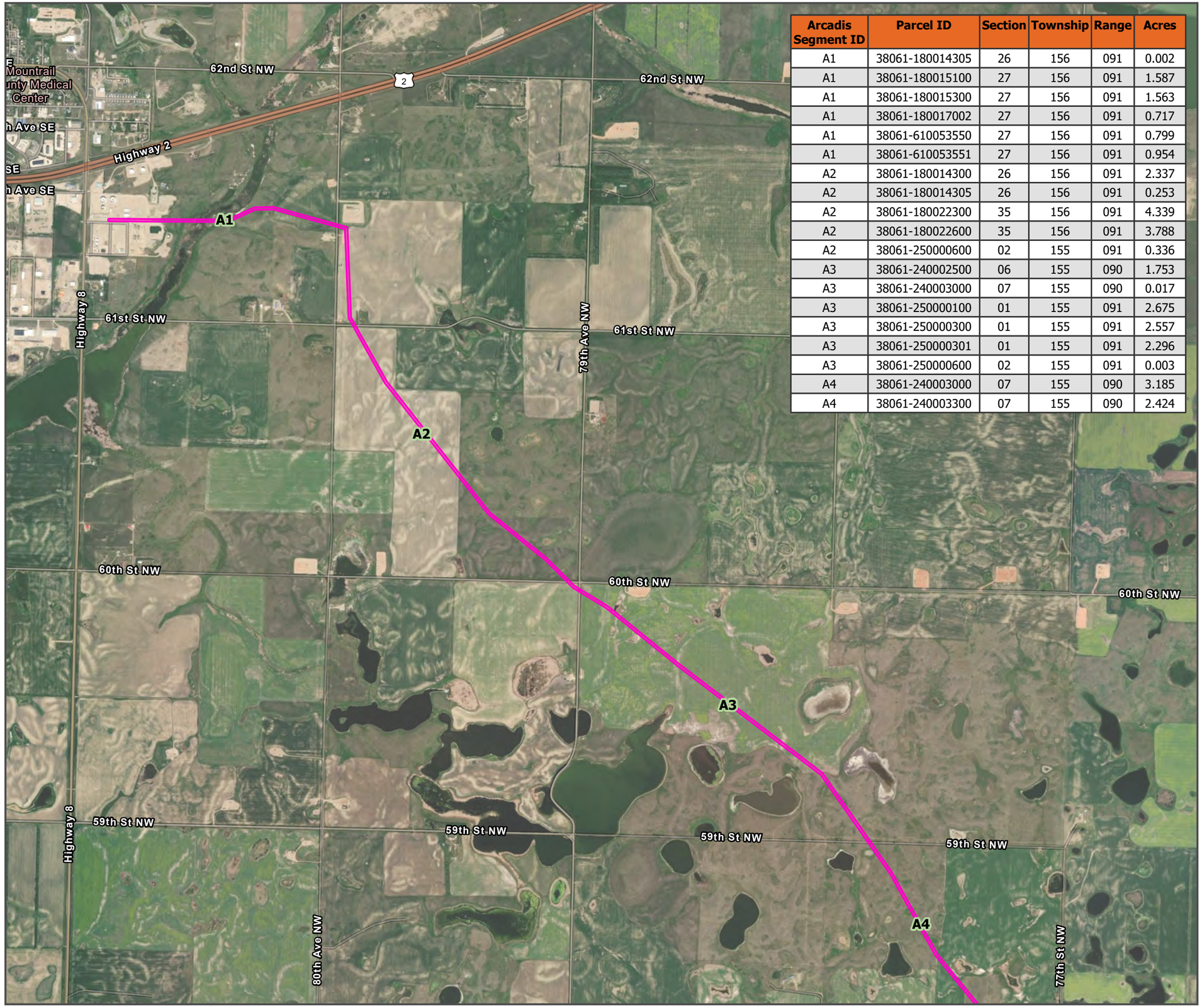
Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Plaza obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS



Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
A1	38061-180014305	26	156	091	0.002
A1	38061-180015100	27	156	091	1.587
A1	38061-180015300	27	156	091	1.563
A1	38061-180017002	27	156	091	0.717
A1	38061-610053550	27	156	091	0.799
A1	38061-610053551	27	156	091	0.954
A2	38061-180014300	26	156	091	2.337
A2	38061-180014305	26	156	091	0.253
A2	38061-180022300	35	156	091	4.339
A2	38061-180022600	35	156	091	3.788
A2	38061-250000600	02	155	091	0.336
A3	38061-240002500	06	155	090	1.753
A3	38061-240003000	07	155	090	0.017
A3	38061-250000100	01	155	091	2.675
A3	38061-250000300	01	155	091	2.557
A3	38061-250000301	01	155	091	2.296
A3	38061-250000600	02	155	091	0.003
A4	38061-240003000	07	155	090	3.185
A4	38061-240003300	07	155	090	2.424

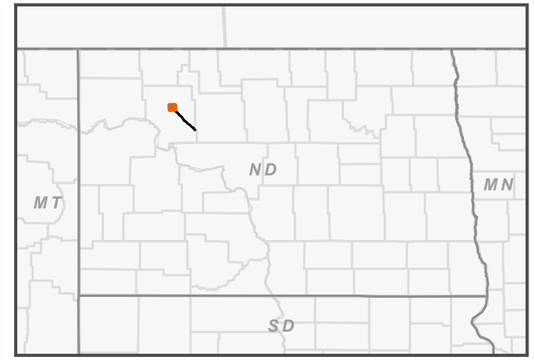


FIGURE 1-2.1
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Stanley SE obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS

Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
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A4	38061-240003200	07	155	090	1.998
A4	38061-240003300	07	155	090	2.424
A4	38061-240007100	17	155	090	0.002
A4	38061-240007500	18	155	090	0.248
A5	38061-240007000	17	155	090	0.008
A5	38061-240007100	17	155	090	4.154
A5	38061-240007101	17	155	090	0.023
A5	38061-240007300	17	155	090	4.005
A5	38061-240008800	20	155	090	0.715
A6	38061-240008800	20	155	090	0.019
A6	38061-240009000	21	155	090	4.011
A6	38061-240009100	21	155	090	0.023
A6	38061-240009300	21	155	090	4.141
A6	38061-240009500	21	155	090	0.024
A6	38061-240009800	22	155	090	0.456
A6	38061-240011800	27	155	090	0.069
A7	38061-240011600	26	155	090	0.004
A7	38061-240011800	27	155	090	3.782
A7	38061-240011900	27	155	090	3.762
A7	38061-240012100	27	155	090	0.433
A8	38061-240011600	26	155	090	0.385
A8	38061-240015400	35	155	090	3.996

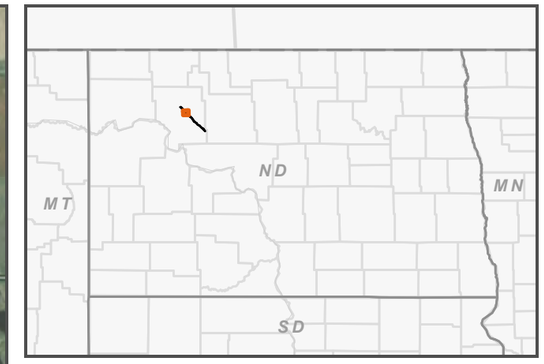


FIGURE 1-2.2
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

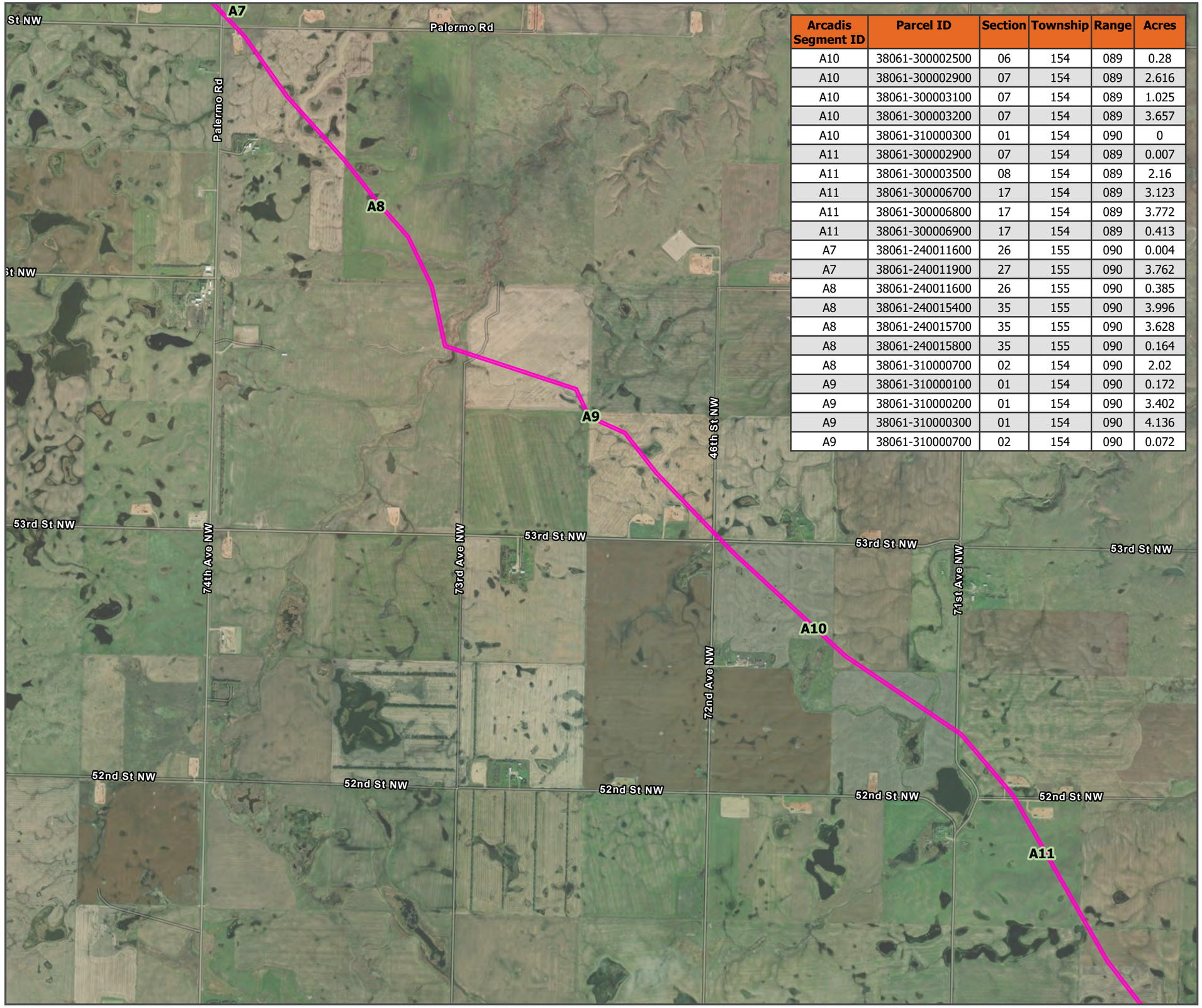
Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Stanley SE, Belden, Epworth NW obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS



Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
A10	38061-300002500	06	154	089	0.28
A10	38061-300002900	07	154	089	2.616
A10	38061-300003100	07	154	089	1.025
A10	38061-300003200	07	154	089	3.657
A10	38061-310000300	01	154	090	0
A11	38061-300002900	07	154	089	0.007
A11	38061-300003500	08	154	089	2.16
A11	38061-300006700	17	154	089	3.123
A11	38061-300006800	17	154	089	3.772
A11	38061-300006900	17	154	089	0.413
A7	38061-240011600	26	155	090	0.004
A7	38061-240011900	27	155	090	3.762
A8	38061-240011600	26	155	090	0.385
A8	38061-240015400	35	155	090	3.996
A8	38061-240015700	35	155	090	3.628
A8	38061-240015800	35	155	090	0.164
A8	38061-310000700	02	154	090	2.02
A9	38061-310000100	01	154	090	0.172
A9	38061-310000200	01	154	090	3.402
A9	38061-310000300	01	154	090	4.136
A9	38061-310000700	02	154	090	0.072

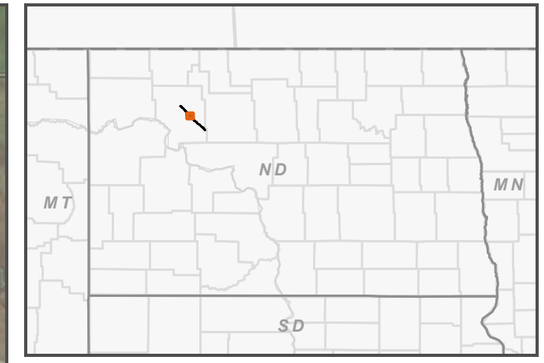


FIGURE 1-2.3
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

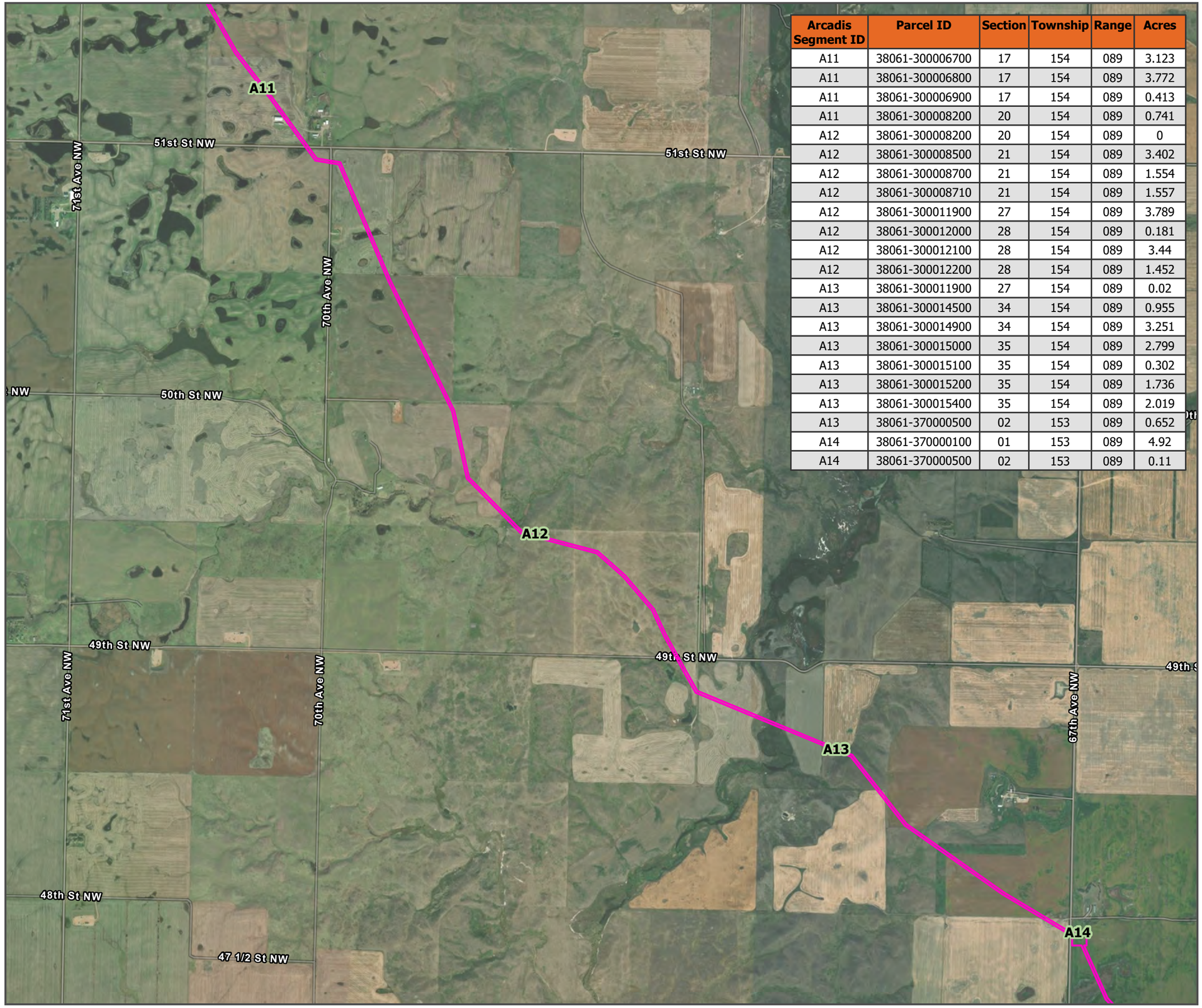
Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth NW obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS



Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
A11	38061-300006700	17	154	089	3.123
A11	38061-300006800	17	154	089	3.772
A11	38061-300006900	17	154	089	0.413
A11	38061-300008200	20	154	089	0.741
A12	38061-300008200	20	154	089	0
A12	38061-300008500	21	154	089	3.402
A12	38061-300008700	21	154	089	1.554
A12	38061-300008710	21	154	089	1.557
A12	38061-300011900	27	154	089	3.789
A12	38061-300012000	28	154	089	0.181
A12	38061-300012100	28	154	089	3.44
A12	38061-300012200	28	154	089	1.452
A13	38061-300011900	27	154	089	0.02
A13	38061-300014500	34	154	089	0.955
A13	38061-300014900	34	154	089	3.251
A13	38061-300015000	35	154	089	2.799
A13	38061-300015100	35	154	089	0.302
A13	38061-300015200	35	154	089	1.736
A13	38061-300015400	35	154	089	2.019
A13	38061-370000500	02	153	089	0.652
A14	38061-370000100	01	153	089	4.92
A14	38061-370000500	02	153	089	0.11

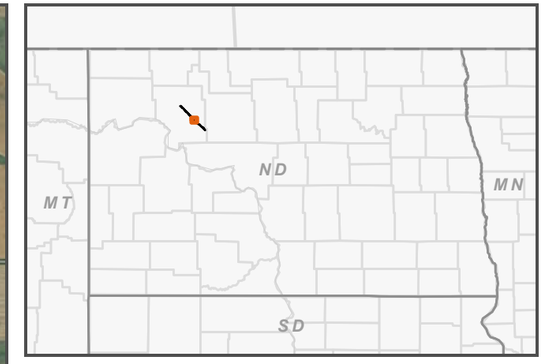


FIGURE 1-2.4
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth NW, Shell Lake, Epworth SE obtained through ArcG
streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS

Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
A13	38061-370000500	02	153	089	0.652
A14	38061-360002500	07	153	088	3.207
A14	38061-360002600	07	153	088	2.388
A14	38061-360002800	07	153	088	1.09
A14	38061-370000100	01	153	089	4.92
A14	38061-370000200	01	153	089	2.537
A14	38061-370000400	01	153	089	1.336
A14	38061-370000500	02	153	089	0.11
A14	38061-370005300	12	153	089	3.236
A15	38061-360002500	07	153	088	0.005
A15	38061-360002900	08	153	088	0.001
A15	38061-360003000	08	153	088	3.168
A15	38061-360006400	16	153	088	0.004
A15	38061-360006600	17	153	088	0.049
A15	38061-360006800	17	153	088	3.761
A15	38061-360006900	17	153	088	1.258
A16	38061-360006400	16	153	088	3.109
A16	38061-360008800	21	153	088	2.492
A16	38061-360008900	21	153	088	1.456
A16	38061-360009200	21	153	088	1.797

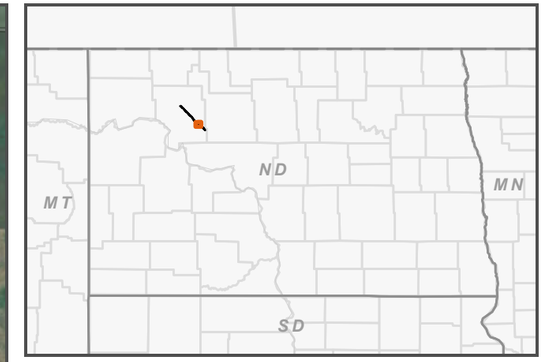


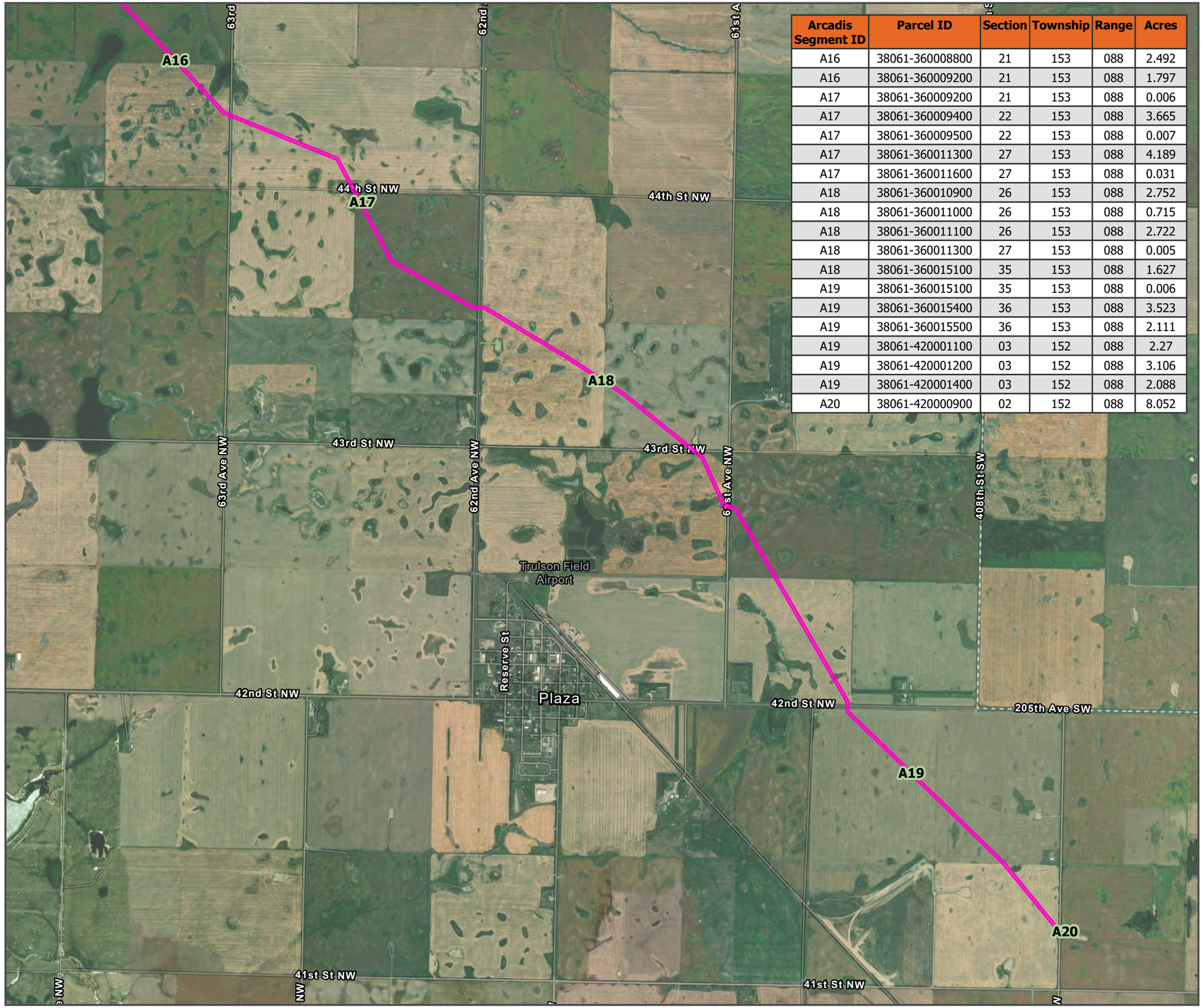
FIGURE 1-2.5
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend
Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Epworth SE, Plaza obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS



Arcadis Segment ID	Parcel ID	Section	Township	Range	Acres
A16	38061-360008800	21	153	088	2.492
A16	38061-360009200	21	153	088	1.797
A17	38061-360009200	21	153	088	0.006
A17	38061-360009400	22	153	088	3.665
A17	38061-360009500	22	153	088	0.007
A17	38061-360011300	27	153	088	4.189
A17	38061-360011600	27	153	088	0.031
A18	38061-360010900	26	153	088	2.752
A18	38061-360011000	26	153	088	0.715
A18	38061-360011100	26	153	088	2.722
A18	38061-360011300	27	153	088	0.005
A18	38061-360015100	35	153	088	1.627
A19	38061-360015100	35	153	088	0.006
A19	38061-360015400	36	153	088	3.523
A19	38061-360015500	36	153	088	2.111
A19	38061-420001100	03	152	088	2.27
A19	38061-420001200	03	152	088	3.106
A19	38061-420001400	03	152	088	2.088
A20	38061-420000900	02	152	088	8.052

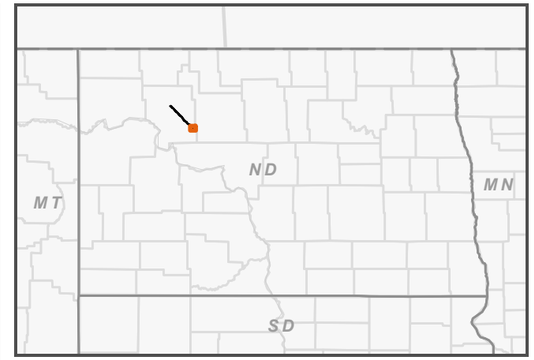


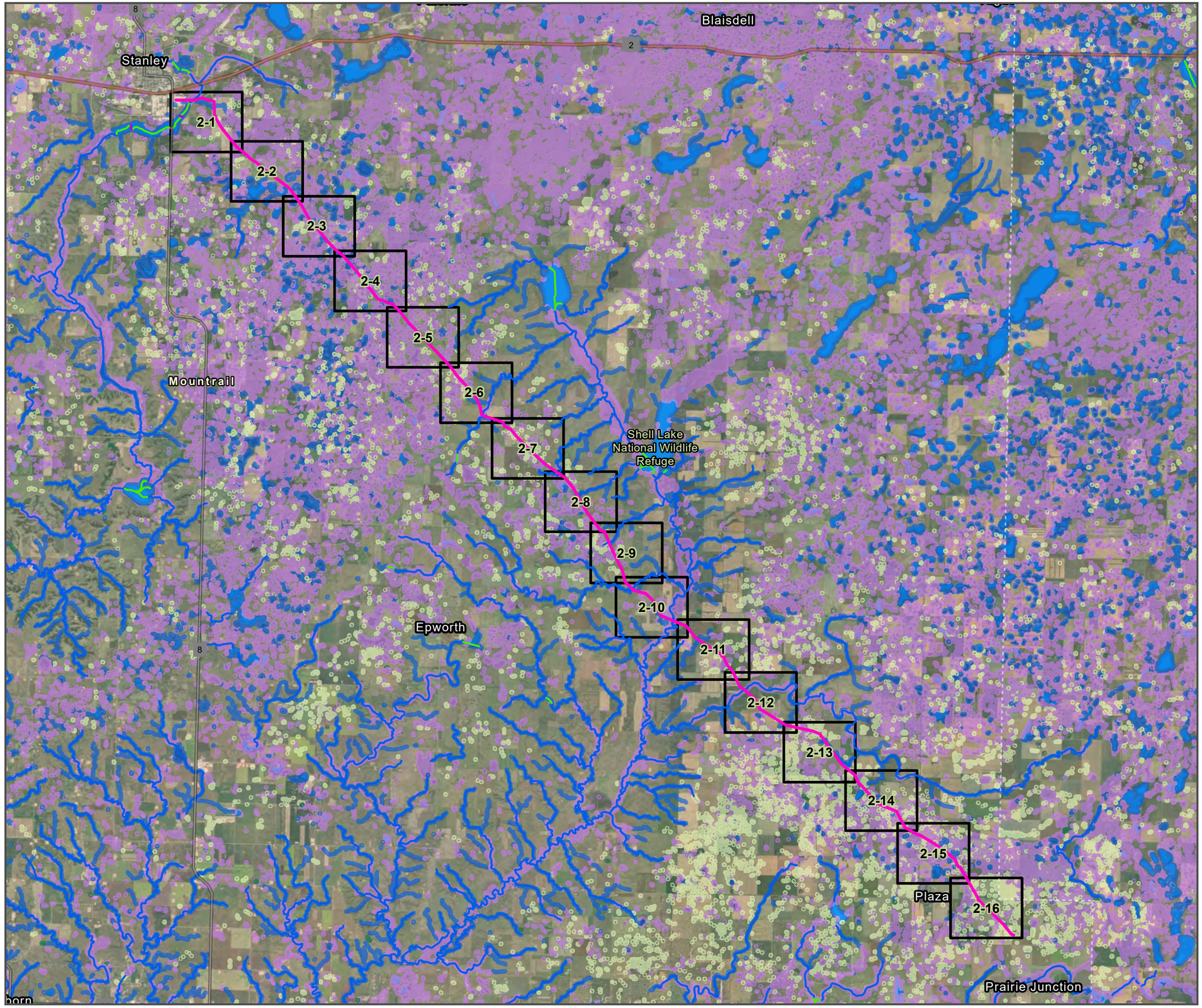
FIGURE 1-2.6
ARCADIS SEGMENTS
Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend
Environmental Survey Area (ESA)

Notes:
1. USGS Topographic Quadrangle for Plaza obtained through ArcGIS Online streaming service.

0 1,000 2,000 4,000 ft
0 250 500 1,000 m

ARCADIS



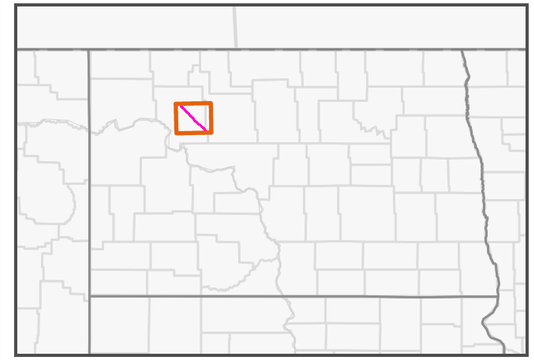


FIGURE 2-0

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

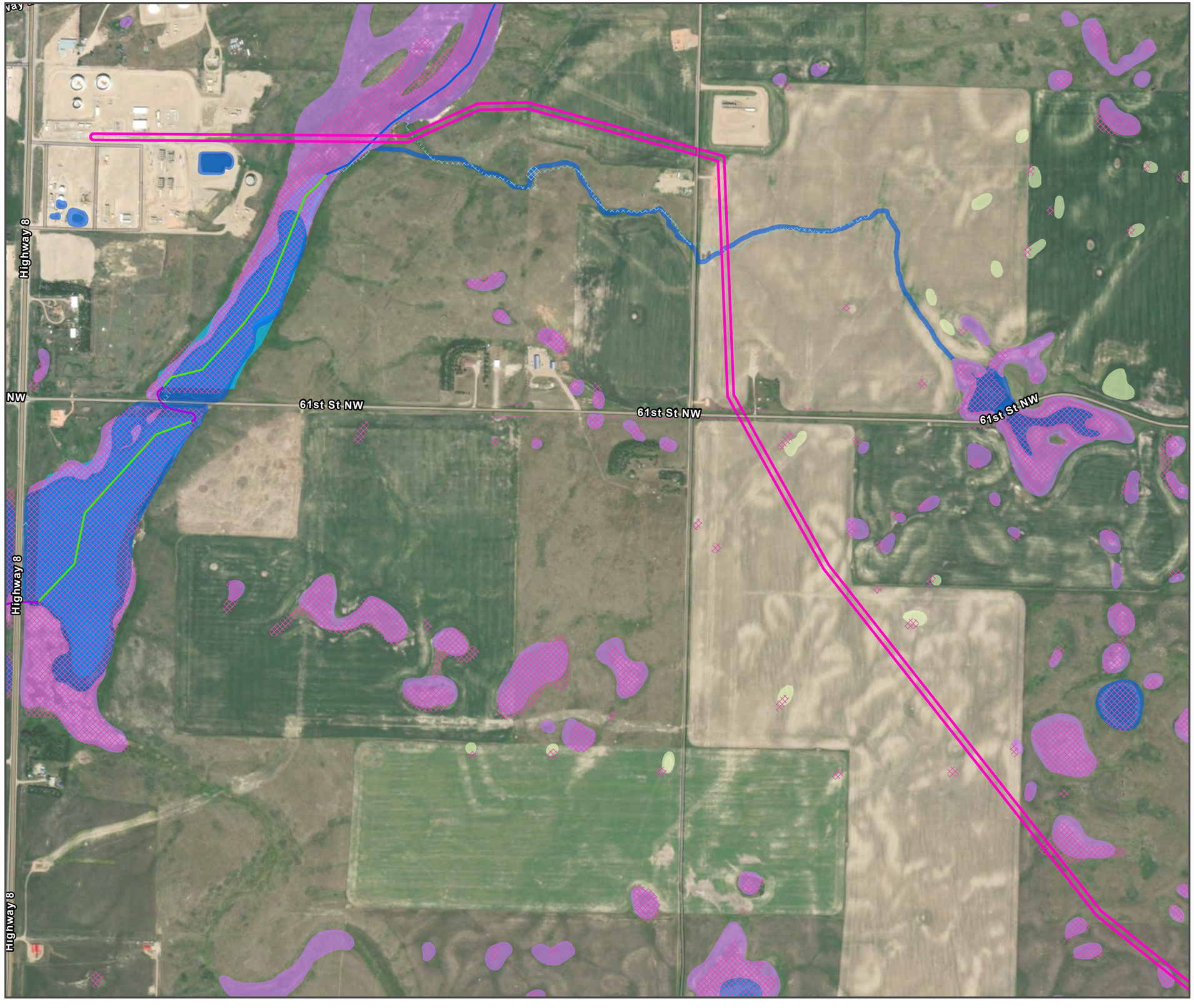
Legend

- Environmental Survey Area (ESA)
- Figure Extent
- Sinks
- Wetland
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- NHD Artifical Path
- NHD Connector
- NHD Stream/River
- NWI Freshwater Emergent Wetland
- NWI Freshwater Forested/Shrub Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 7,500 15,000 30,000 ft
0 2,500 5,000 10,000 m

ARCADIS



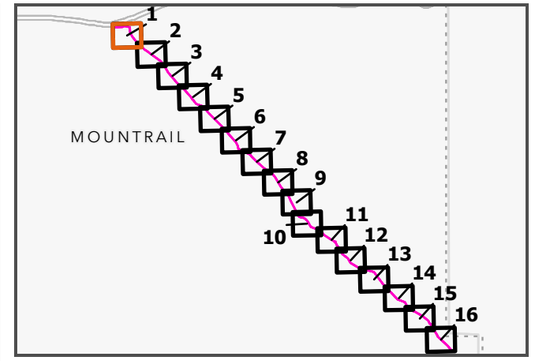


FIGURE 2-1

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Environmental Survey Area (ESA)
- NHD Artifical Path
- NHD Connector
- NHD Stream/River
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: Lhardin Last Saved: 8/16/2024 7:20 AM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

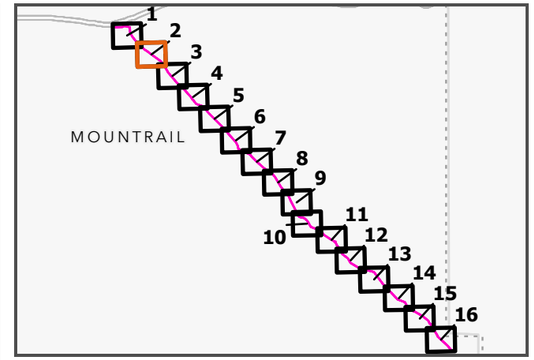


FIGURE 2-2

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

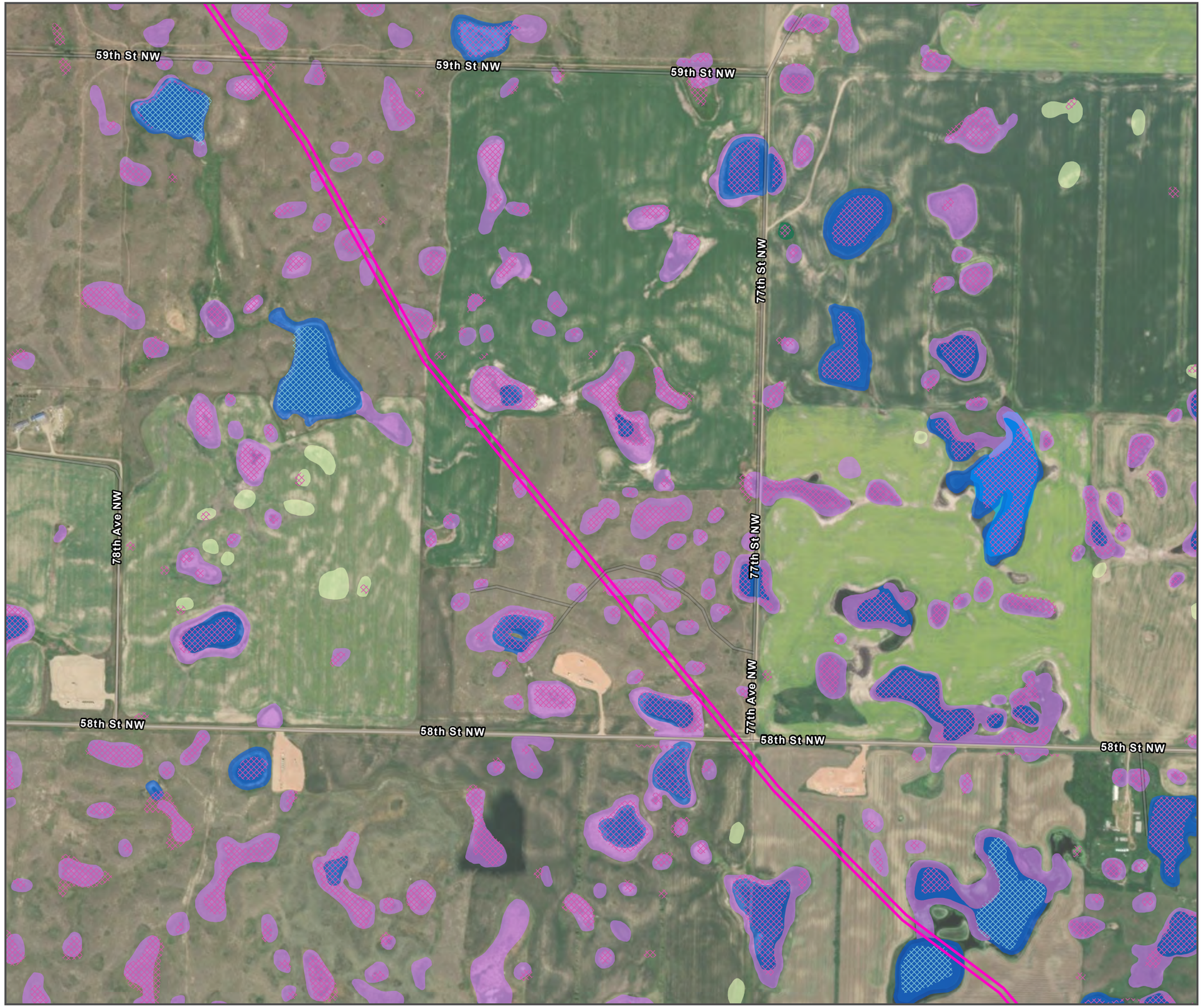
Legend

- Environmental Survey Area (ESA)
- Sinks
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



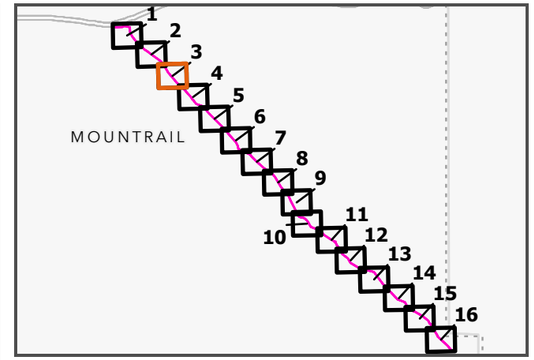


FIGURE 2-3

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Environmental Survey Area (ESA)
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Forested/Shrub Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

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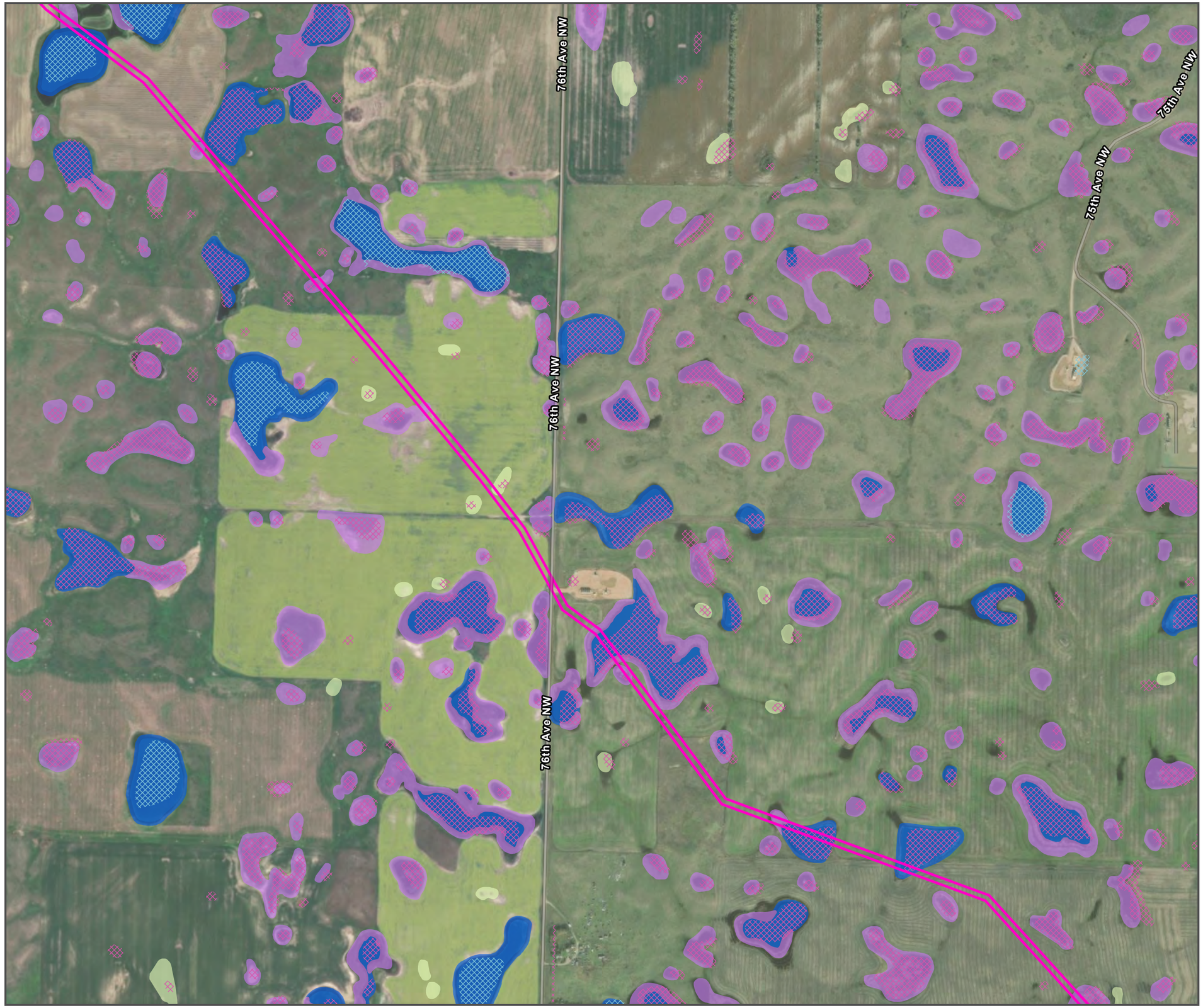
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



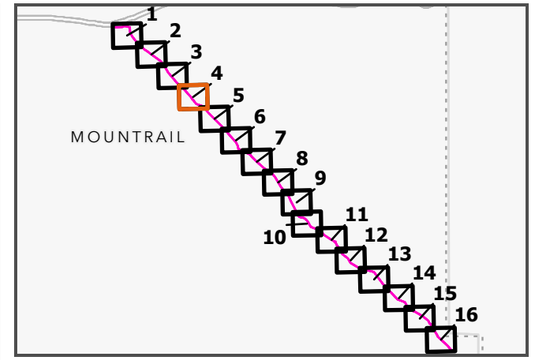


FIGURE 2-4

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Environmental Survey Area (ESA)
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: Uhrdin Last Saved: 8/16/2024 7:20 AM
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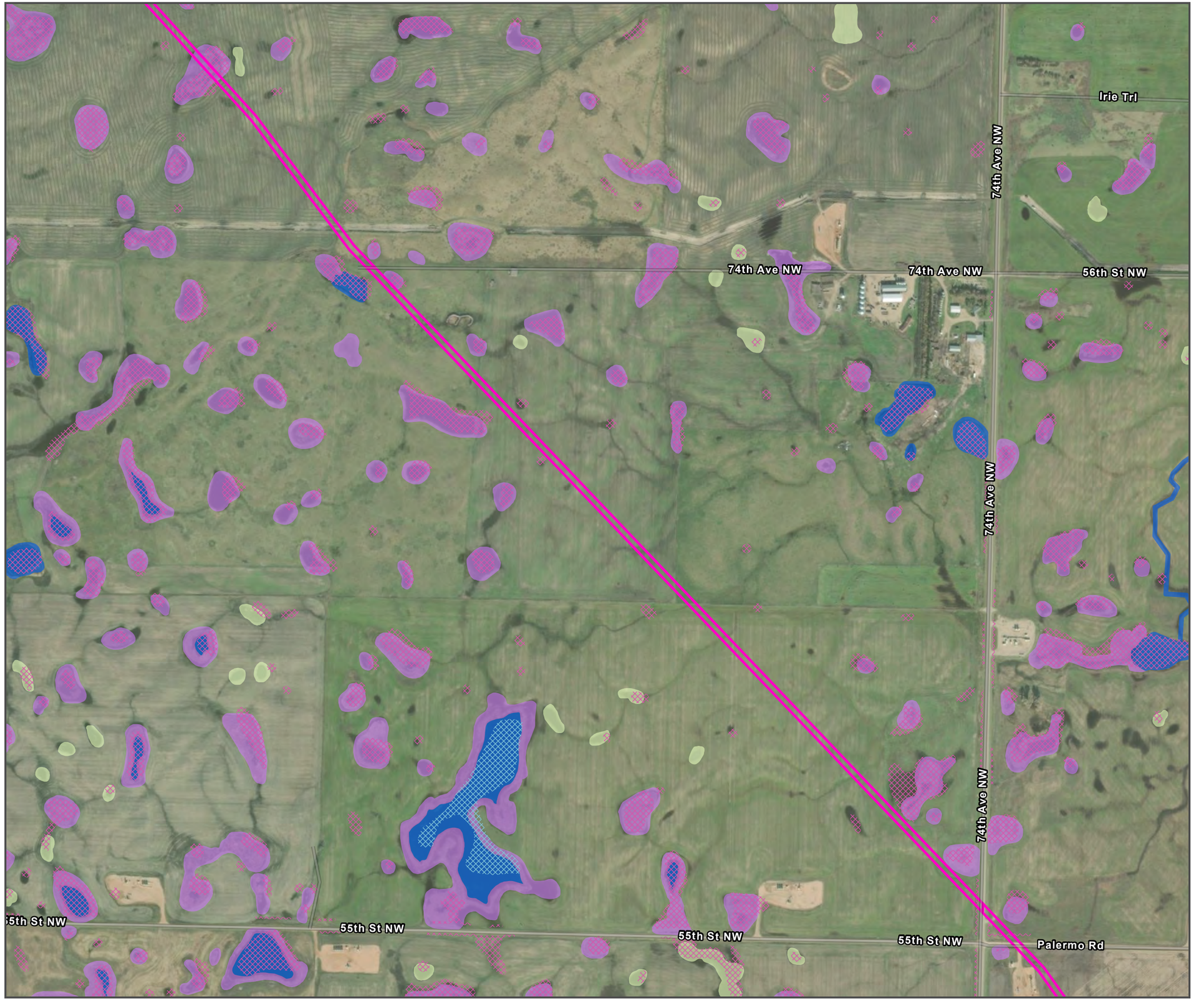
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



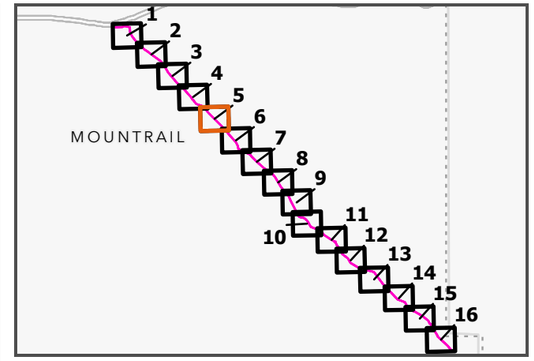


FIGURE 2-5

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

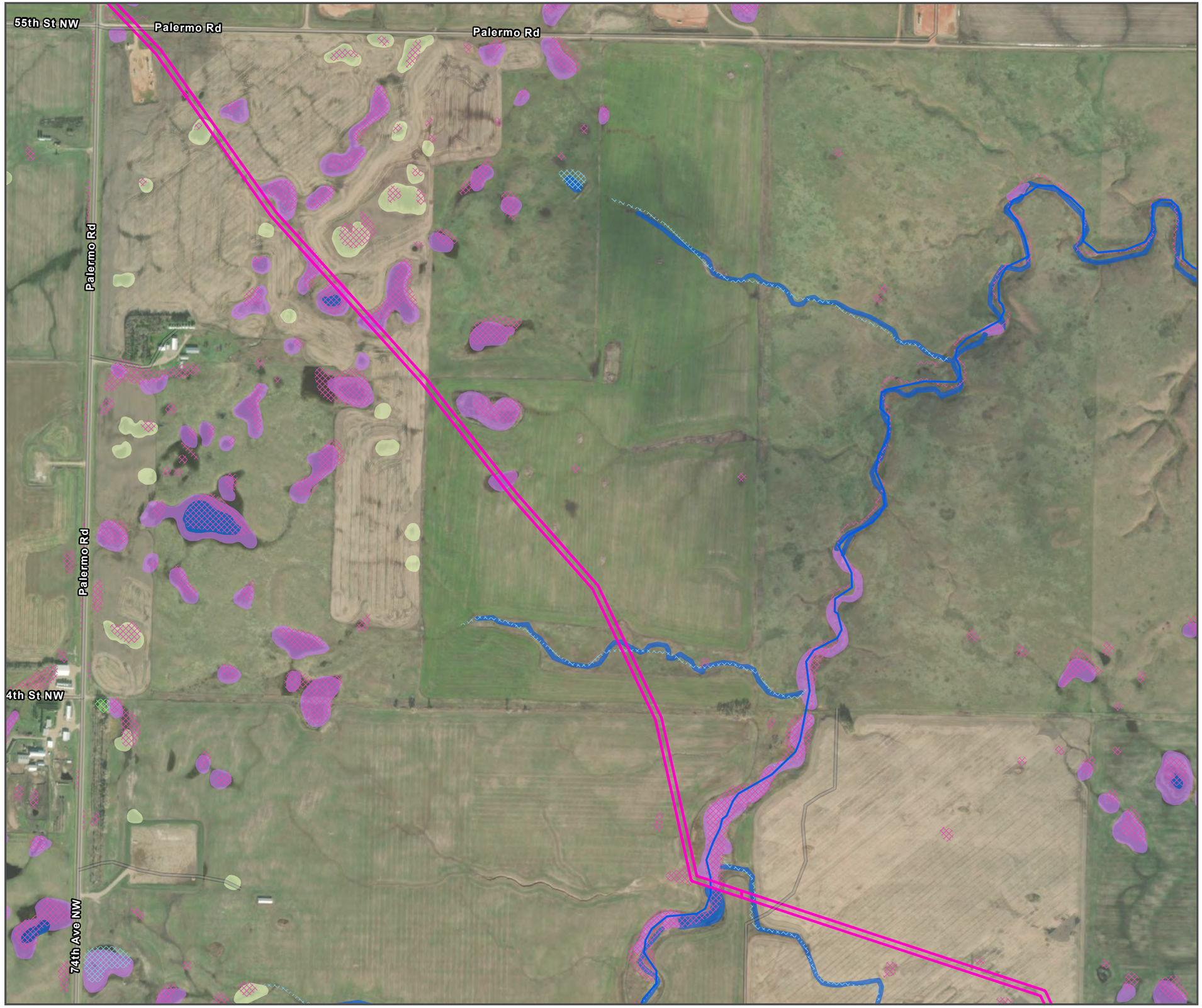
Legend

- Environmental Survey Area (ESA)
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



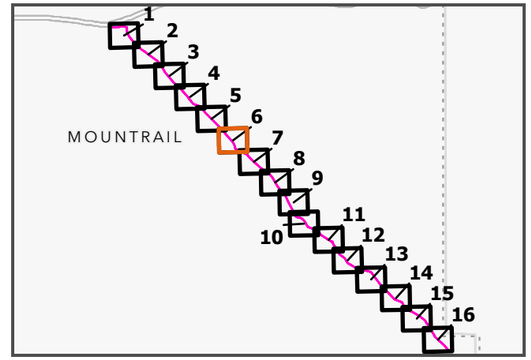


FIGURE 2-6

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Forested/Shrub Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

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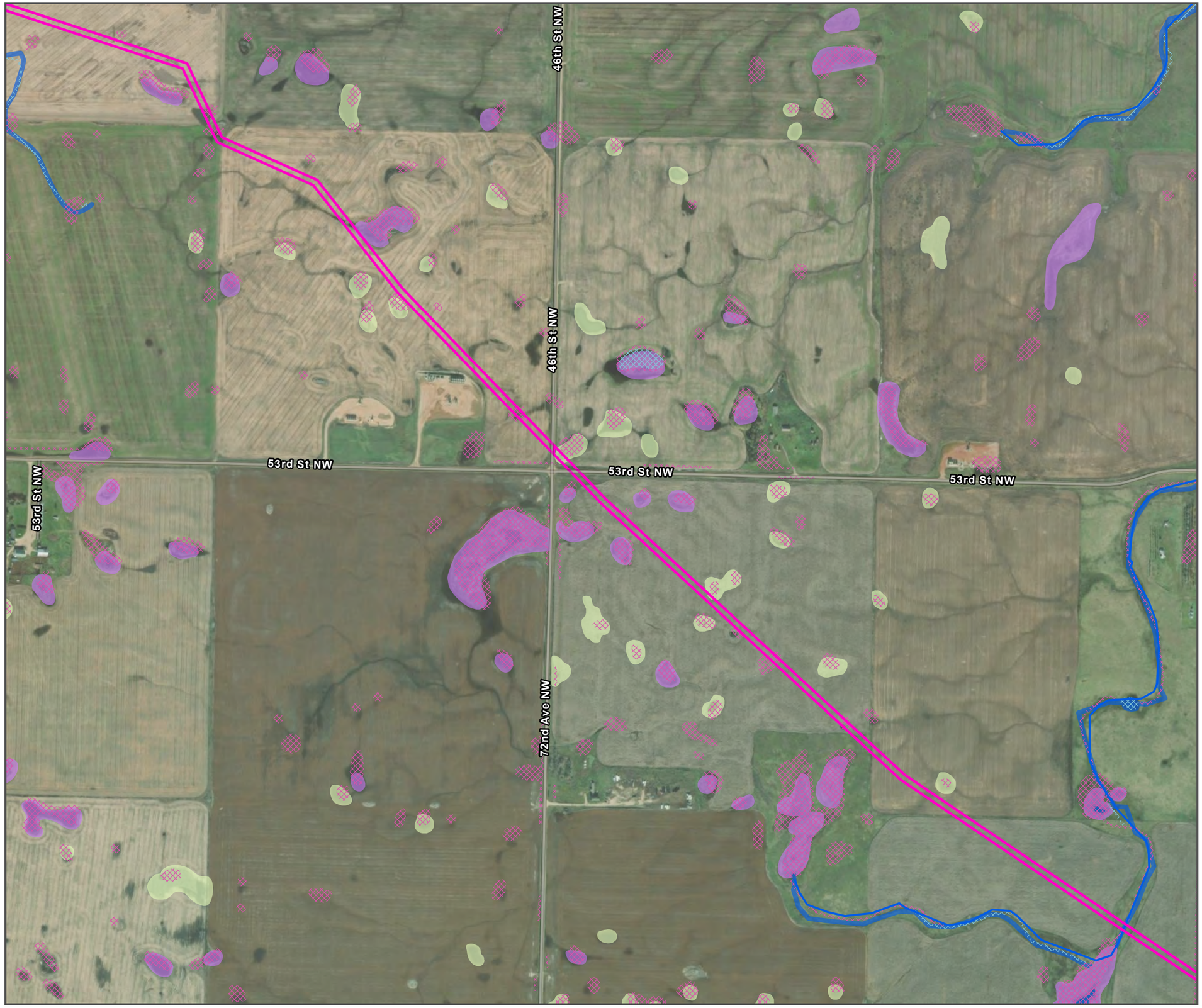
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Maps_Pipeline_Project\MXD_Pro\Thunder_Butte_MapX_WDR.aprx\Figure 2 NHD/NWI/FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



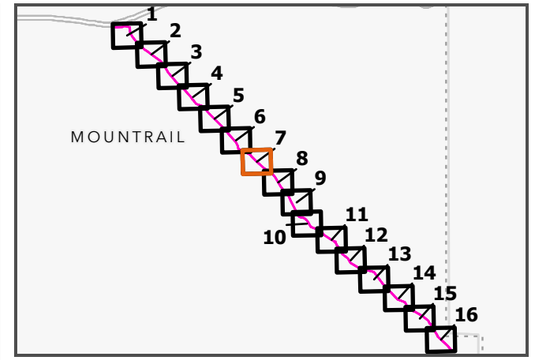


FIGURE 2-7

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: LMardin Last Saved: 8/16/2024 7:20 AM
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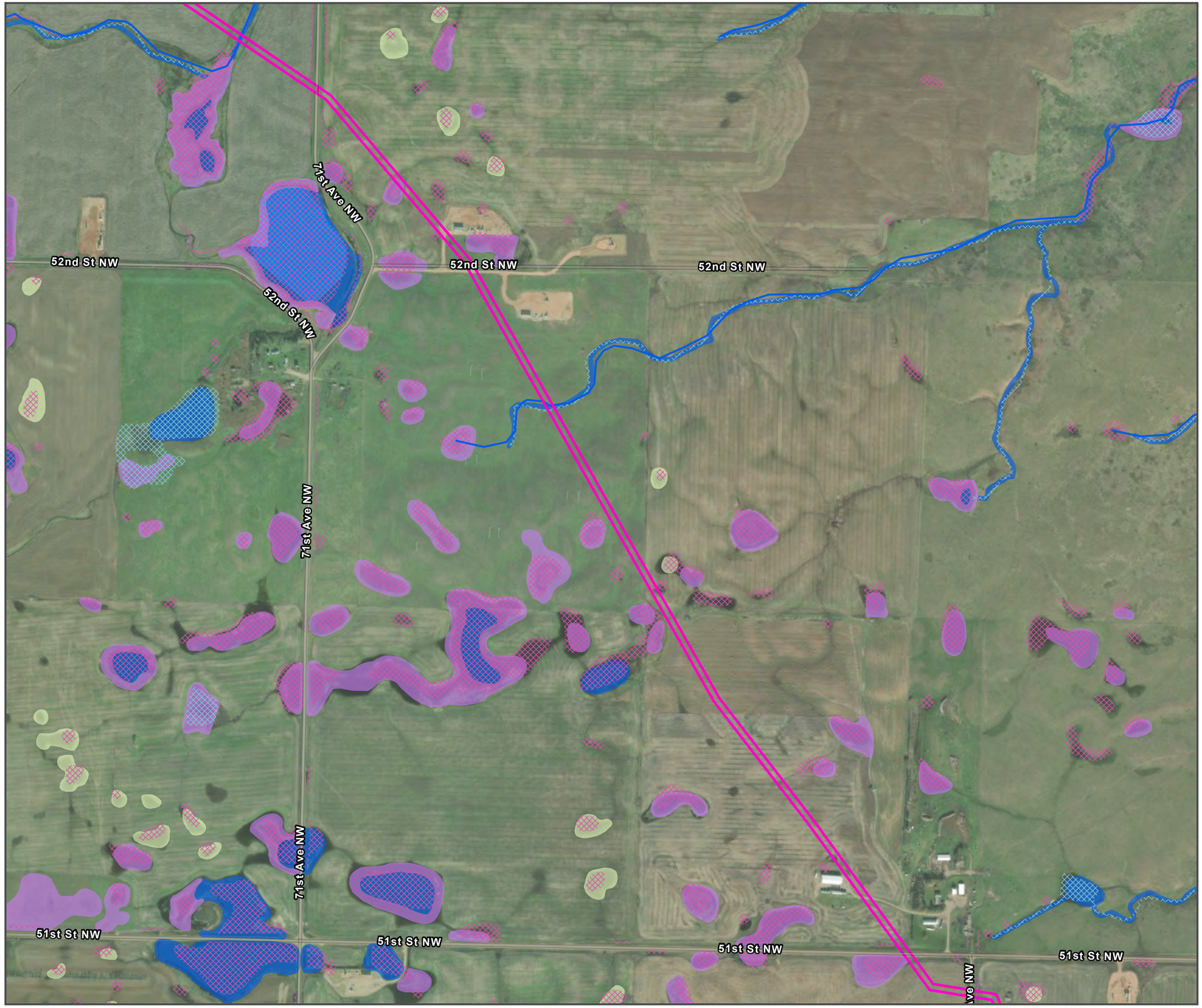
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



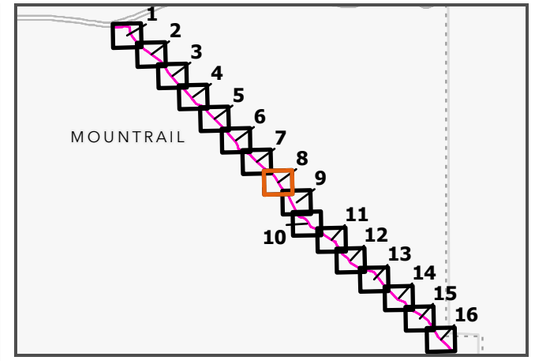


FIGURE 2-8

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

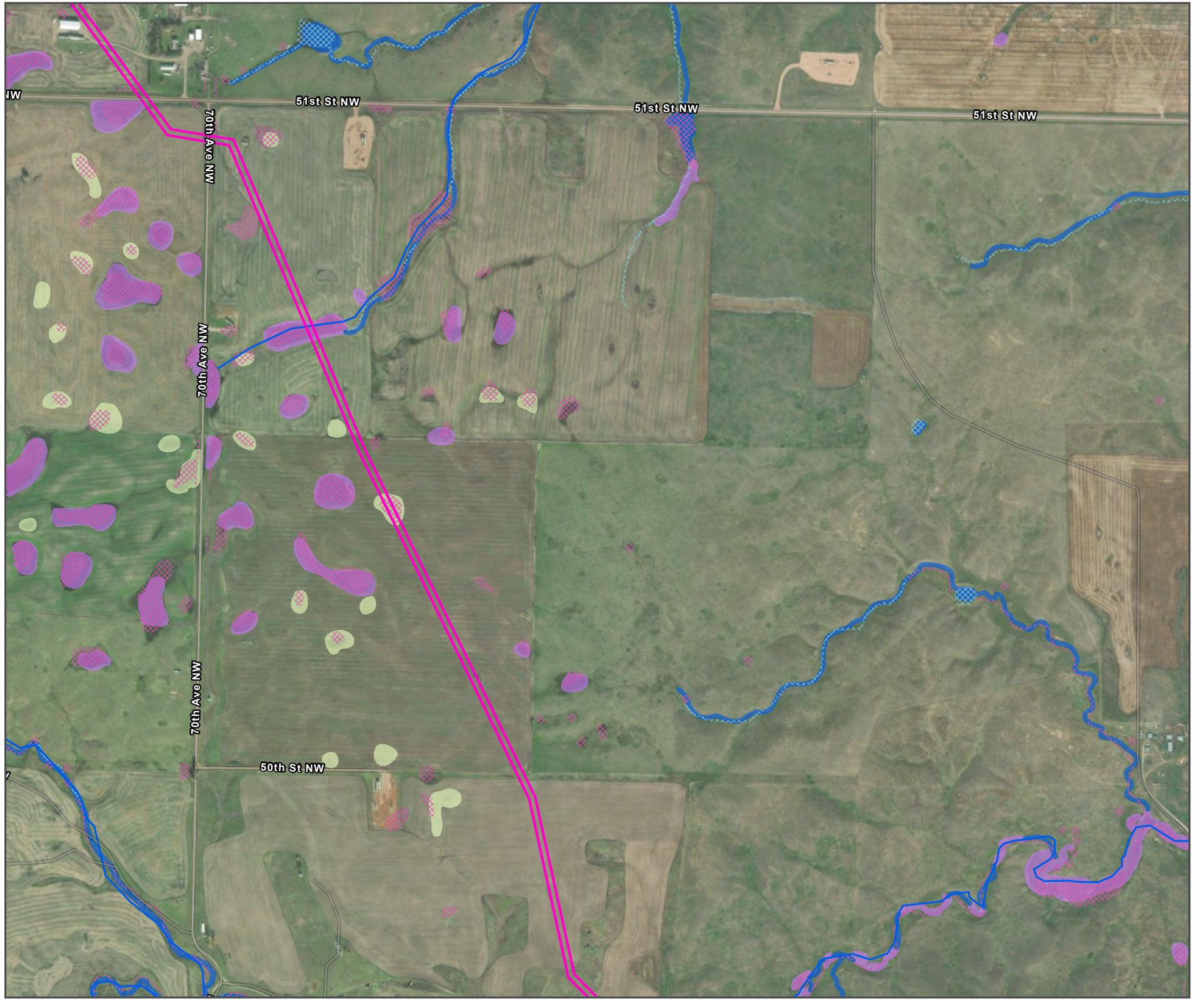
Legend

- Environmental Survey Area (ESA)
- NHD Stream/River
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



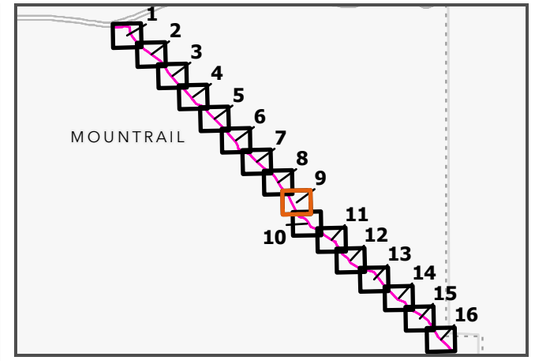


FIGURE 2-9

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

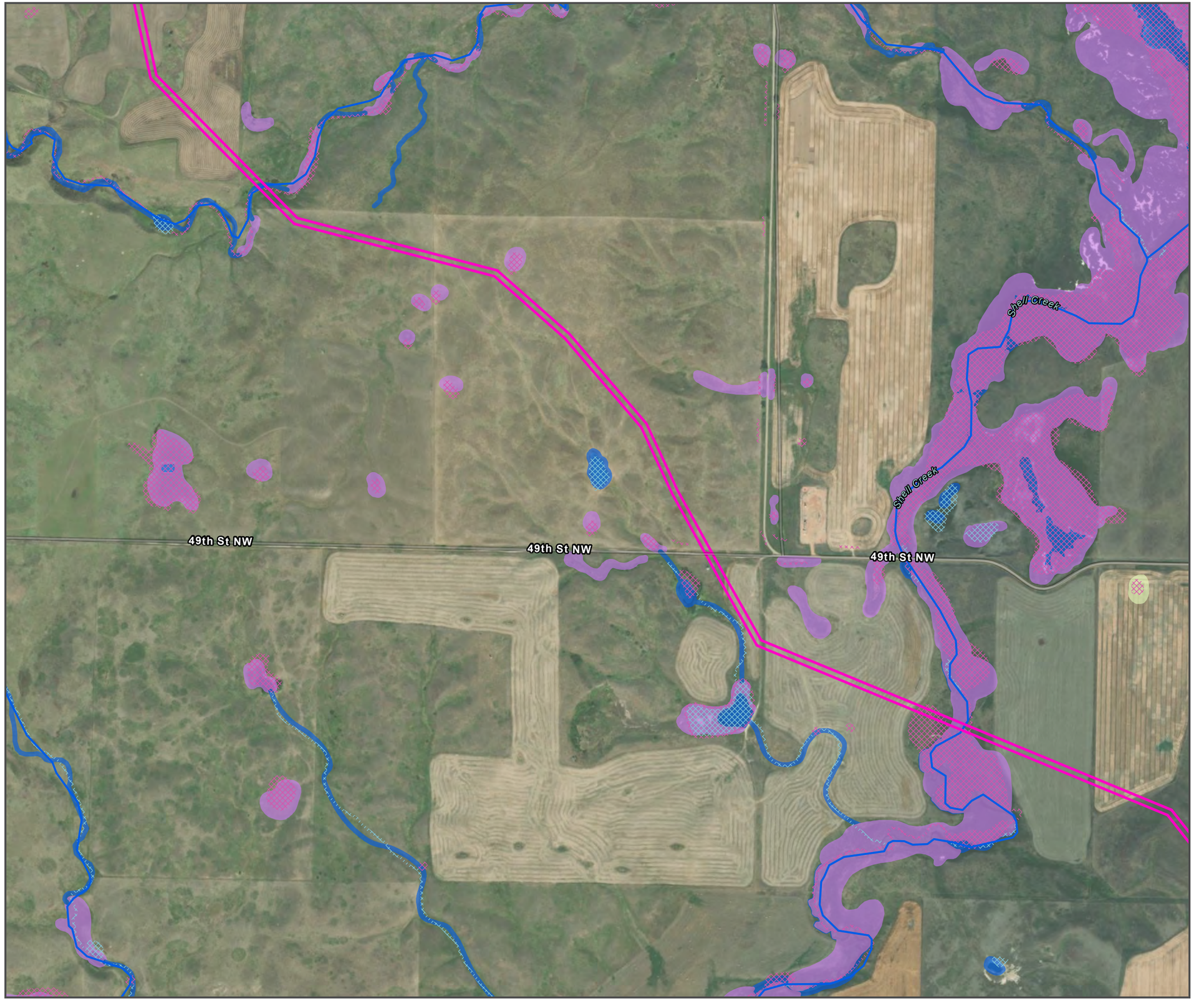
- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: LHardin Last Saved: 8/16/2024 7:20 AM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



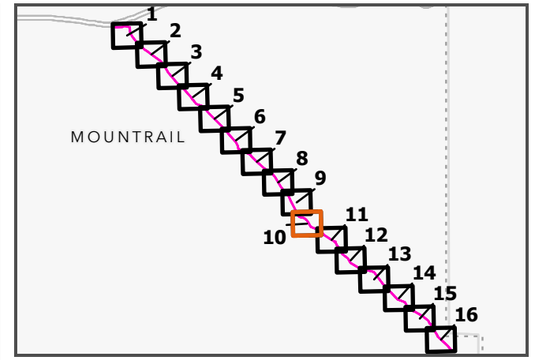


FIGURE 2-10

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

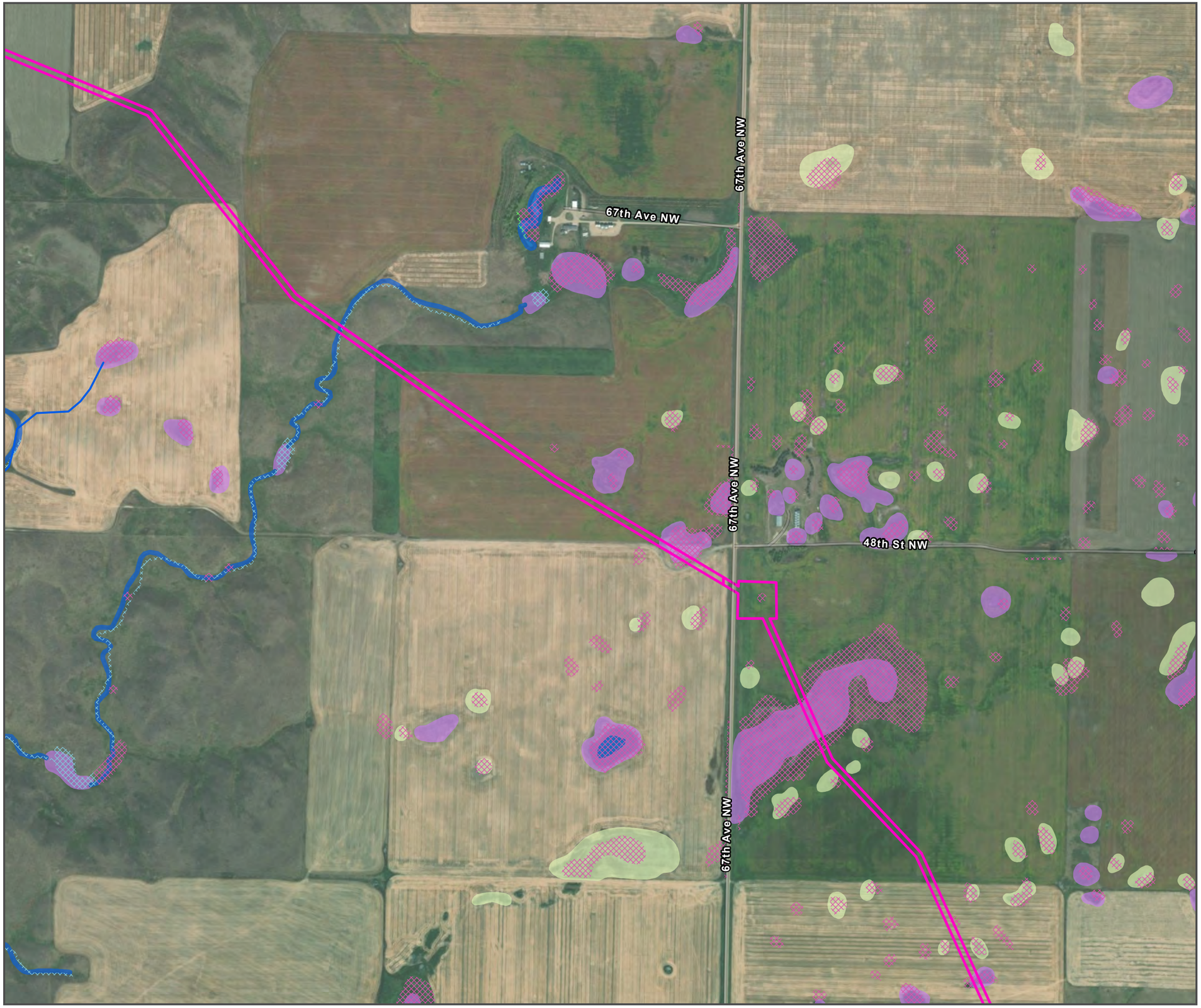
- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: Lhardin Last Saved: 8/16/2024 7:20 AM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



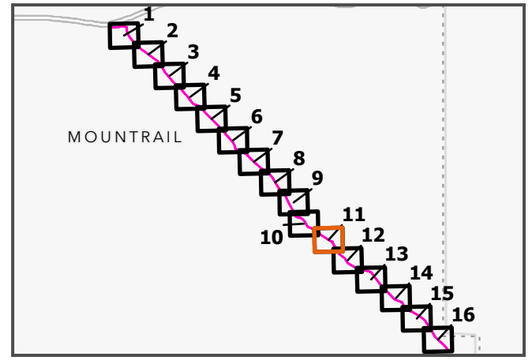


FIGURE 2-11

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

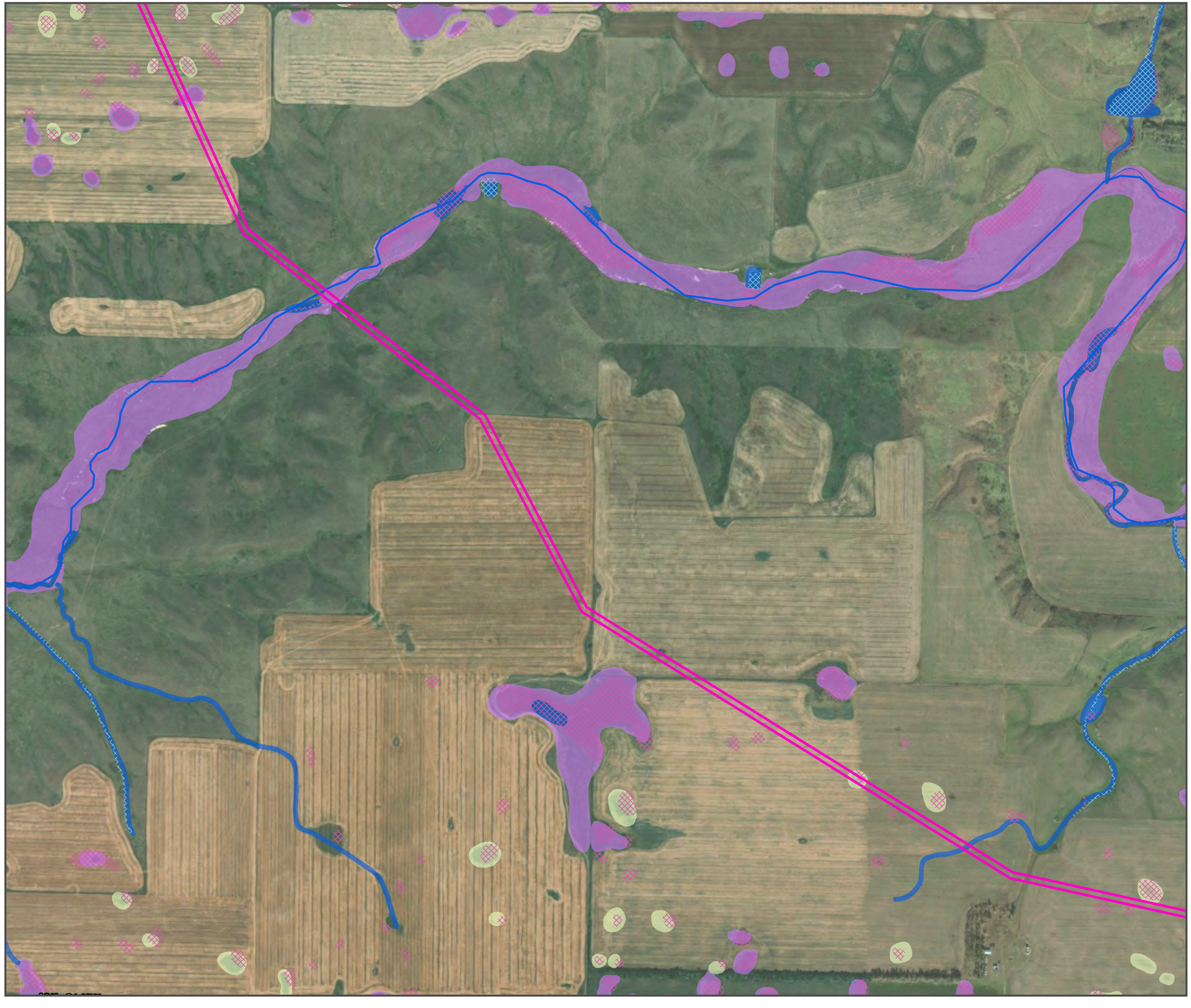
- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Forested/Shrub Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: Lhardin Last Saved: 8/16/2024 7:20 AM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 2 NHD/NWI/FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



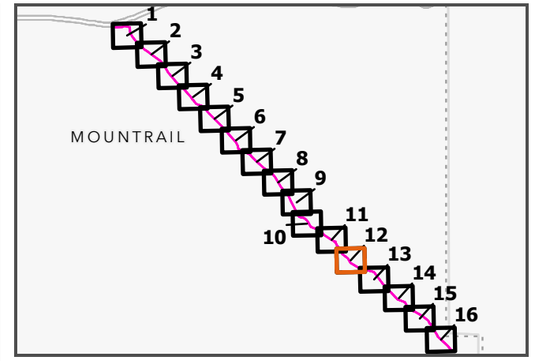


FIGURE 2-12

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

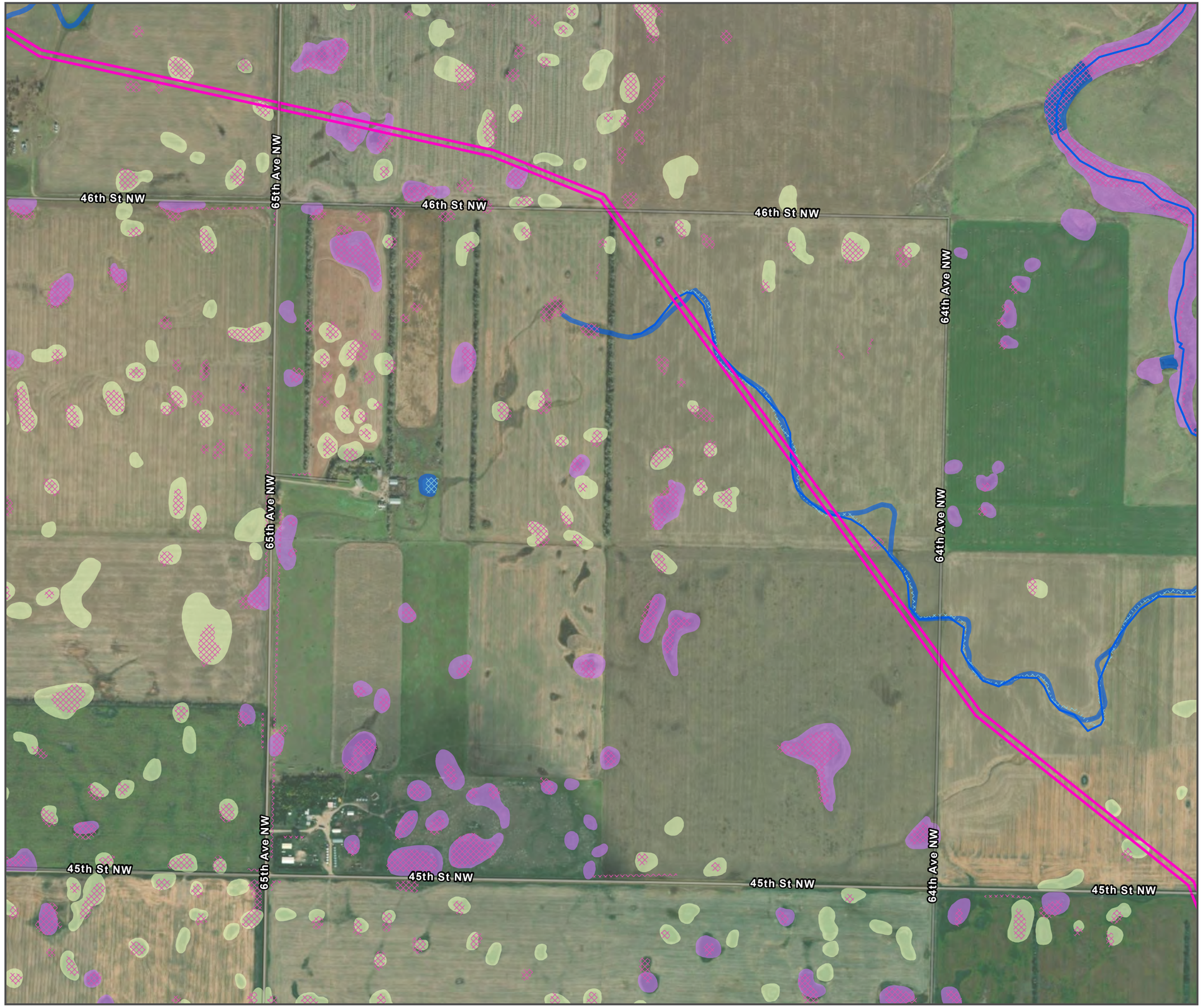
- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: LHardin Last Saved: 8/16/2024 7:20 AM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Processing_EPP\Thunder_Butte_Petroleum\Maps_Pipeline_Project\MXD_Pro\Thunder_Butte_Makati_WDR.aprx\Figure 2 NHD\NWI\FEMA
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



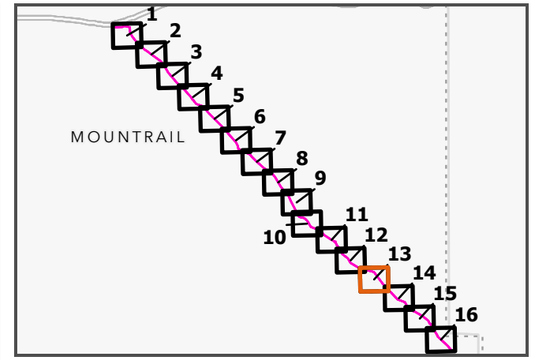


FIGURE 2-13

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

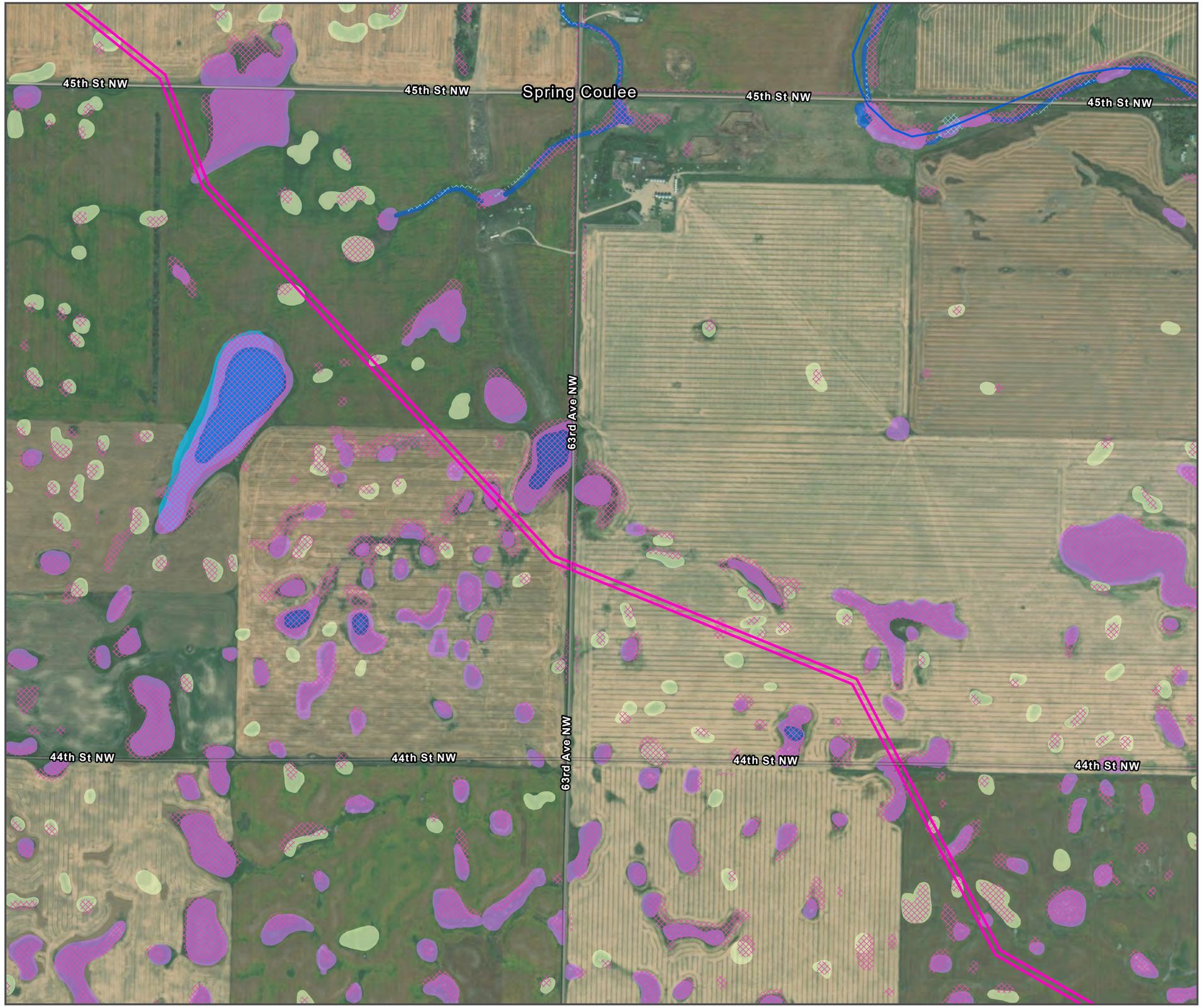
Legend

- Environmental Survey Area (ESA)
- NHD Stream/River
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



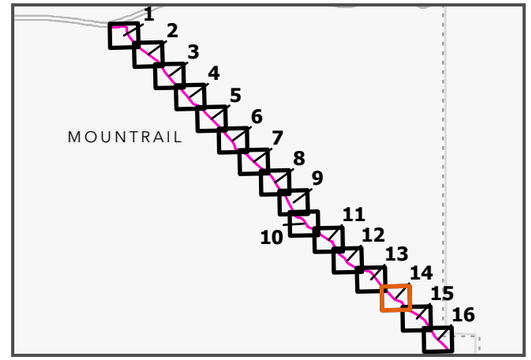


FIGURE 2-14

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

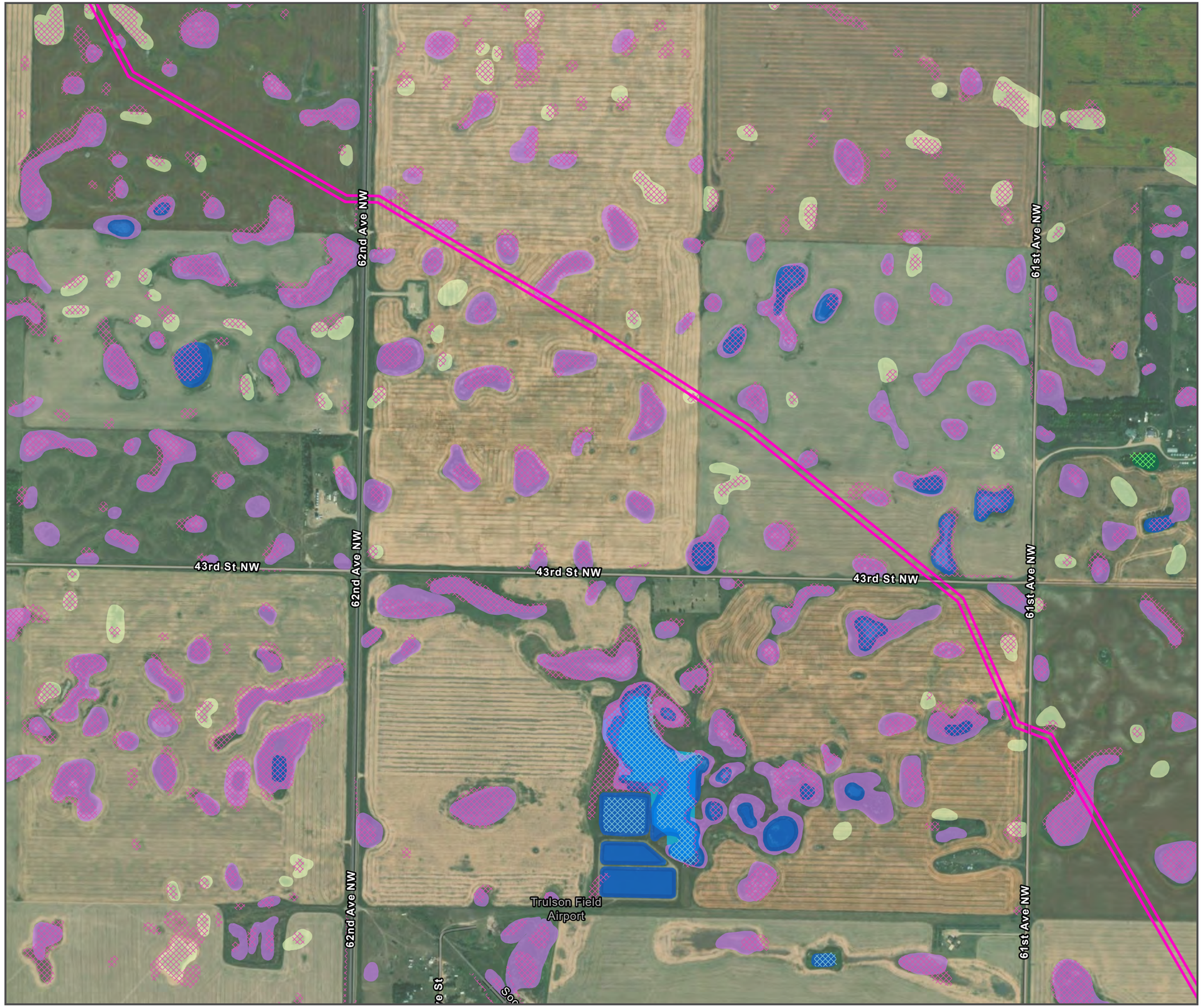
Legend

- Environmental Survey Area (ESA)
- NHD Stream/River
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



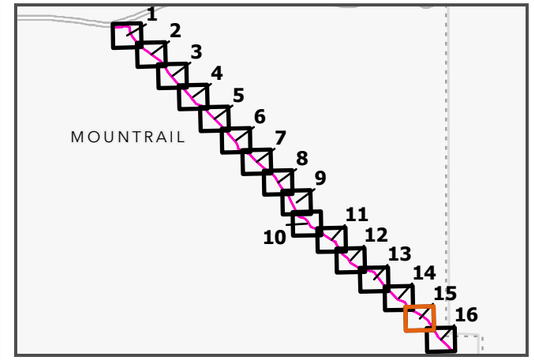


FIGURE 2-15

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

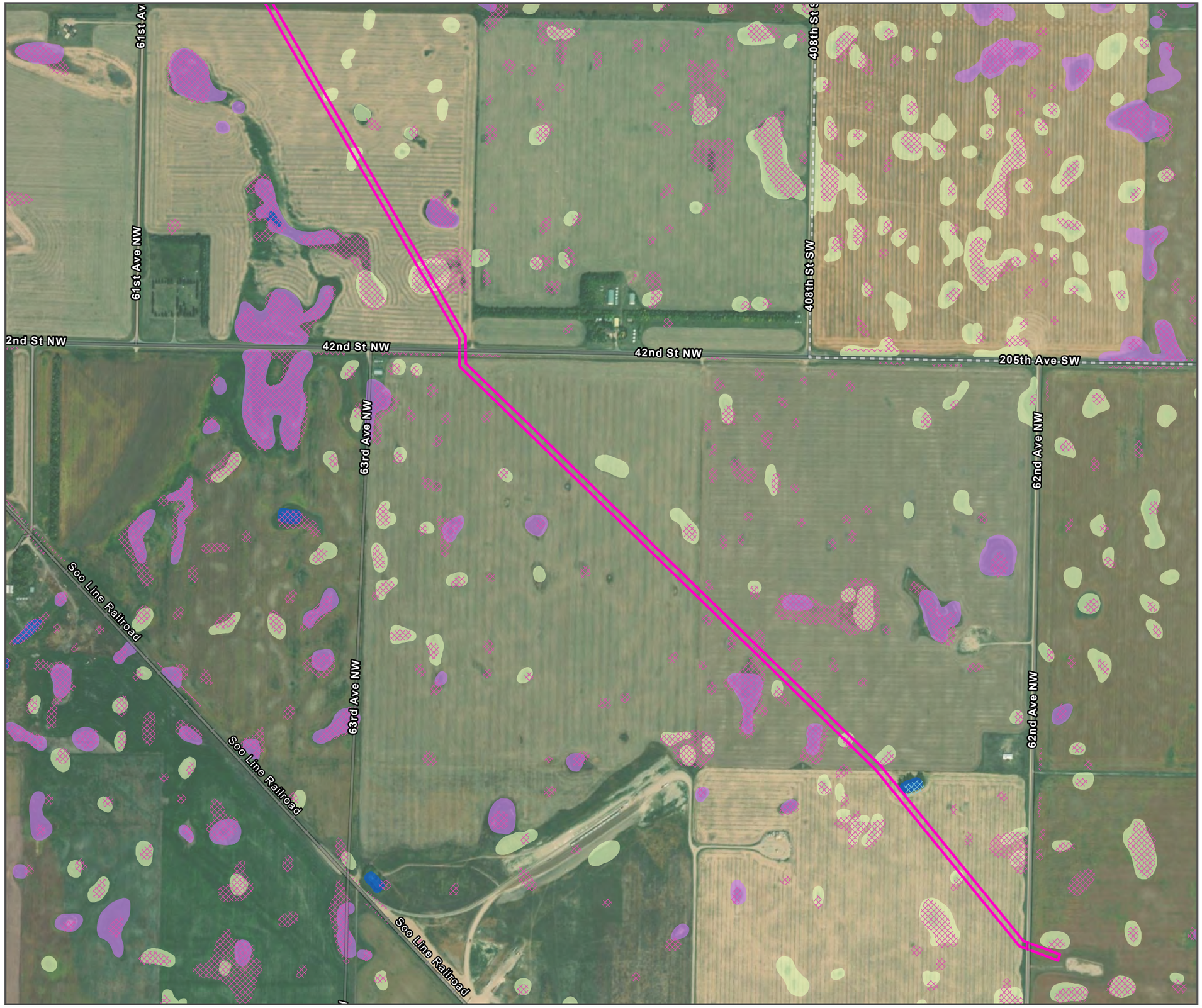
Legend

- Environmental Survey Area (ESA)
- NHD Lakes, Ponds, Reservoirs, and Estuaries
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Forested/Shrub Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Forested/Shrub Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



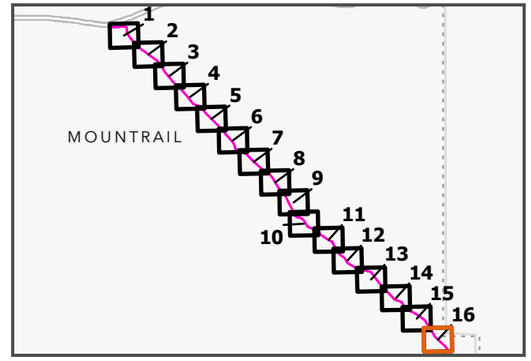


FIGURE 2-16

NHD /NWI /FEMA MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

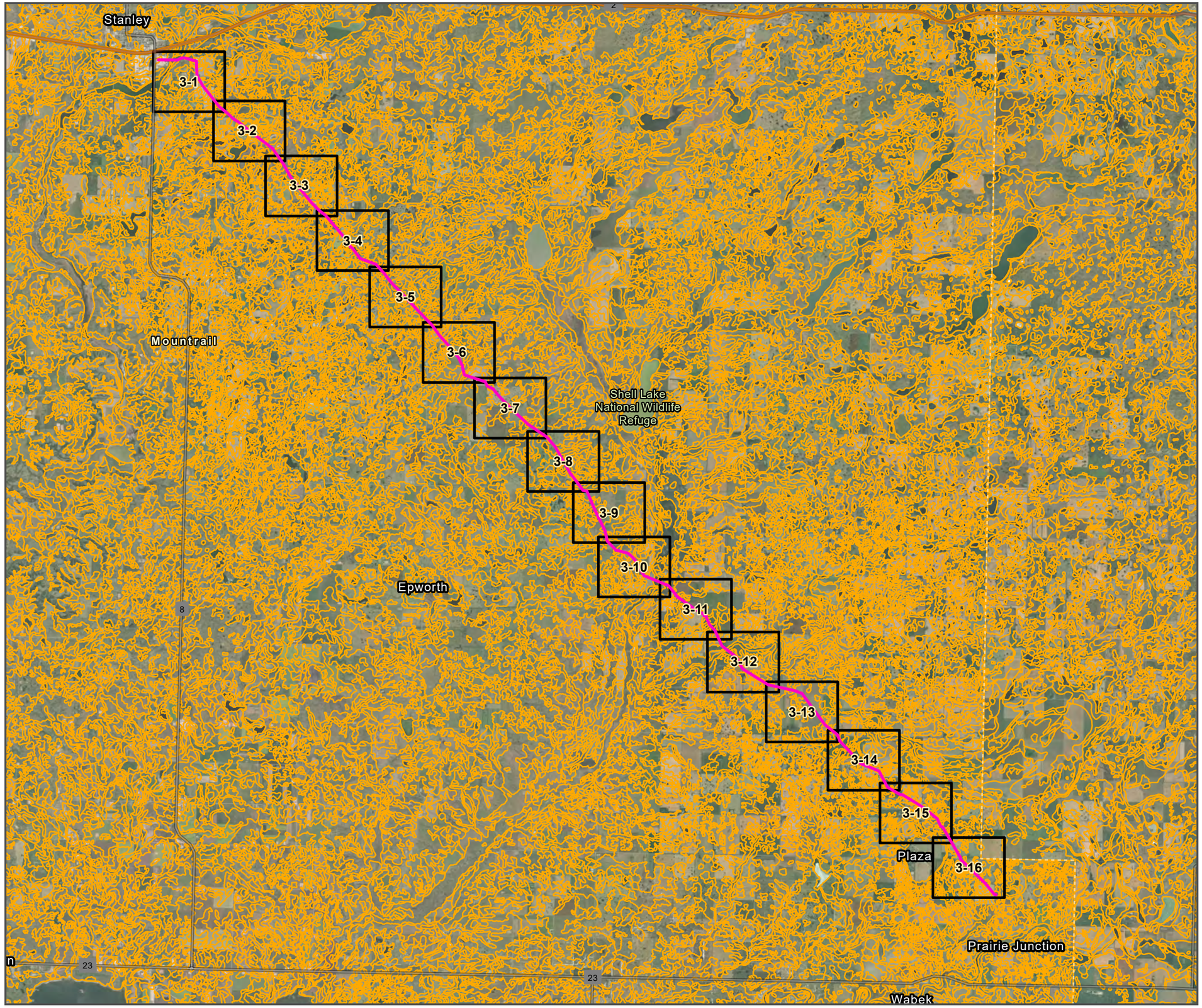
Legend

- Environmental Survey Area (ESA)
- North Dakota Freshwater Emergent Wetland
- North Dakota Freshwater Pond; Lake; Riverine
- NWI Freshwater Emergent Wetland
- NWI Freshwater Pond/ Lake/ Riverine
- Other NWI Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS



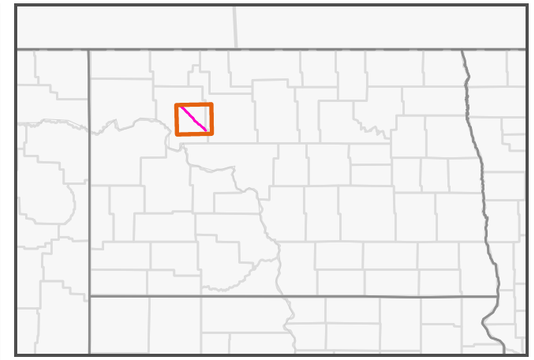


FIGURE 3-0

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

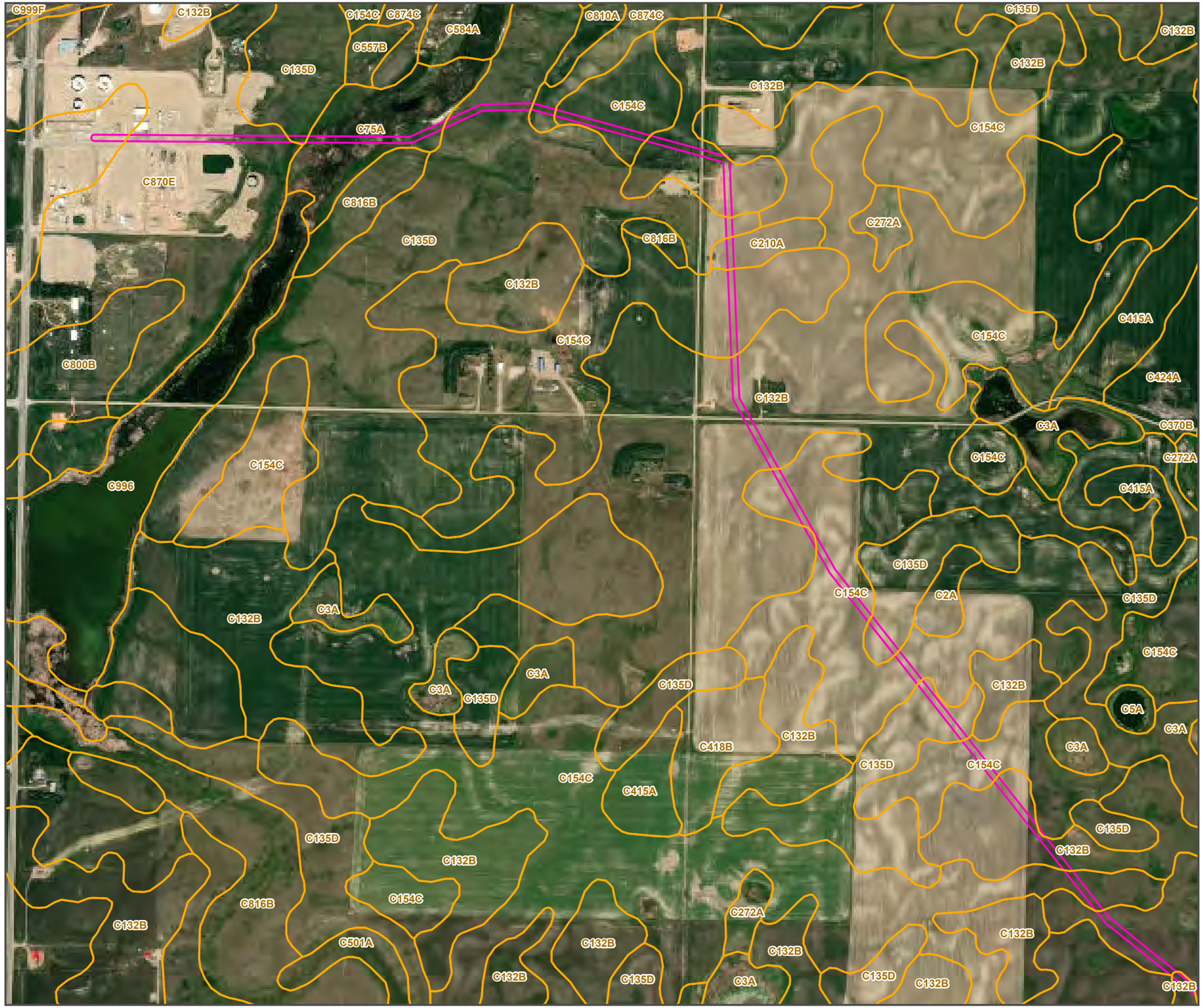
- Environmental Survey Area (ESA)
- Figure Extent
- Soil Class Boundary

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 7,500 15,000 30,000 ft
0 2,500 5,000 10,000 m

ARCADIS

Creator: LHardin Last Saved: 8/16/2024 1:29 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:\Process-ing_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3-0
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



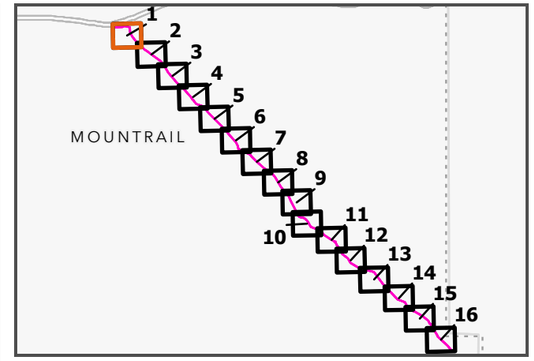


FIGURE 3-1
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

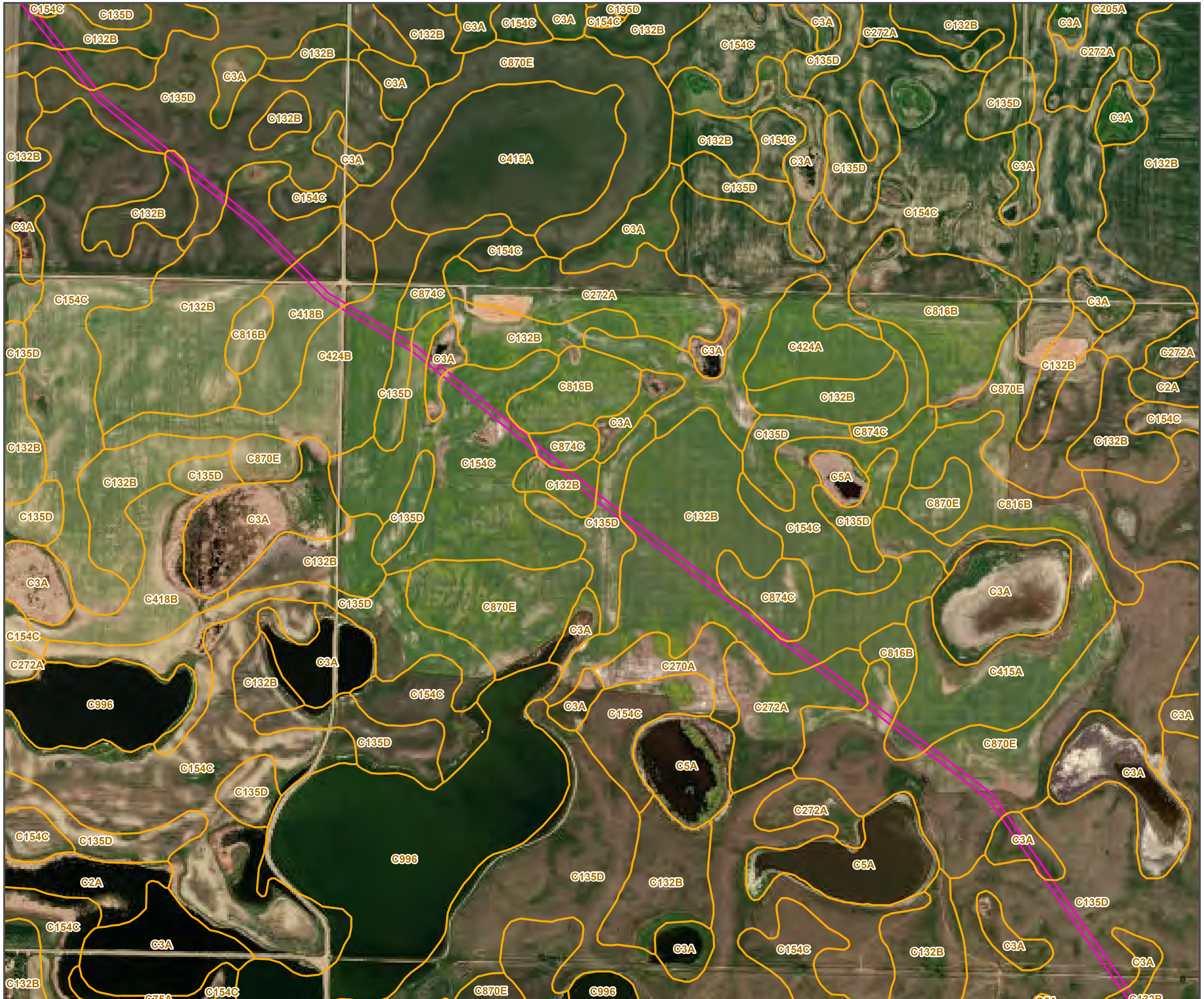
Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric (66-99%)
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Nonhydric (1-33%)
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



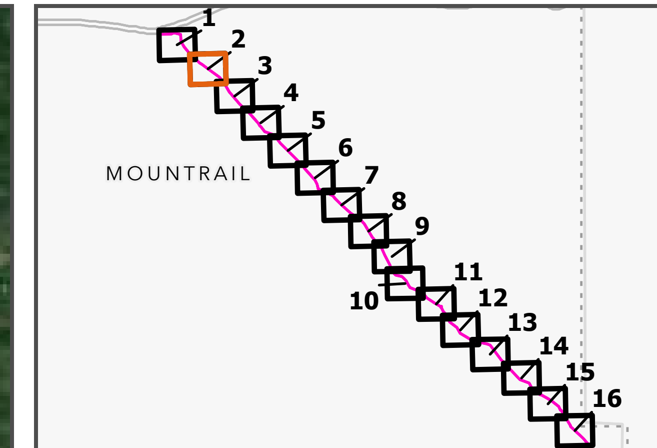


FIGURE 3-2

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

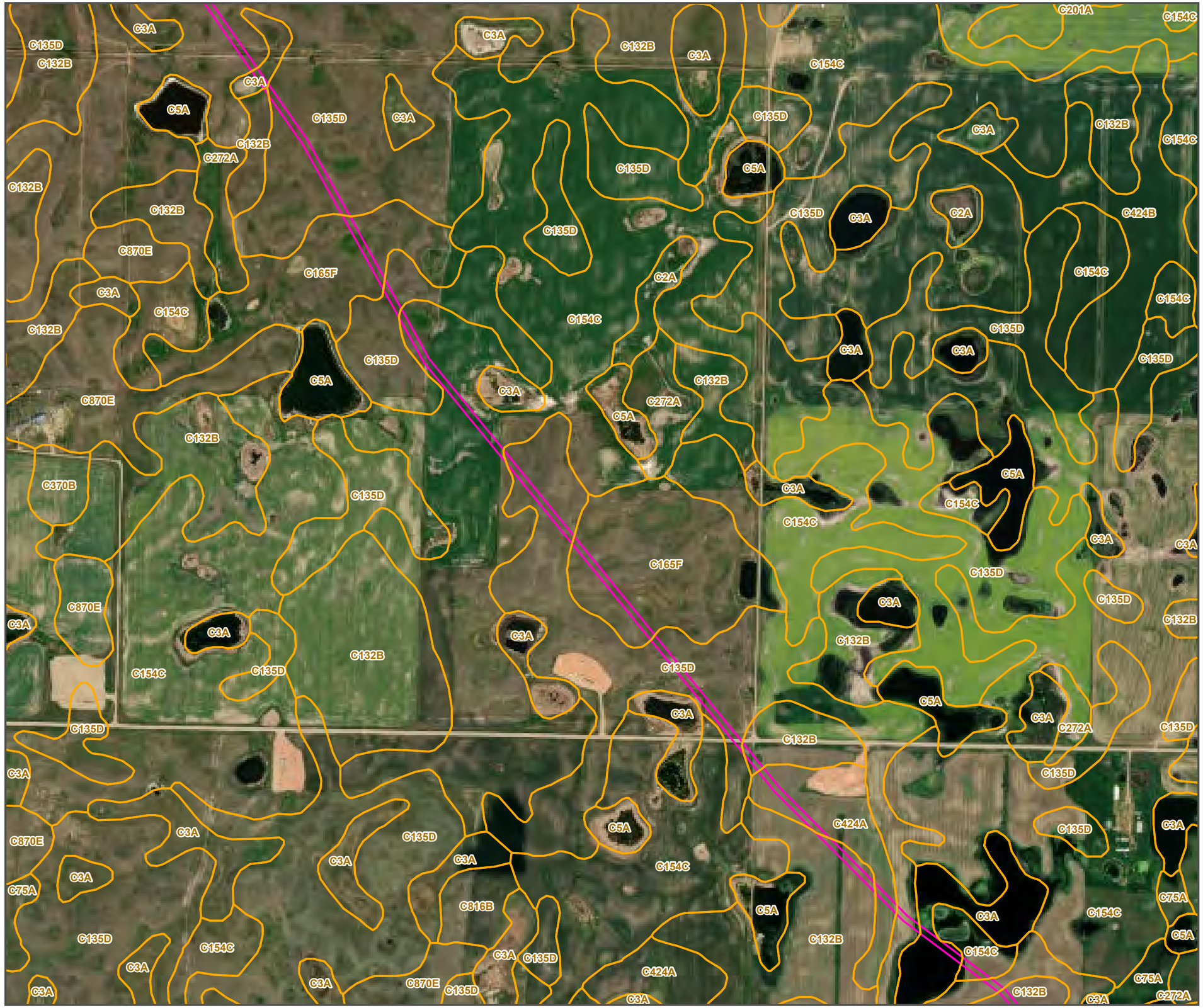
Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)
C418B	Tansem-Sakakawea loams, 2 to 6 percent slopes	Nonhydric (0%)
C424B	Minot silty clay, 2 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Nonhydric (1-33%)
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx/Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



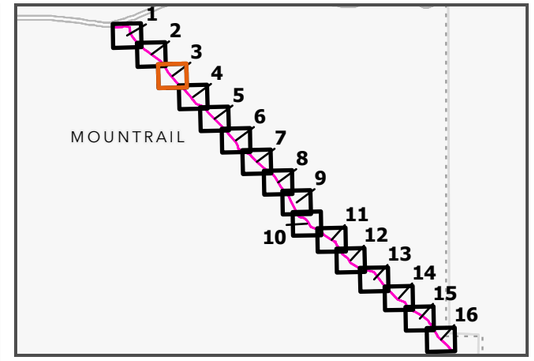


FIGURE 3-3

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C165F	Zahl-Max-Parnell complex, 0 to 35 percent slopes	Predominantly Nonhydric (1-33%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C424A	Minot silty clay, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: NGothman Last Saved: 8/15/2024 2:31 PM
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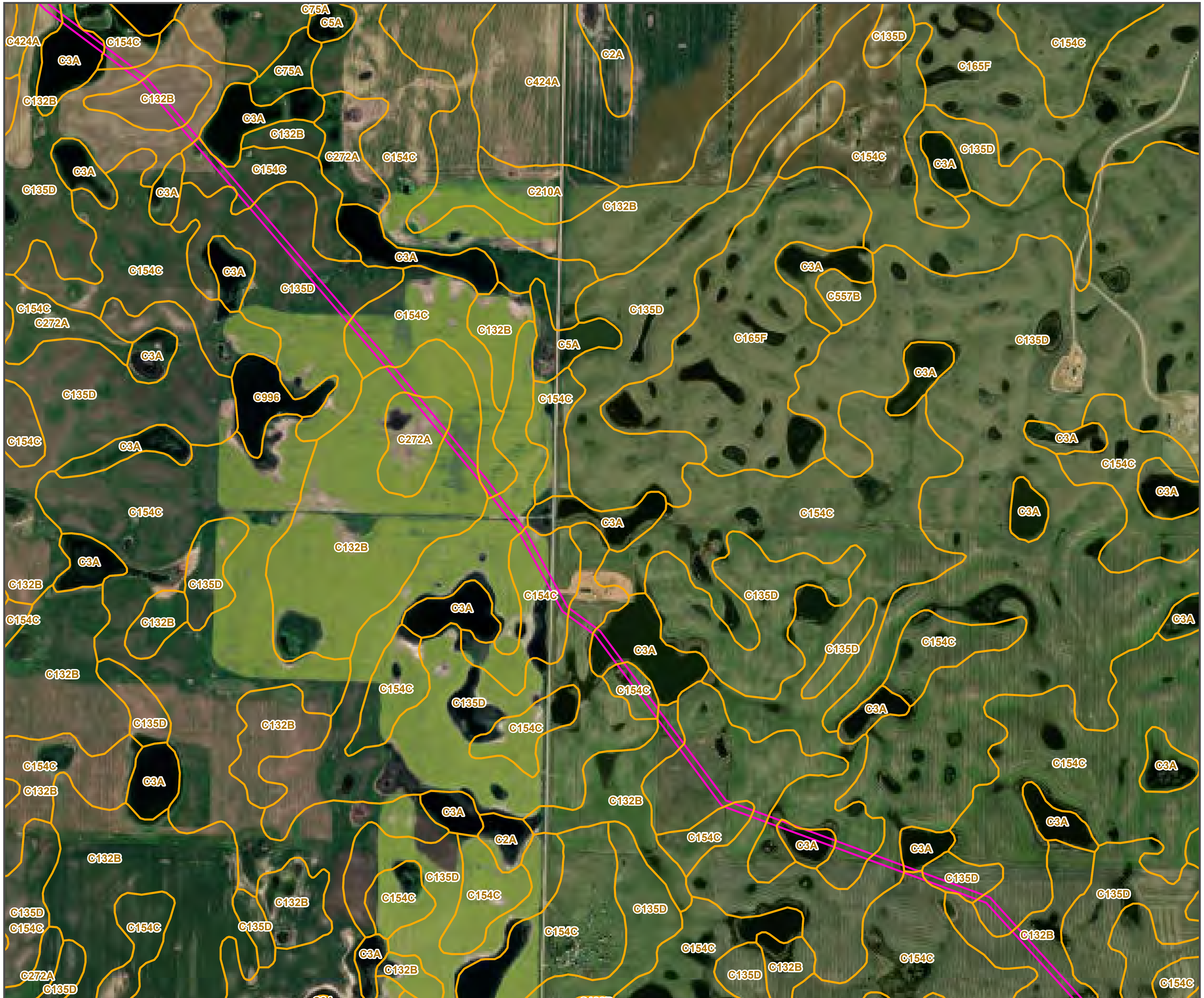
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



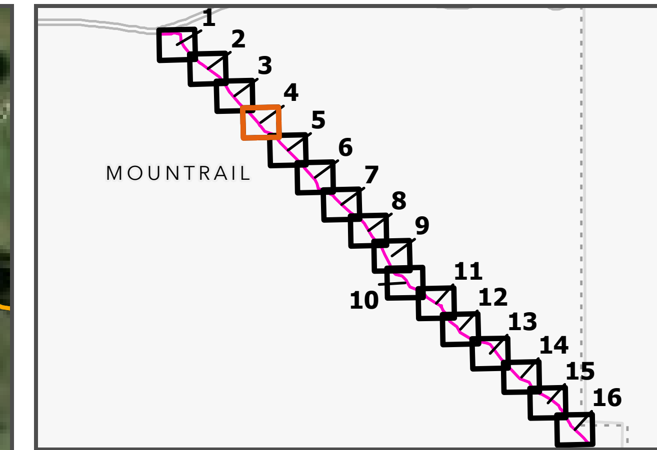


FIGURE 3-4

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Soil Class Boundary
Environmental Survey Area (ESA)

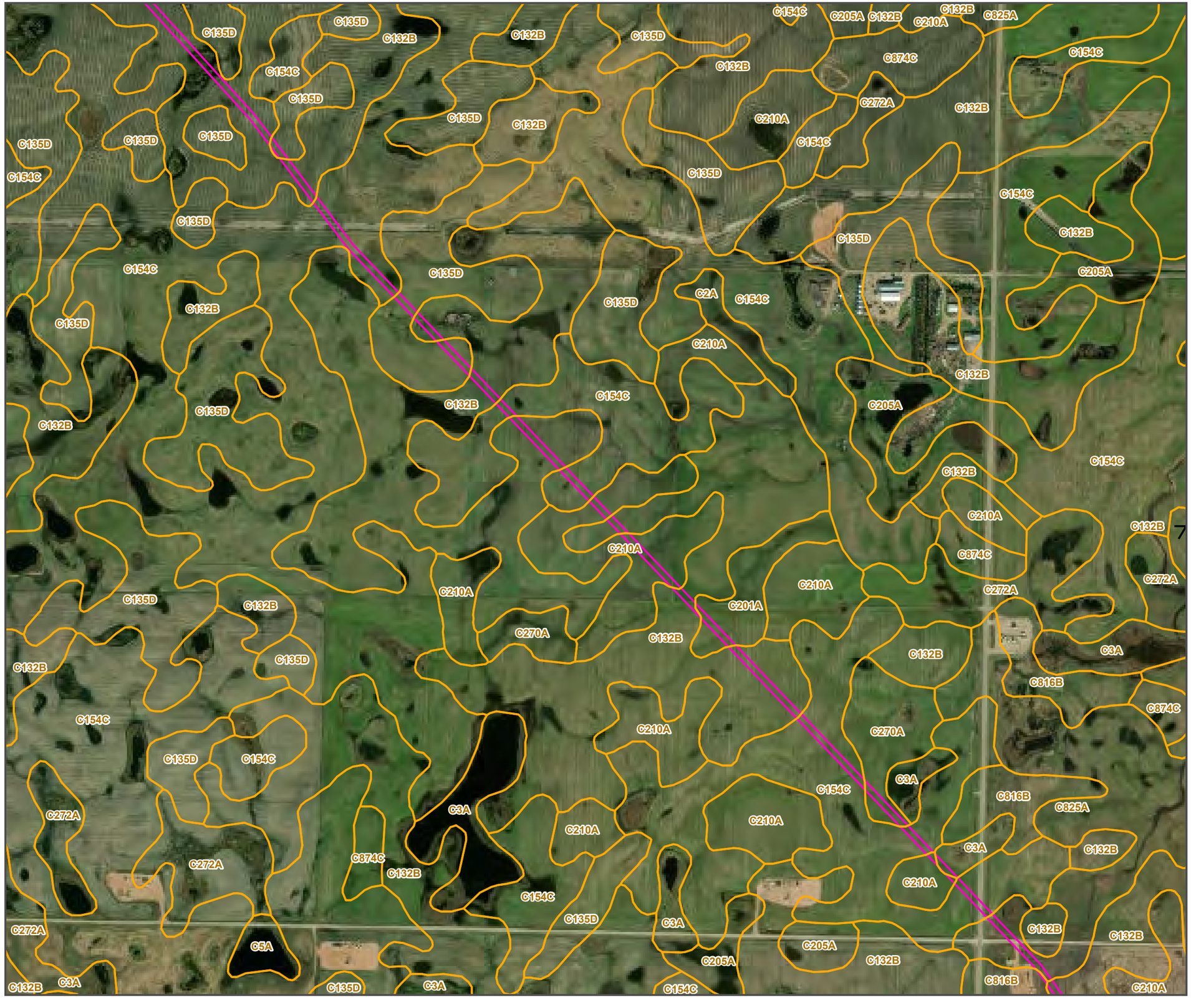
Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
0 125 250 500 m

ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



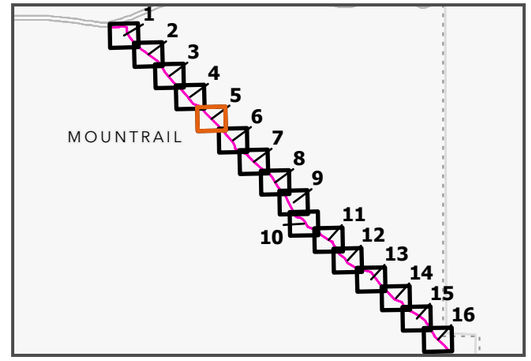


FIGURE 3-5

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C201A	Bowbells loam, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C816B	Lehr loam, 2 to 6 percent slopes	Nonhydric (0%)
C825A	Divide loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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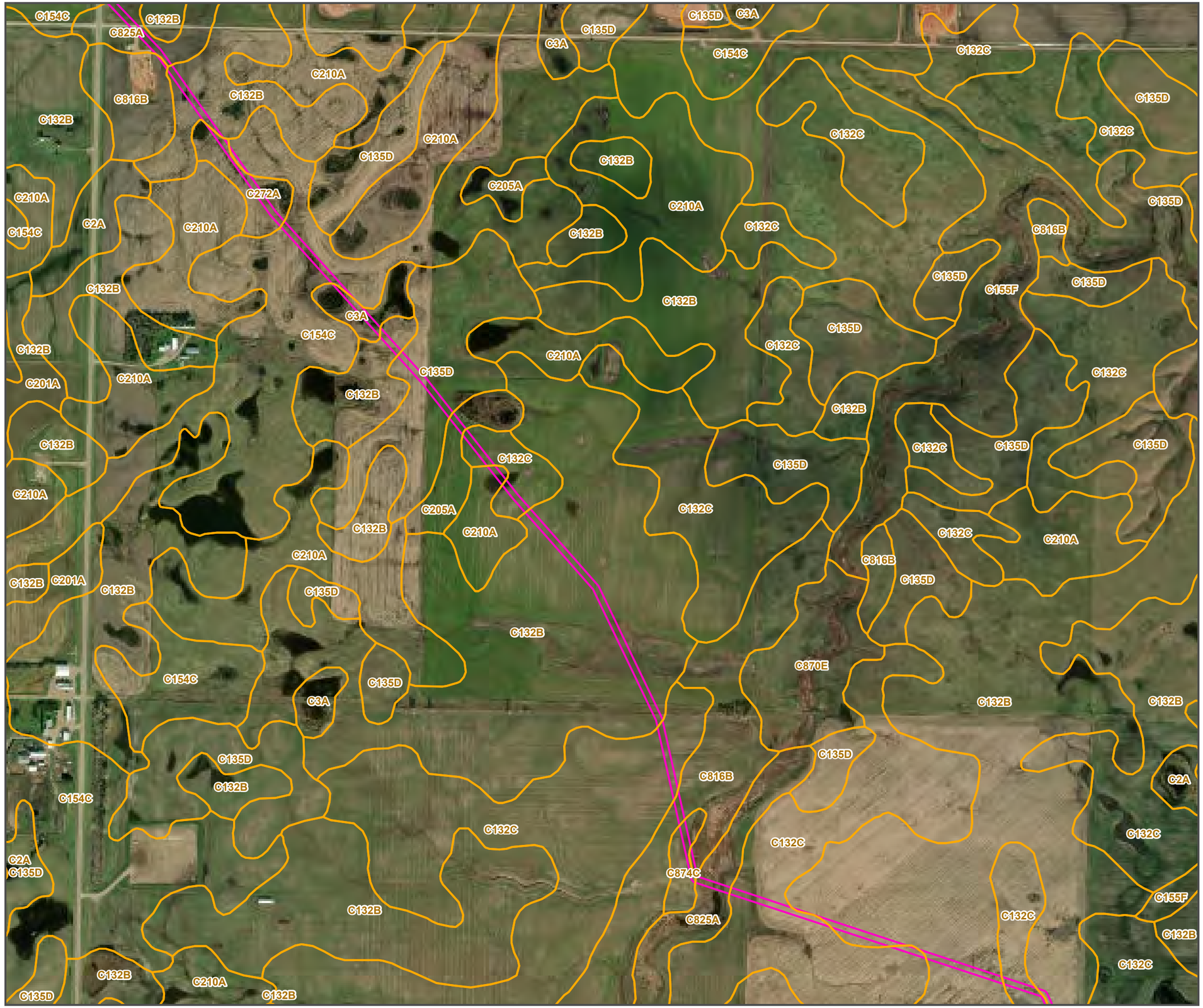

FIGURE 3-6
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C205A	Bowbells-Tonka complex, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C816B	Lehr loam, 2 to 6 percent slopes	Nonhydric (0%)
C825A	Divide loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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ARCADIS

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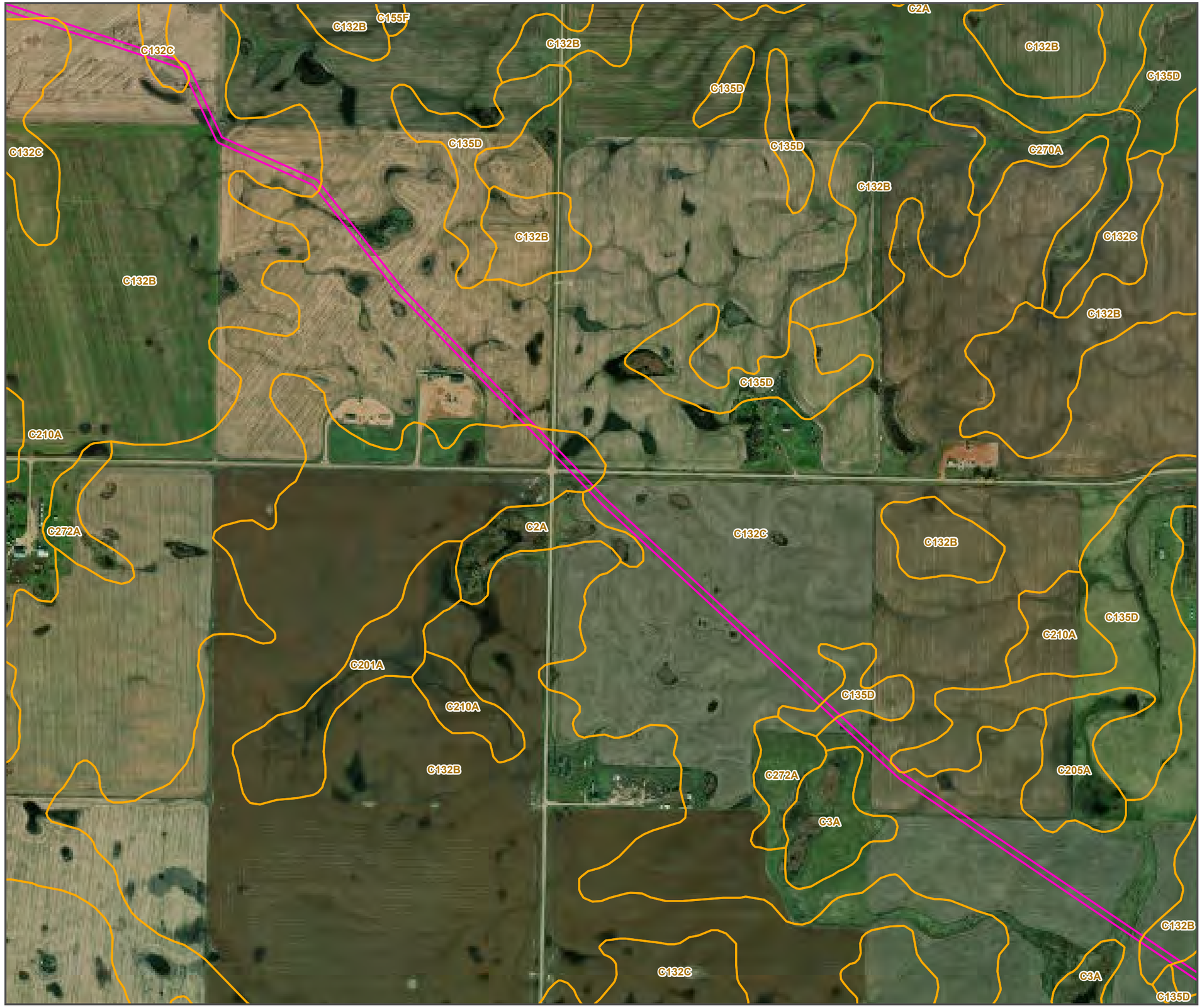
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx#Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



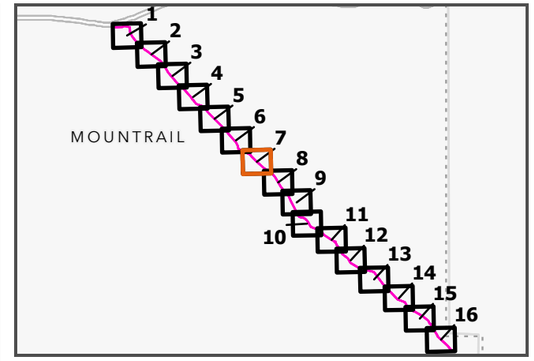


FIGURE 3-7

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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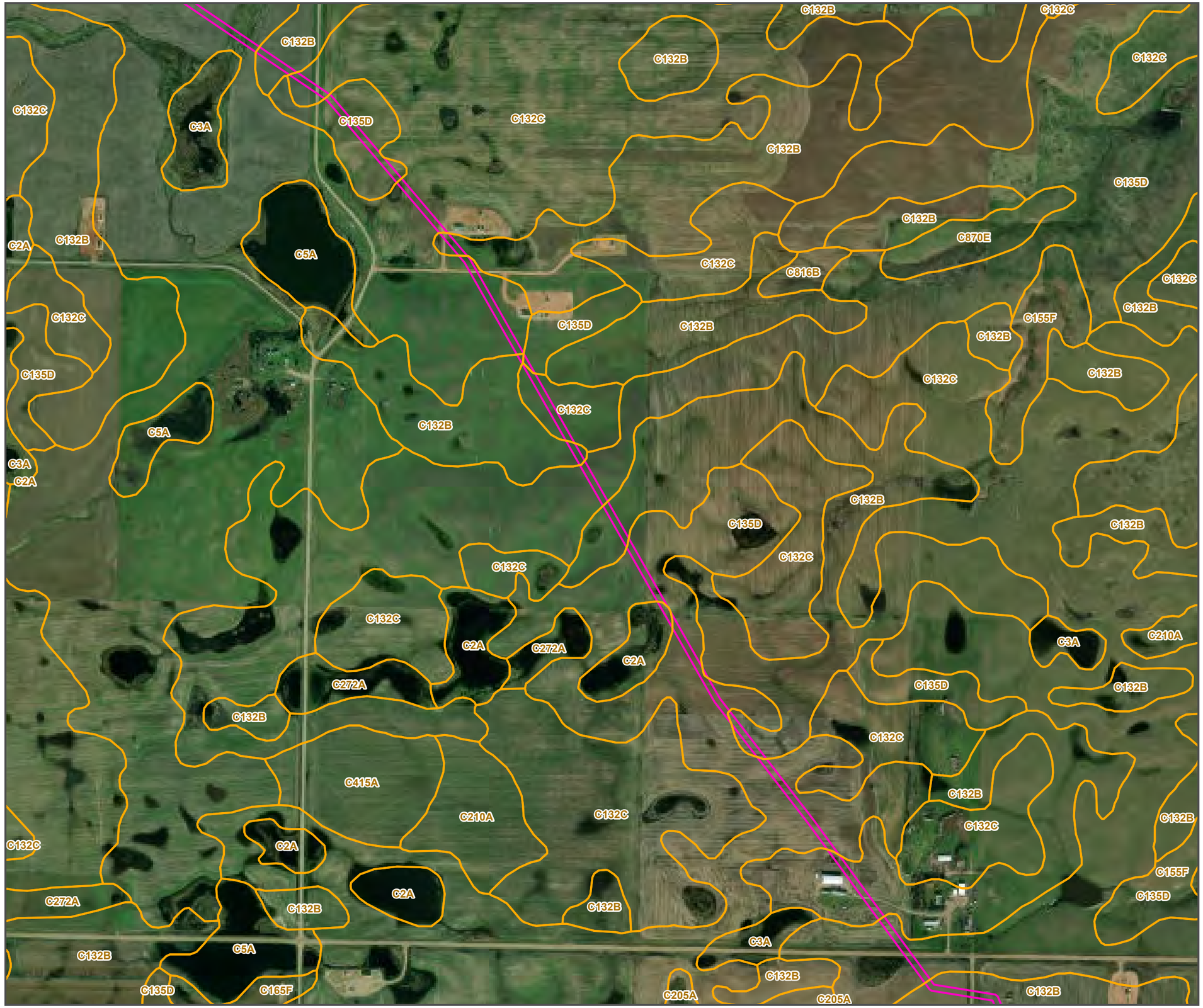
ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



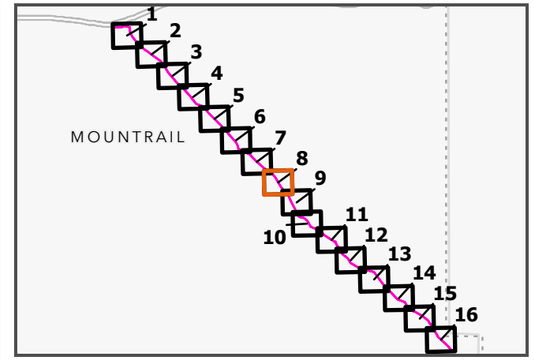


FIGURE 3-8

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric (66-99%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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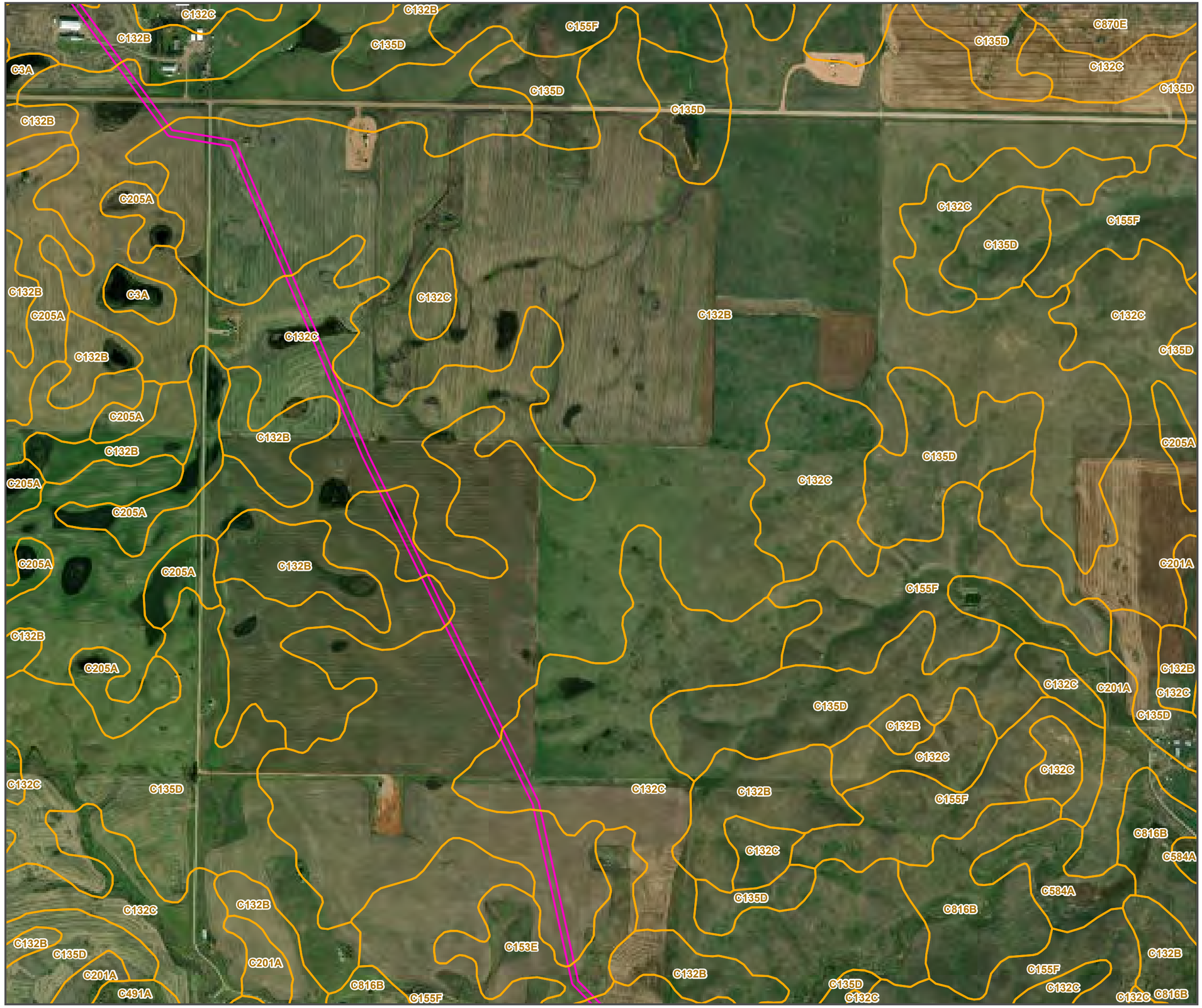
ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



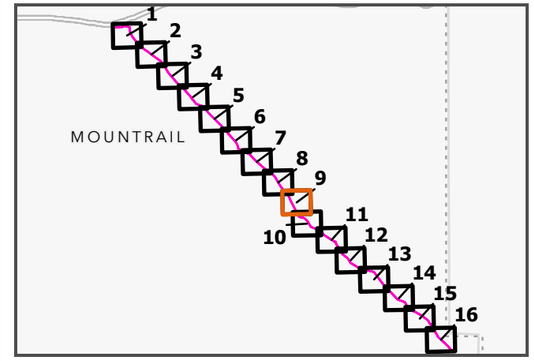


FIGURE 3-9
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C153E	Zahl-Max loams, 15 to 25 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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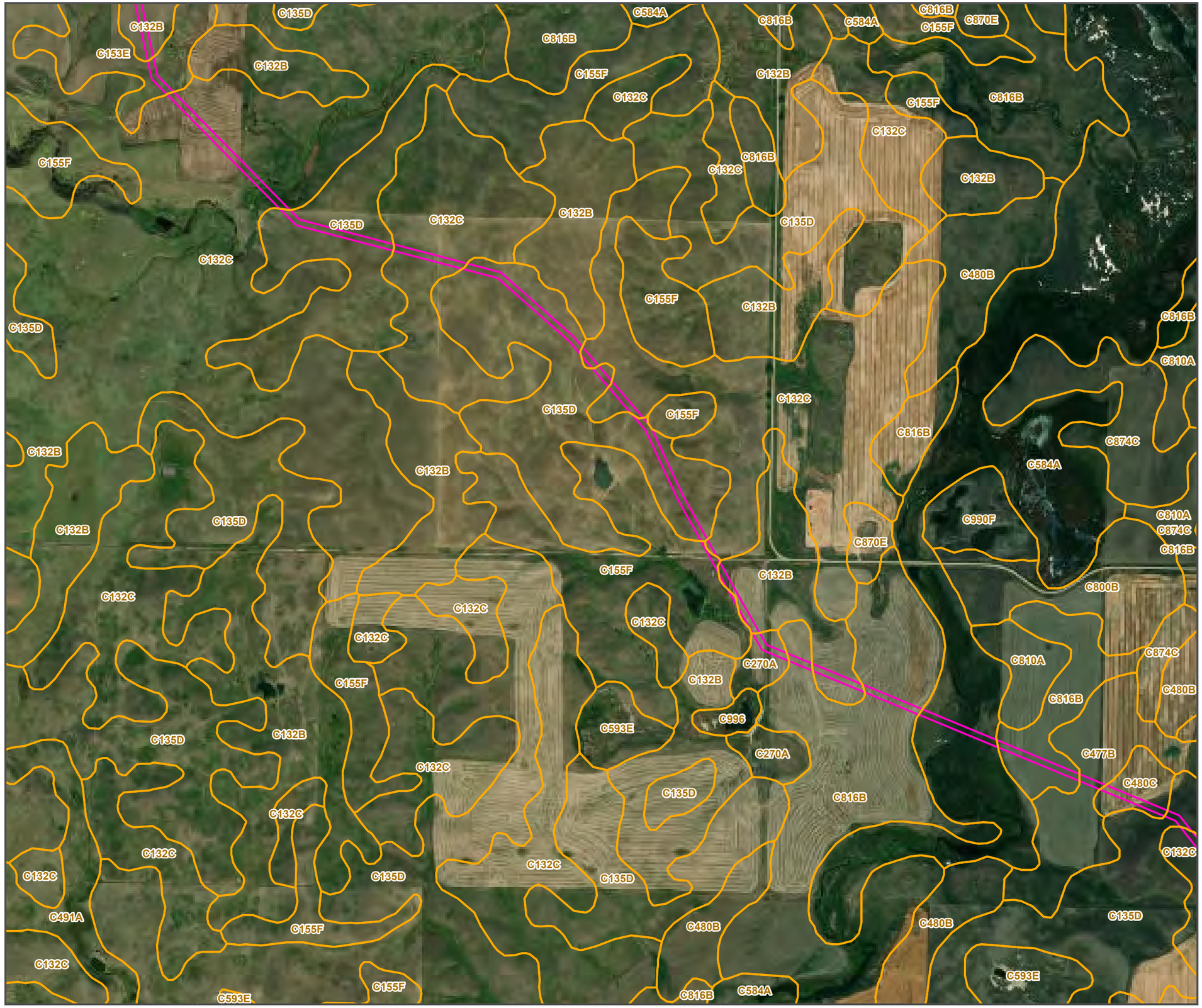
ARCADIS

Created: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



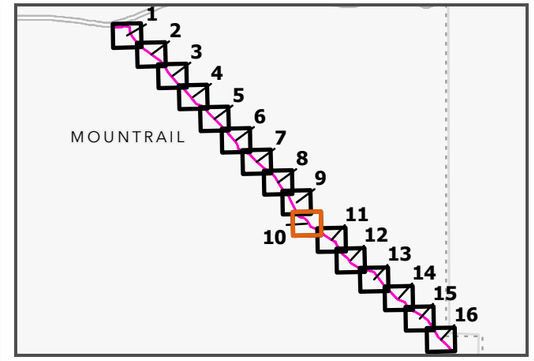


FIGURE 3-10
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C153E	Zahl-Max loams, 15 to 25 percent slopes	Predominantly Nonhydric (1-33%)
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Nonhydric (1-33%)
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C477B	Wyola silty clay loam, 2 to 6 percent slopes	Nonhydric (0%)
C480C	Shambo loam, 6 to 9 percent slopes	Nonhydric (0%)
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric (66-99%)
C816B	Lehr loam, 2 to 6 percent slopes	Nonhydric (0%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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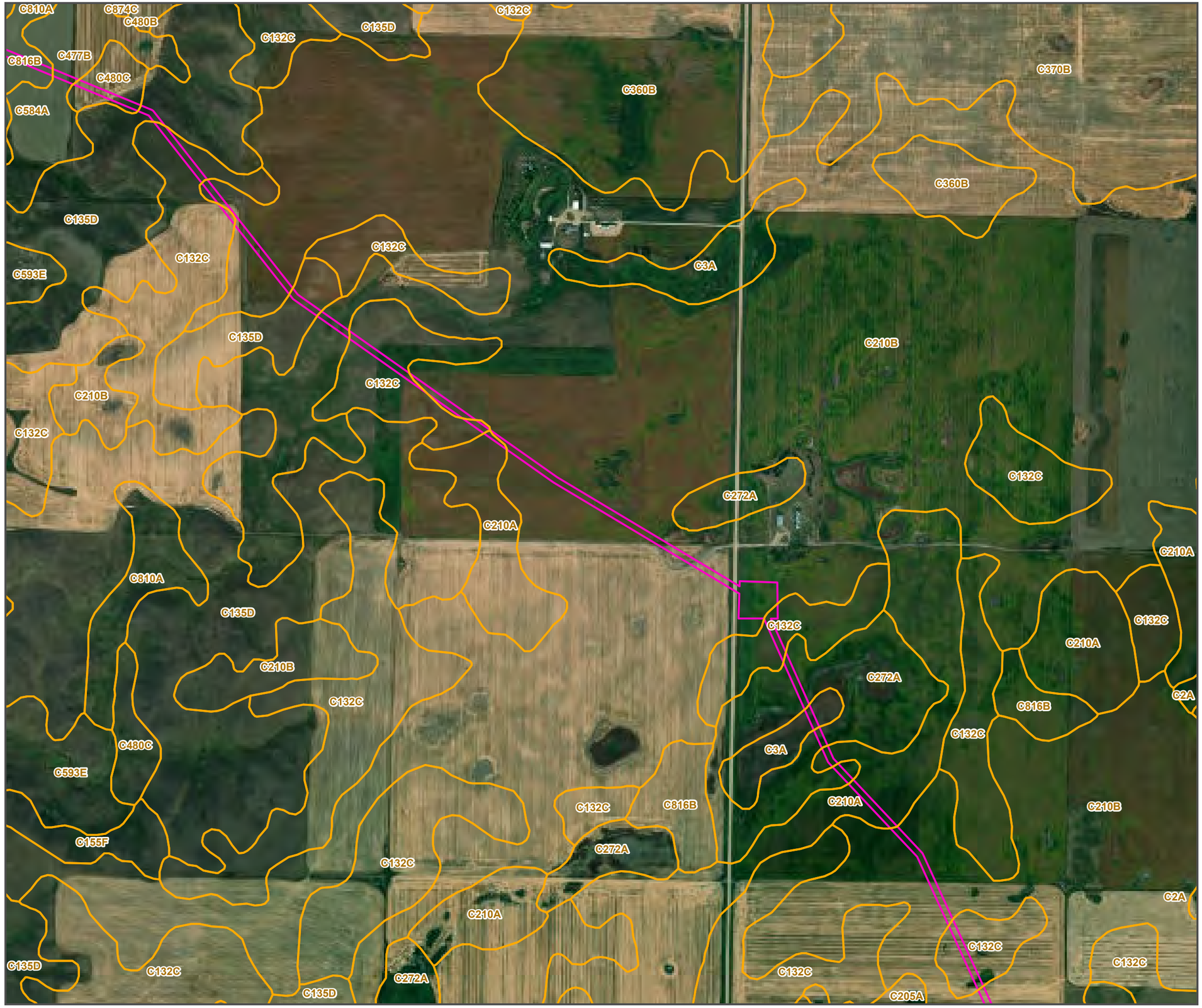
ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



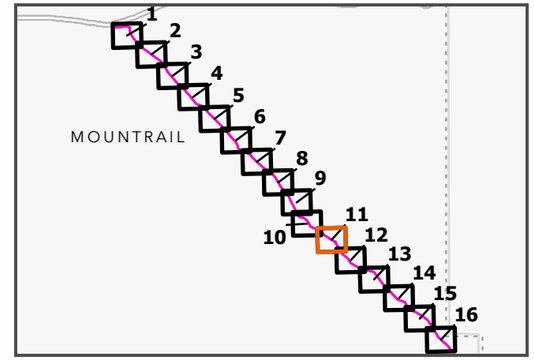


FIGURE 3-11

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C477B	Wyola silty clay loam, 2 to 6 percent slopes	Nonhydric (0%)
C480C	Shambo loam, 6 to 9 percent slopes	Nonhydric (0%)
C816B	Lehr loam, 2 to 6 percent slopes	Nonhydric (0%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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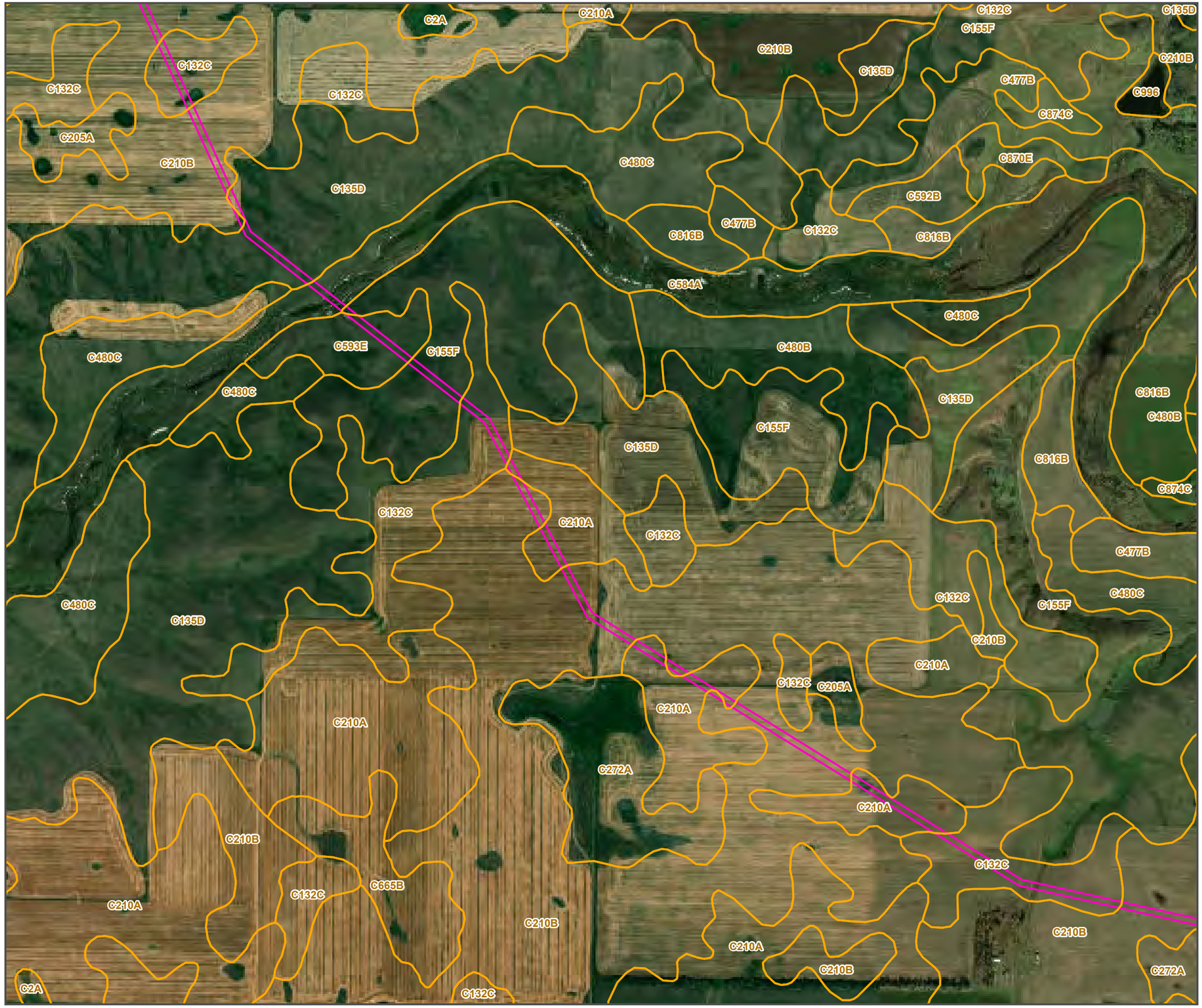

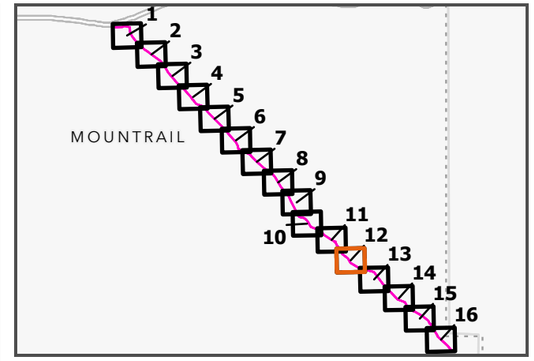

FIGURE 3-12
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric (66-99%)
C593E	Dogtooth-Janesburg-Werner complex, 3 to 25 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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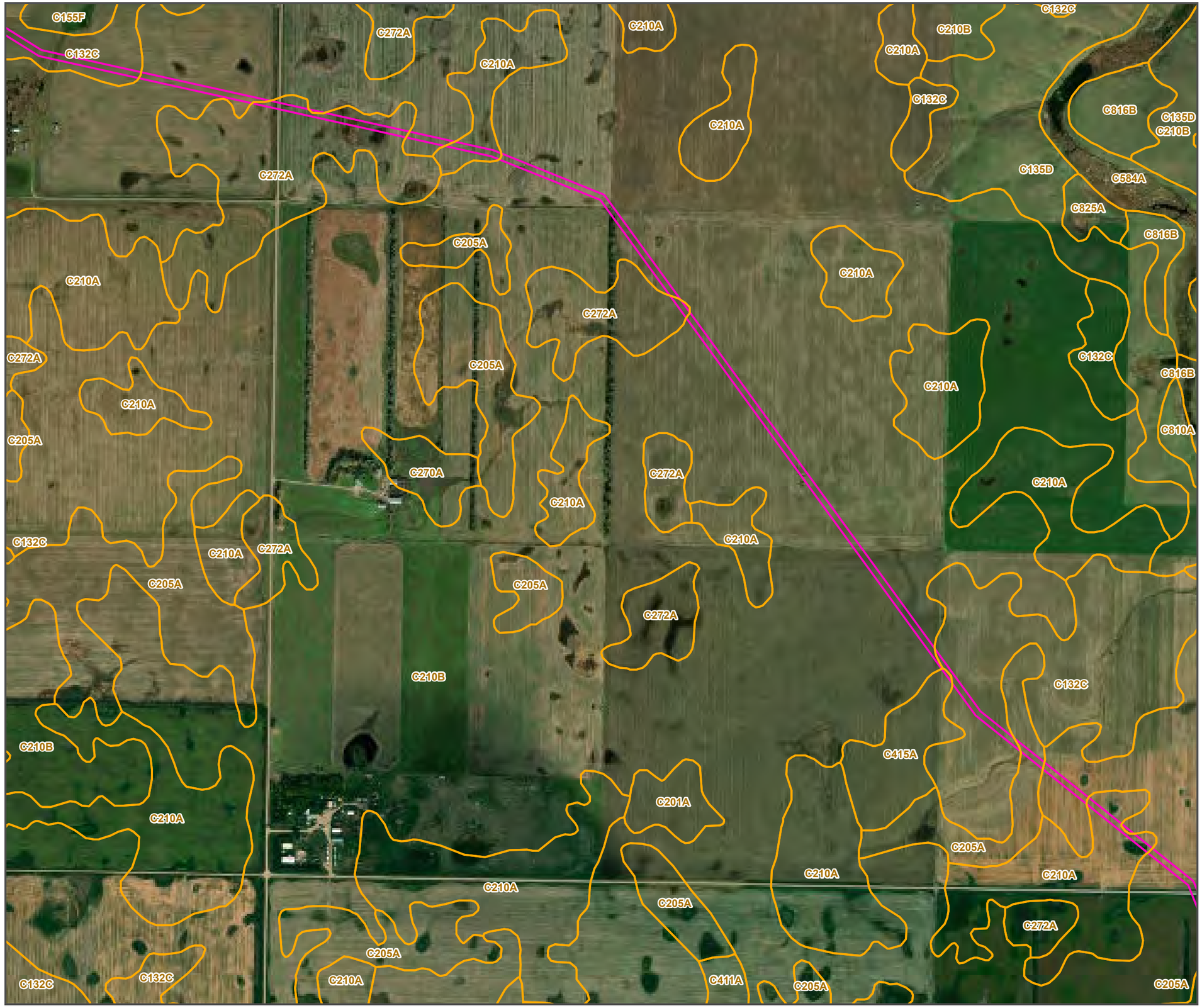

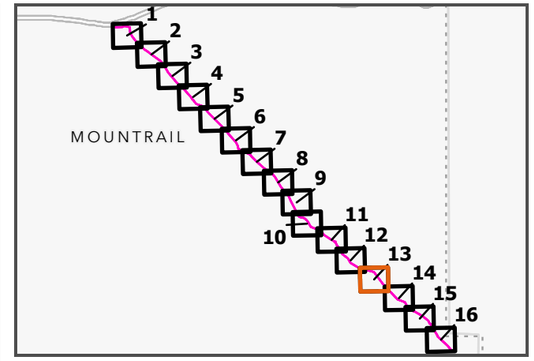

FIGURE 3-13

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C205A	Bowbells-Tonka complex, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
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ARCADIS

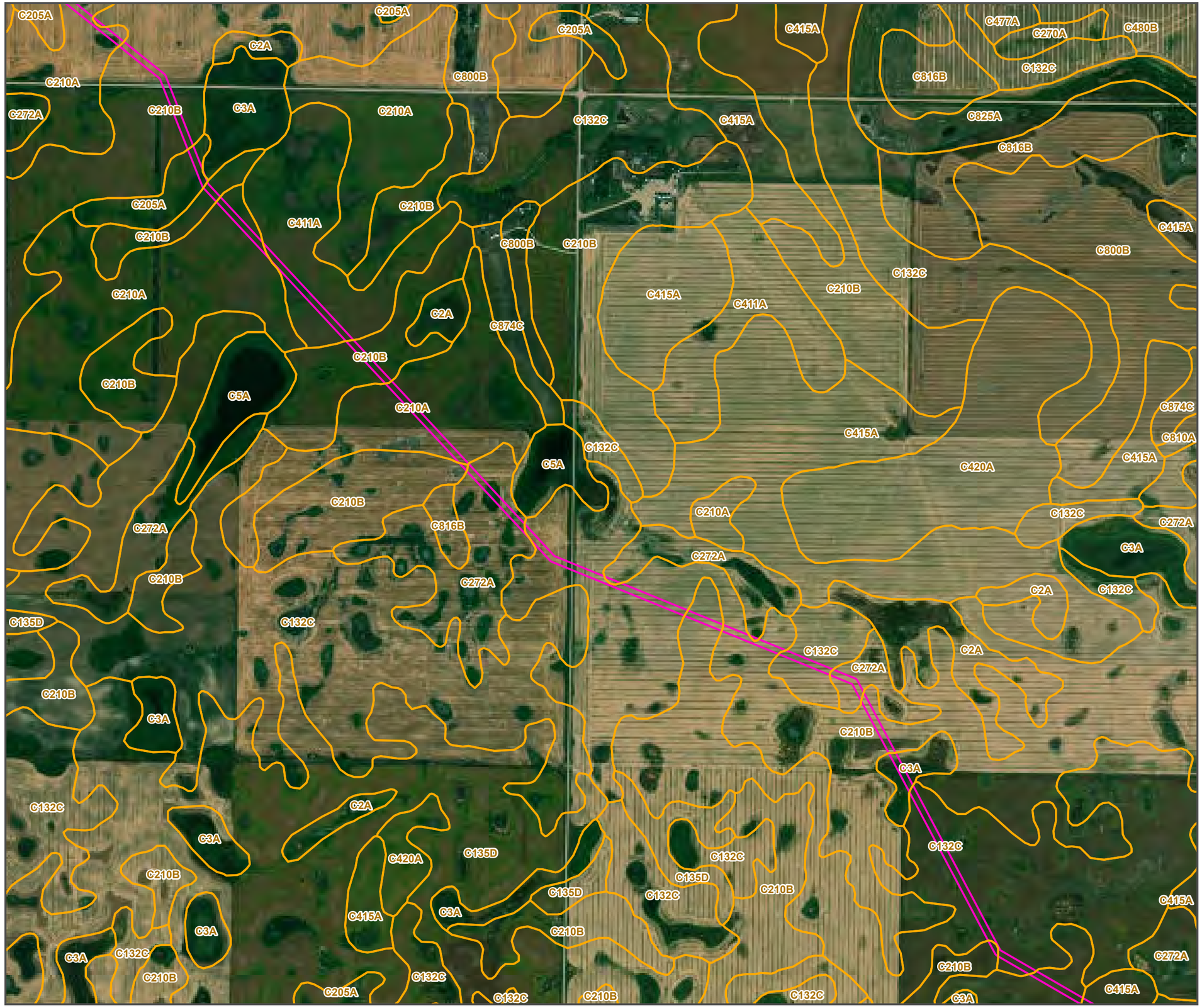

FIGURE 3-14
NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C205A	Bowbells-Tonka complex, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric (33-66%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

0 500 1,000 2,000 ft
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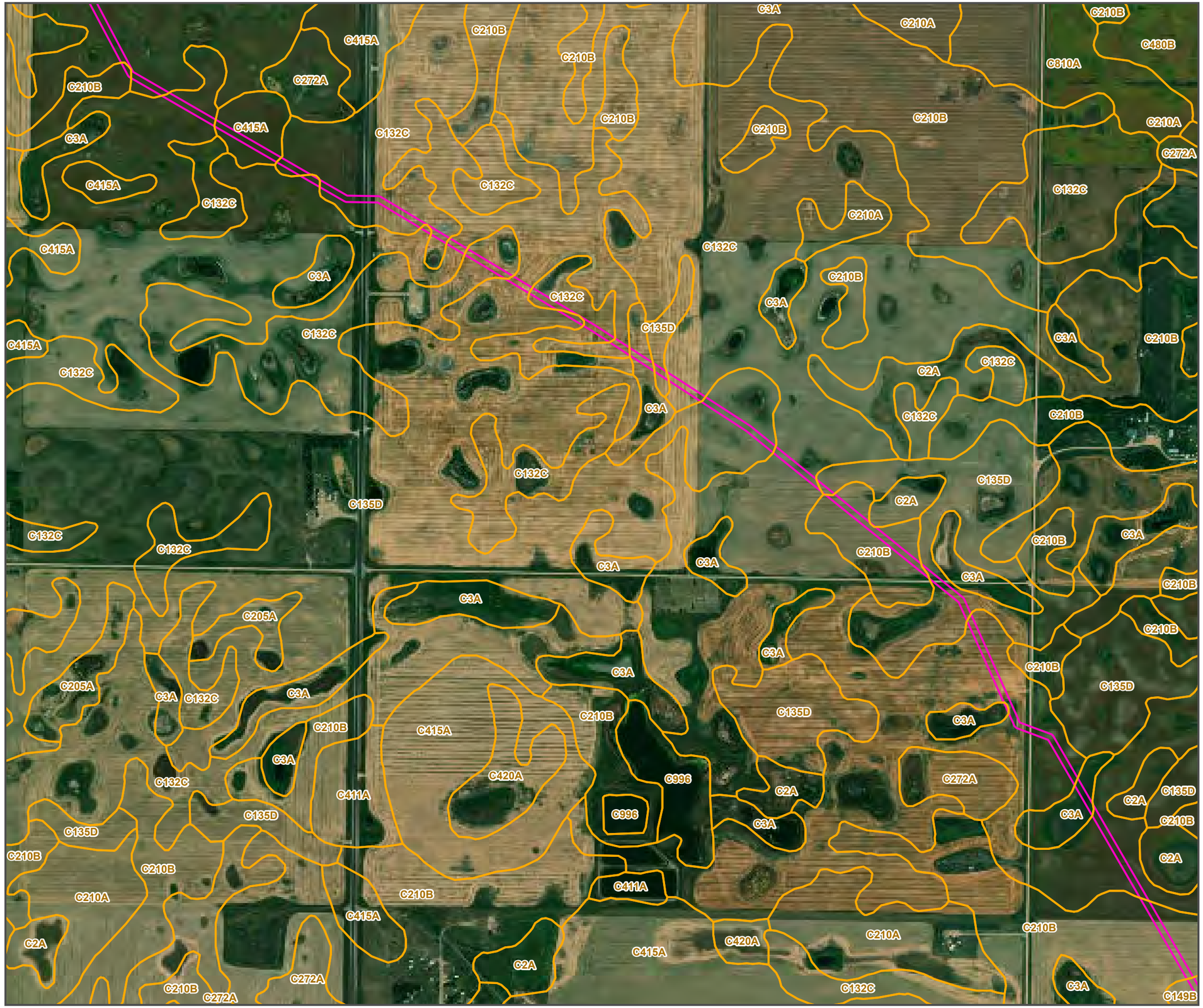

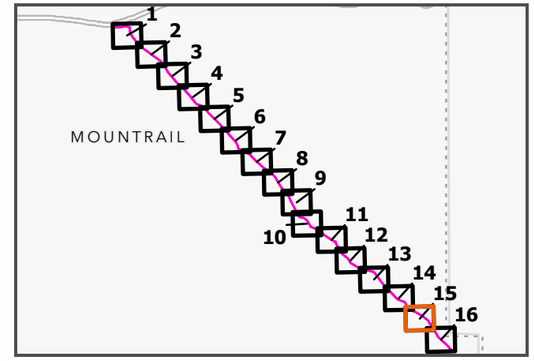

FIGURE 3-15

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Predominantly Nonhydric (1-33%)
C149B	Williams-Bowbells-Tonka complex, 0 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric (66-99%)
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Hydric (100%)
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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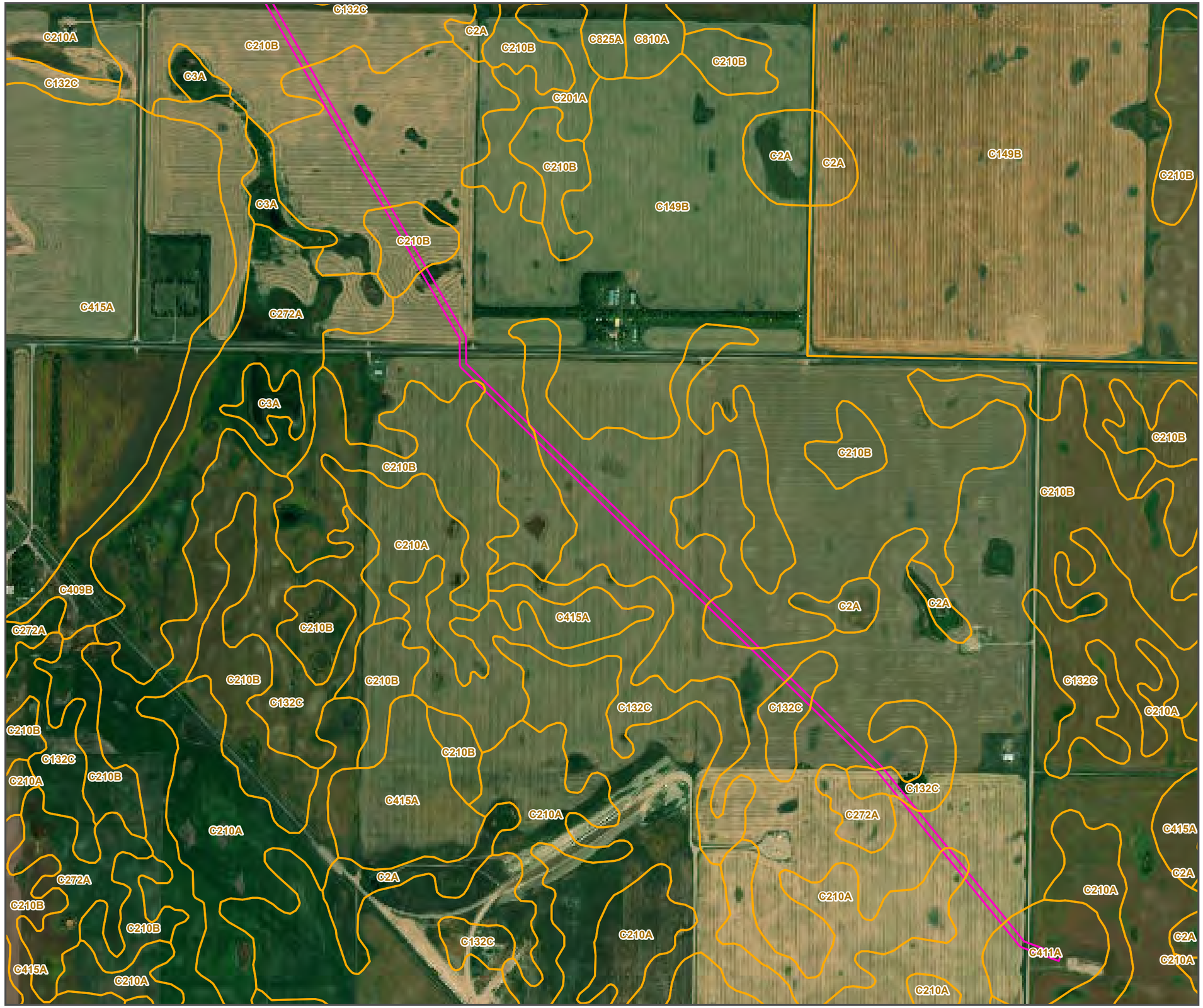
ARCADIS

Creator: NCochran Last Saved: 8/15/2024 2:31 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 3 NRCS Soils
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



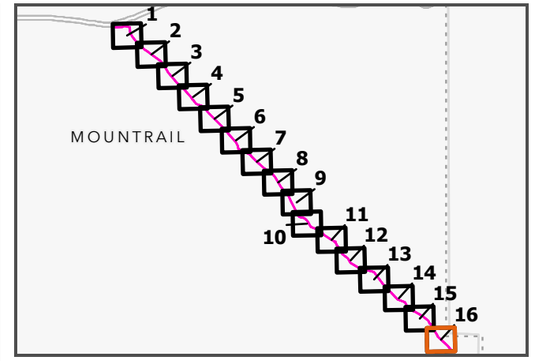


FIGURE 3-16

NRCS SOILS MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Soil Class Boundary
- Environmental Survey Area (ESA)

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Nonhydric (1-33%)
C149B	Williams-Bowbells-Tonka complex, 0 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Nonhydric (1-33%)
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Nonhydric (1-33%)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. September 2018 Aerial Imagery streamed through Esri Image service.

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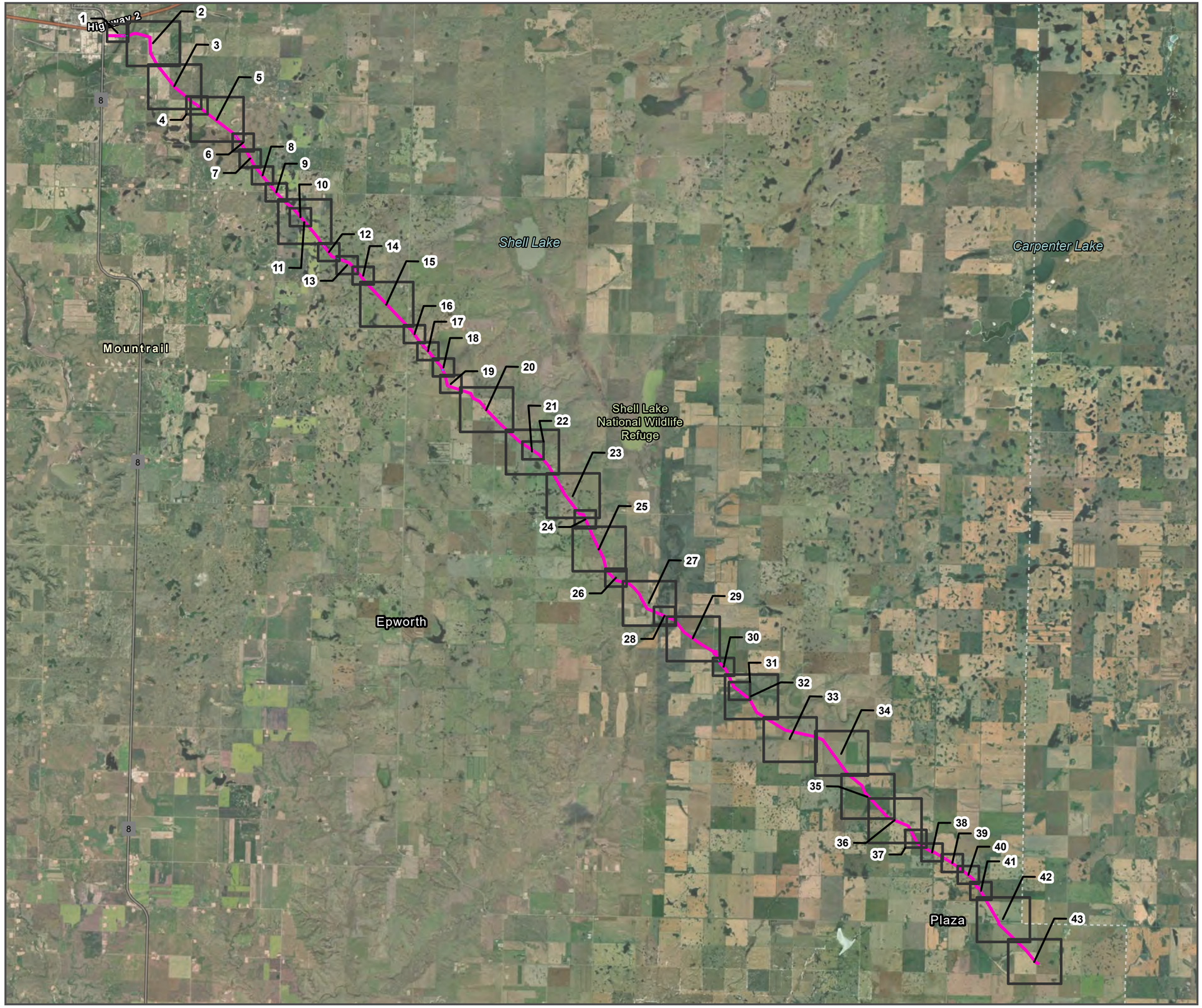
0 125 250 500 m

ARCADIS



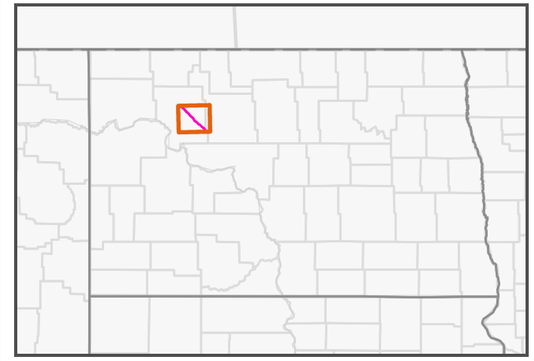


FIGURE 4-0

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

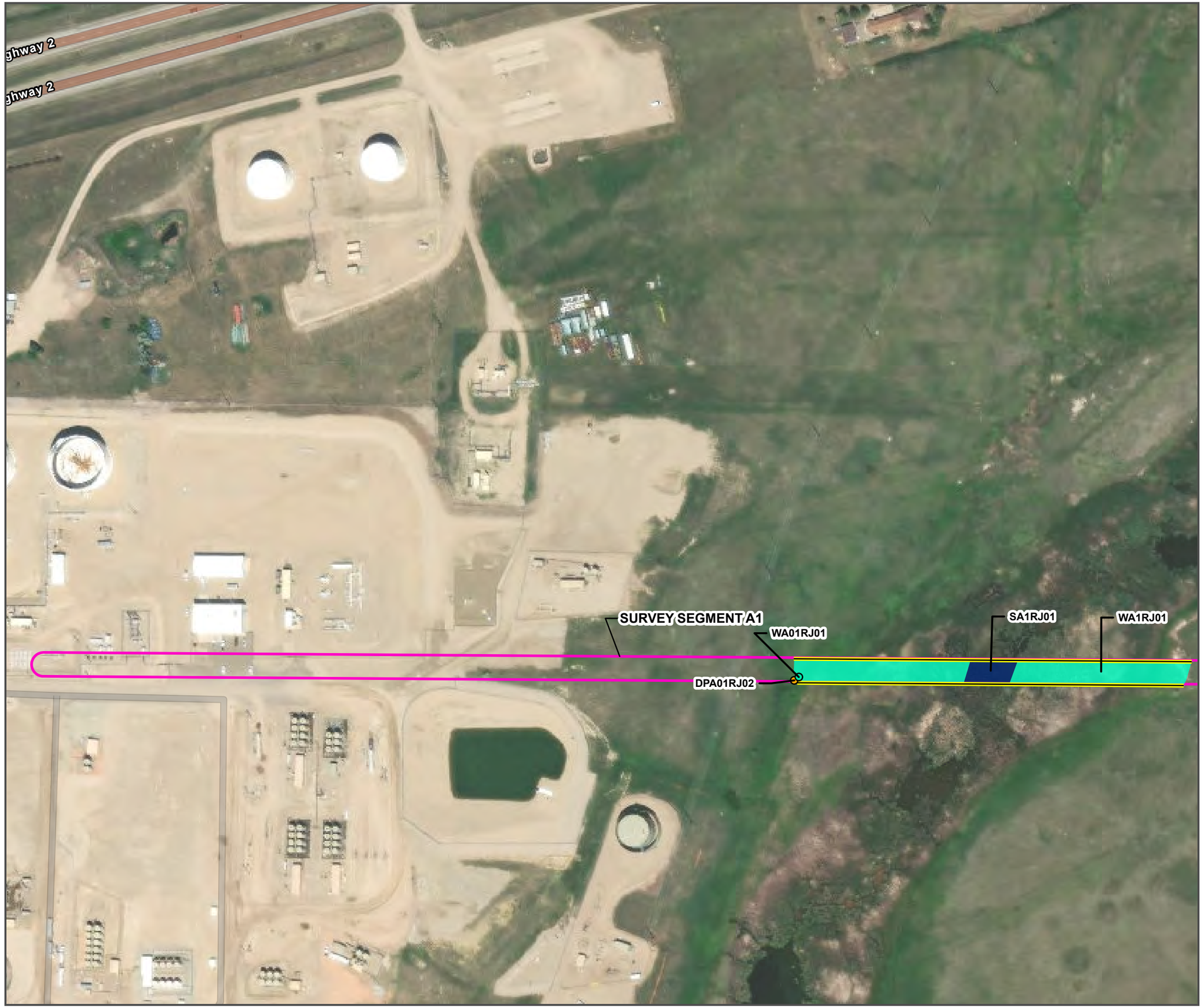
Legend

- Environmental Survey Area (ESA)
- Figure Extent
- Delineated Ephemeral Stream
- Delineated Perennial Stream
- Delineated PEM Wetland
- Delineated PUB Wetland

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 7,500 15,000 30,000 ft
0 2,000 4,000 8,000 m

ARCADIS



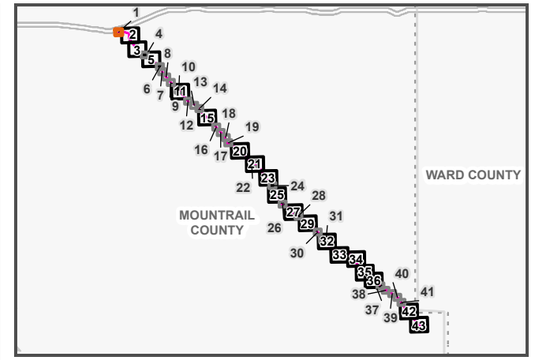


FIGURE 4-1

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Delineated Perennial Stream
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: Ti_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

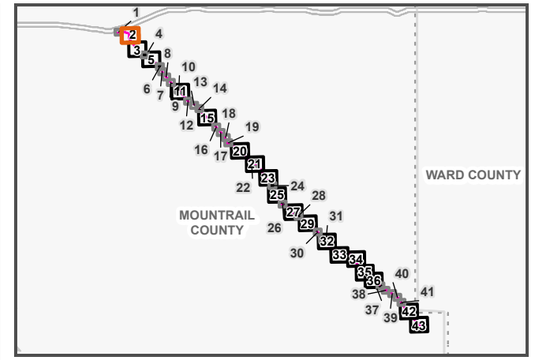


FIGURE 4-2
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

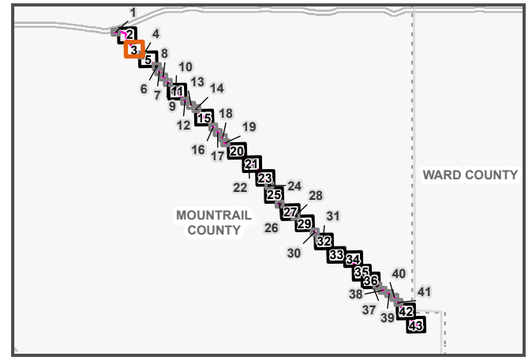


FIGURE 4-3

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

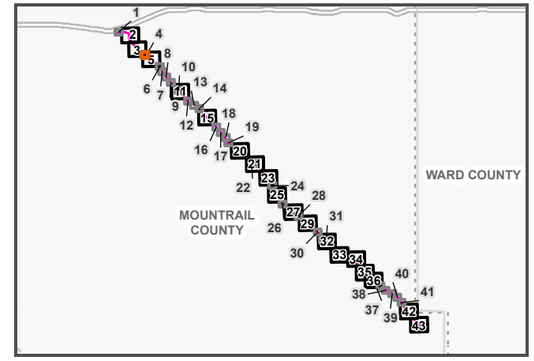


FIGURE 4-4

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

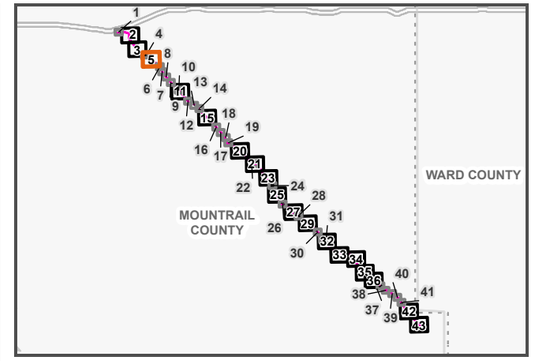


FIGURE 4-5
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

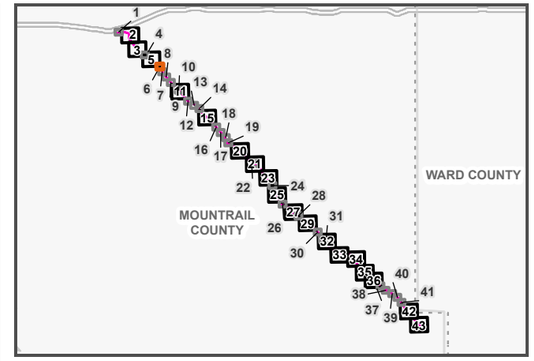


FIGURE 4-6
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

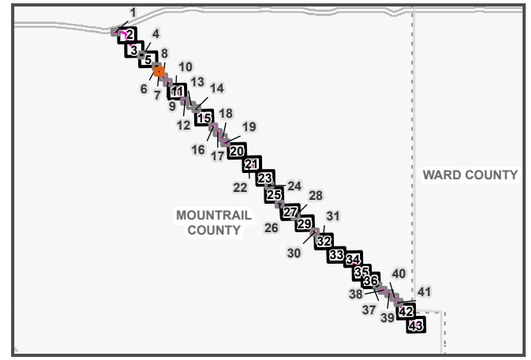


FIGURE 4-7

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

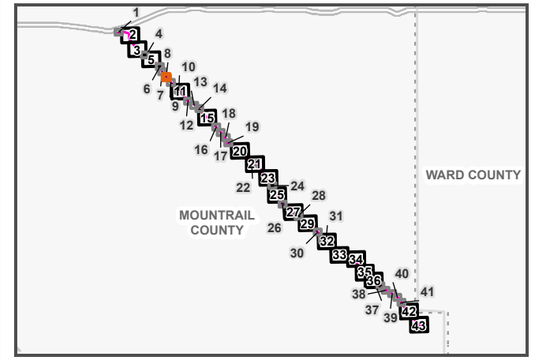


FIGURE 4-8

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

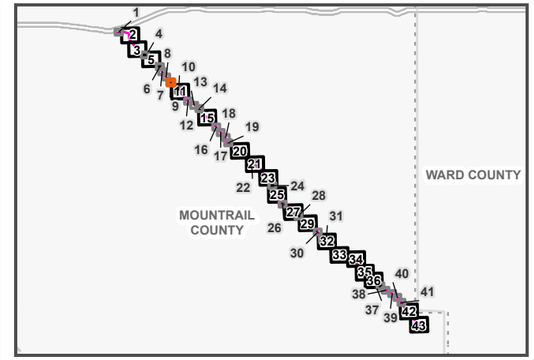


FIGURE 4-9

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

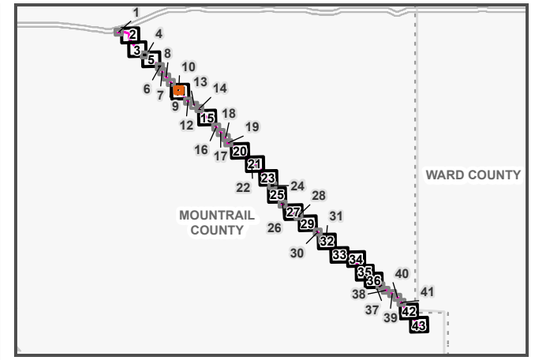


FIGURE 4-10
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 9/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: \\...EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

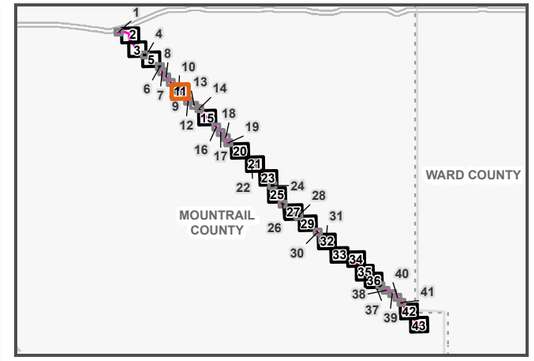


FIGURE 4-11
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

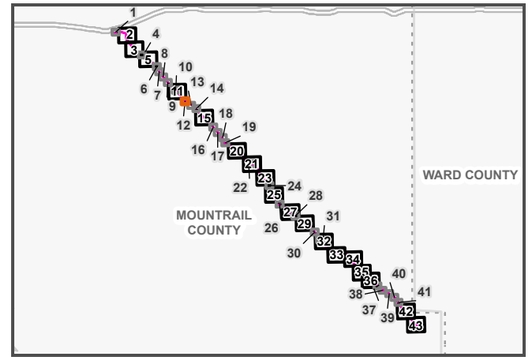


FIGURE 4-12

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

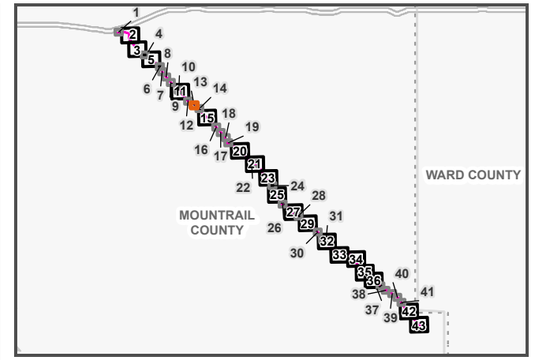


FIGURE 4-13

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

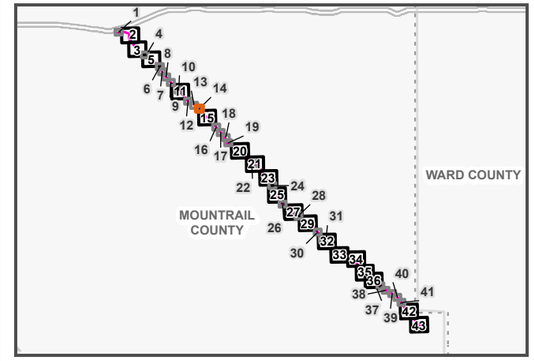


FIGURE 4-14

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

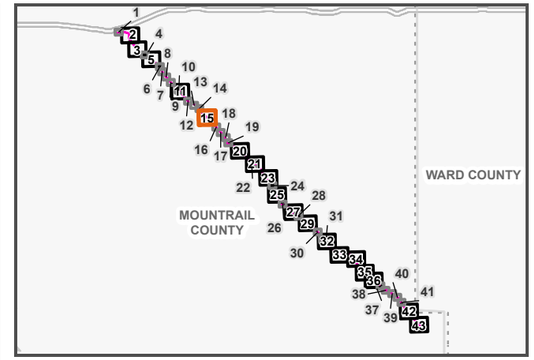


FIGURE 4-15

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

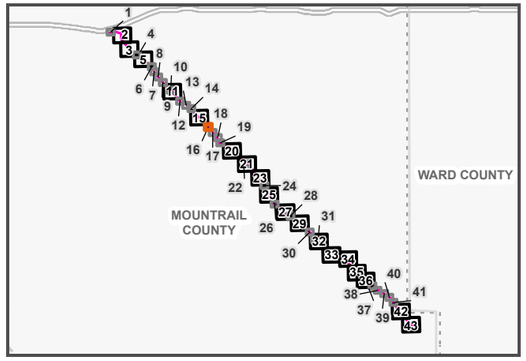


FIGURE 4-16

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

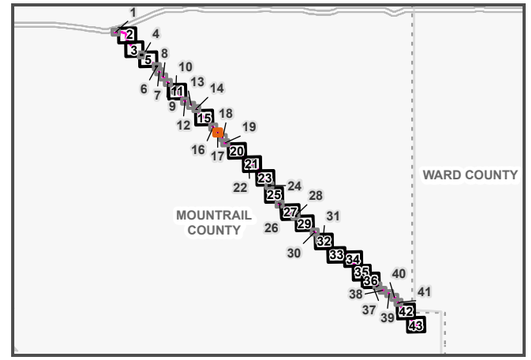


FIGURE 4-17

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

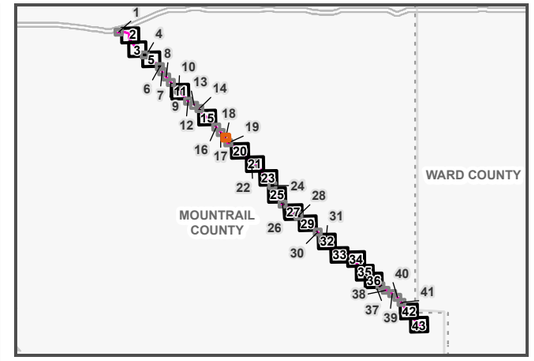


FIGURE 4-18

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

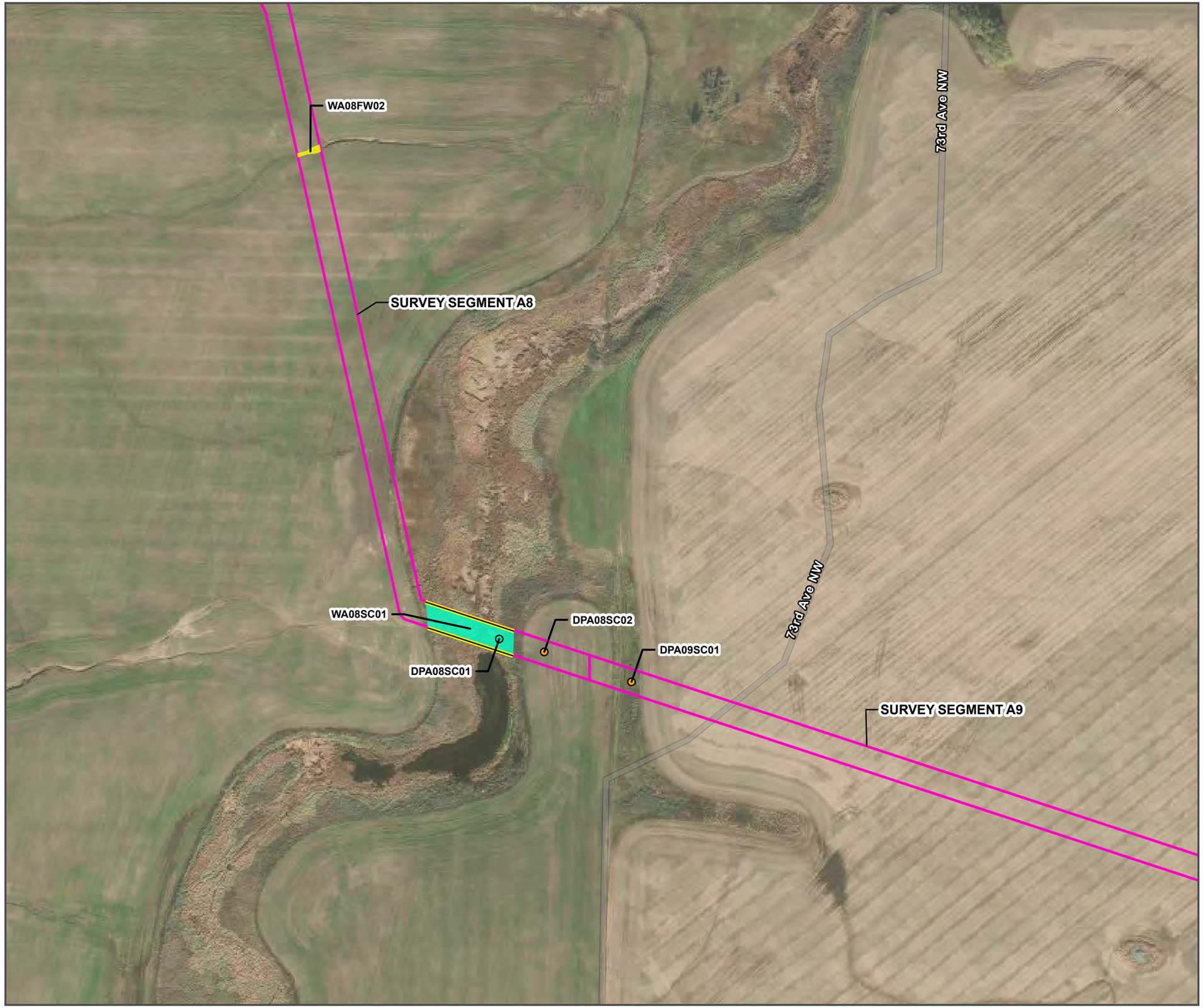
- Upland Data Point
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.



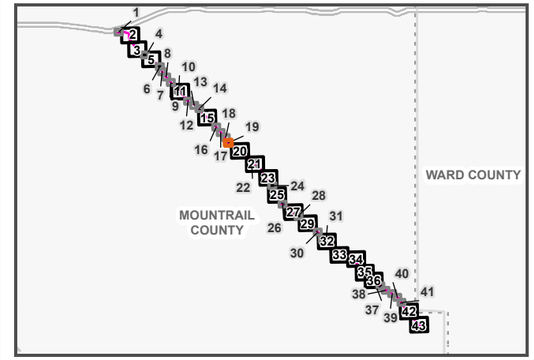


FIGURE 4-19

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

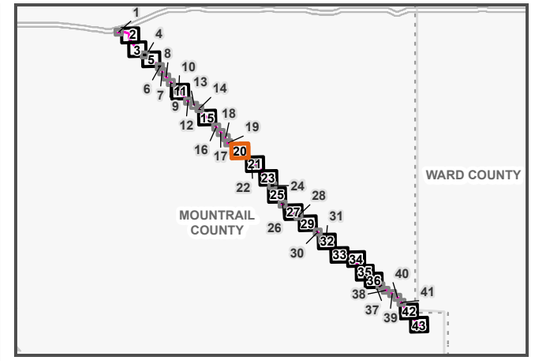


FIGURE 4-20

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

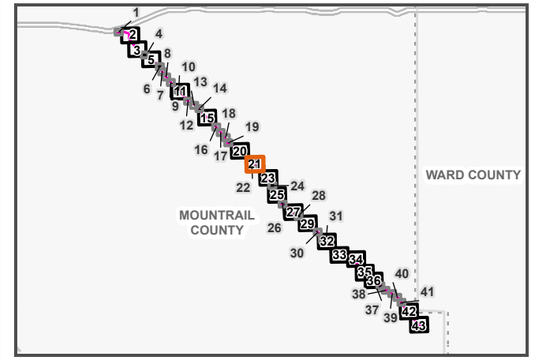


FIGURE 4-21
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

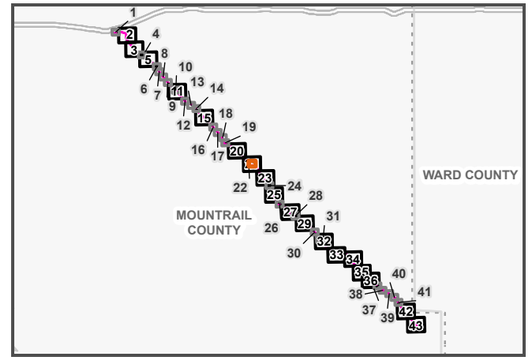


FIGURE 4-22

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

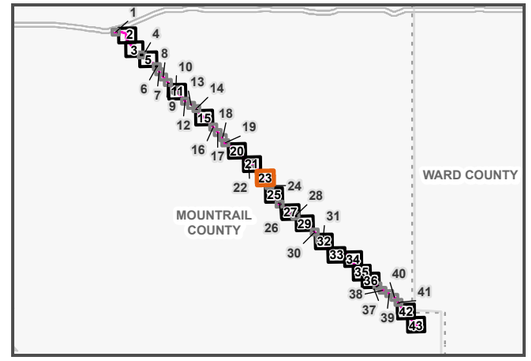


FIGURE 4-23

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

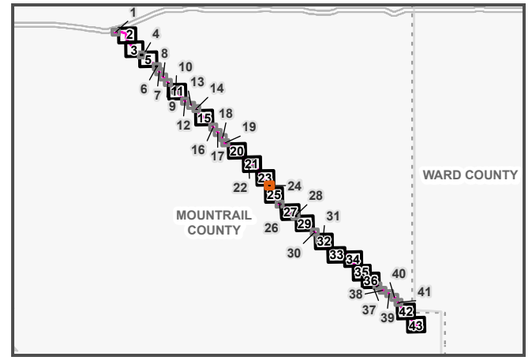


FIGURE 4-24

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

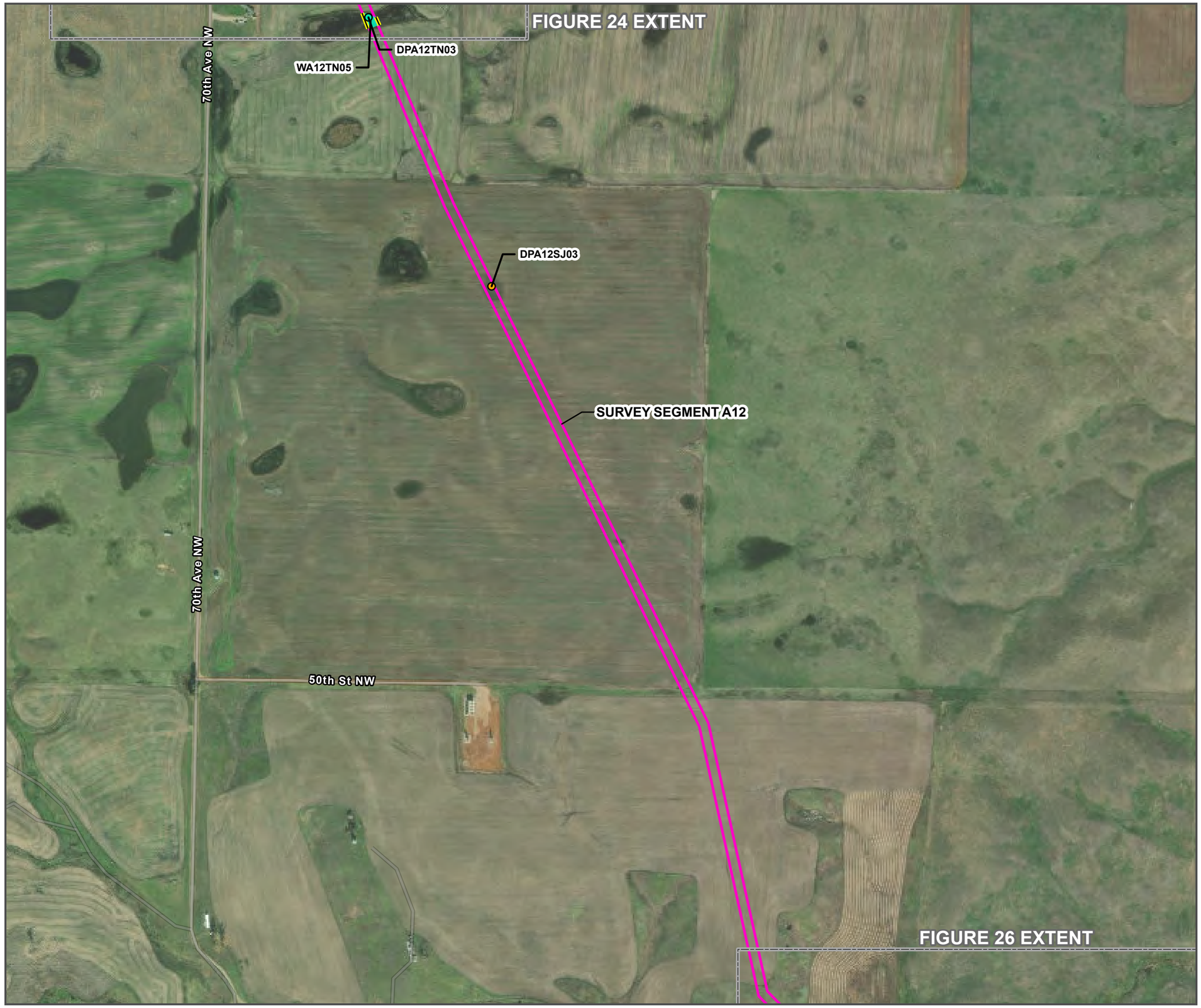
Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS



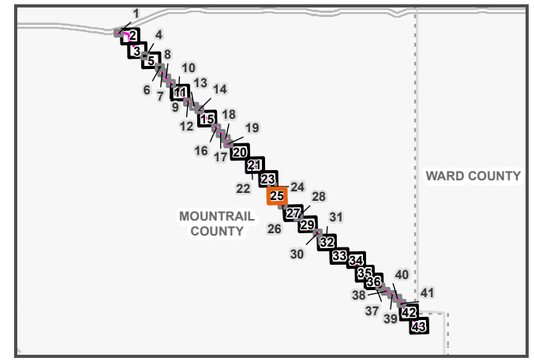


FIGURE 4-25
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

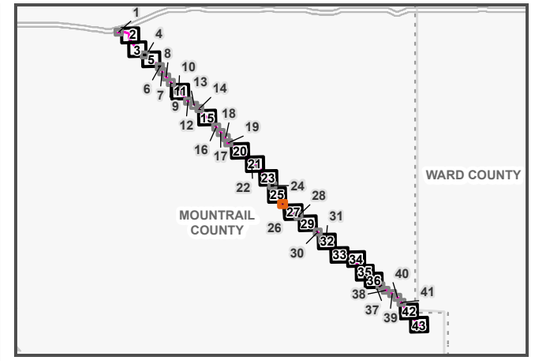


FIGURE 4-26

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Seep/Spring
- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_PetroleumMakoil_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoil_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

FIGURE 26 EXTENT

SURVEY SEGMENT A12

SURVEY SEGMENT A13

Shell Creek

Shell Creek

49th St NW

49th St NW

FIGURE 28 EXTENT

WA13CK01

DPA13CK02

SA13CK01

DPA13CK01

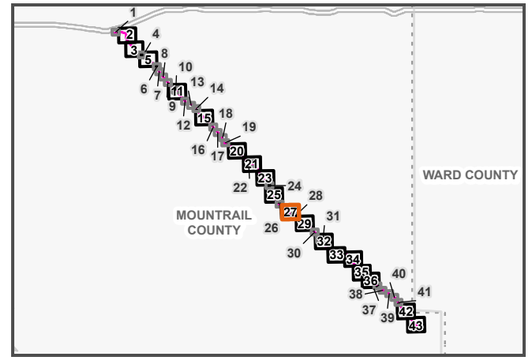


FIGURE 4-27
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Delineated Perennial Stream
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

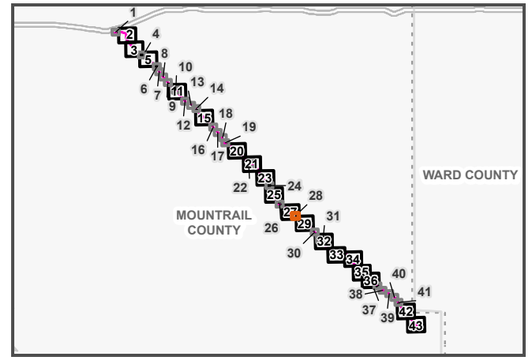


FIGURE 4-28

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Delineated Perennial Stream
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

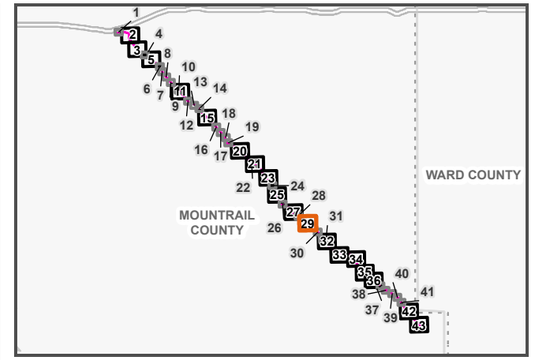


FIGURE 4-29
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

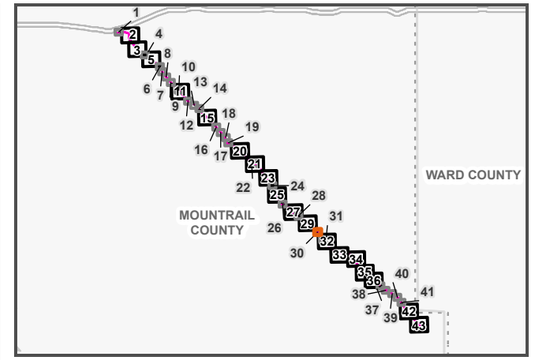


FIGURE 4-30
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

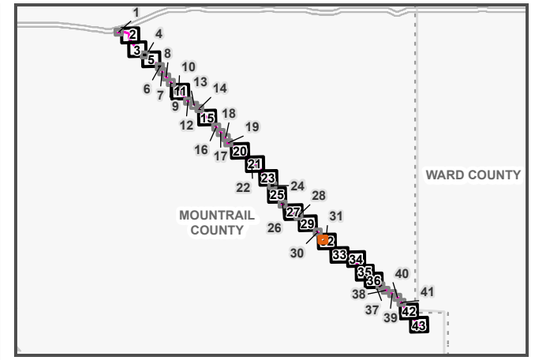


FIGURE 4-31

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Delineated Perennial Stream
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 9/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: \\...EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

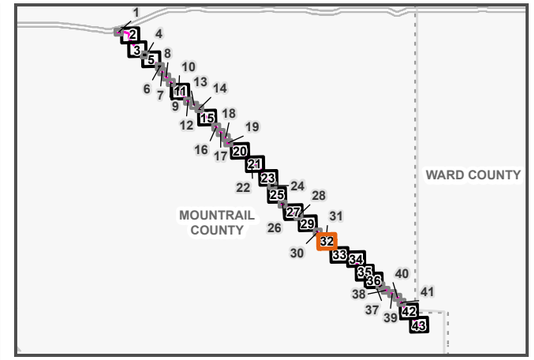


FIGURE 4-32
DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Delineated Perennial Stream
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: \\...\EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

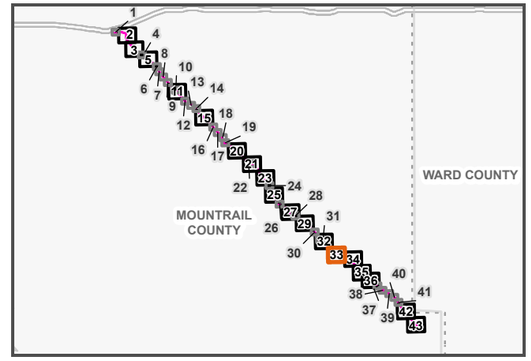


FIGURE 4-33

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

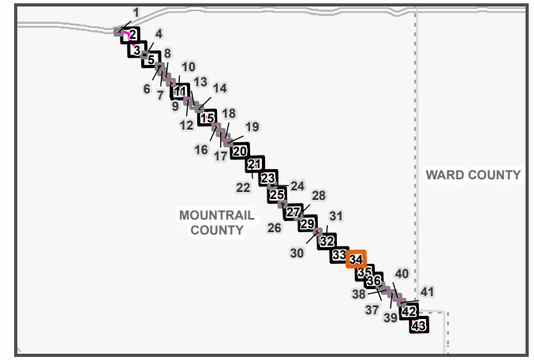


FIGURE 4-34

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

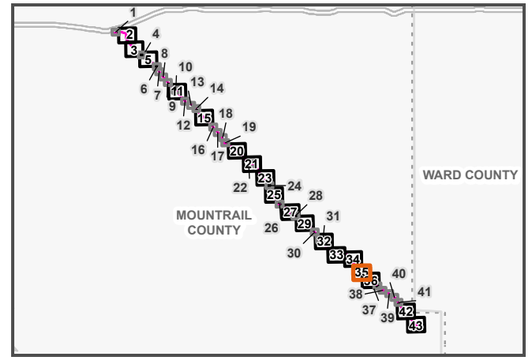


FIGURE 4-35

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

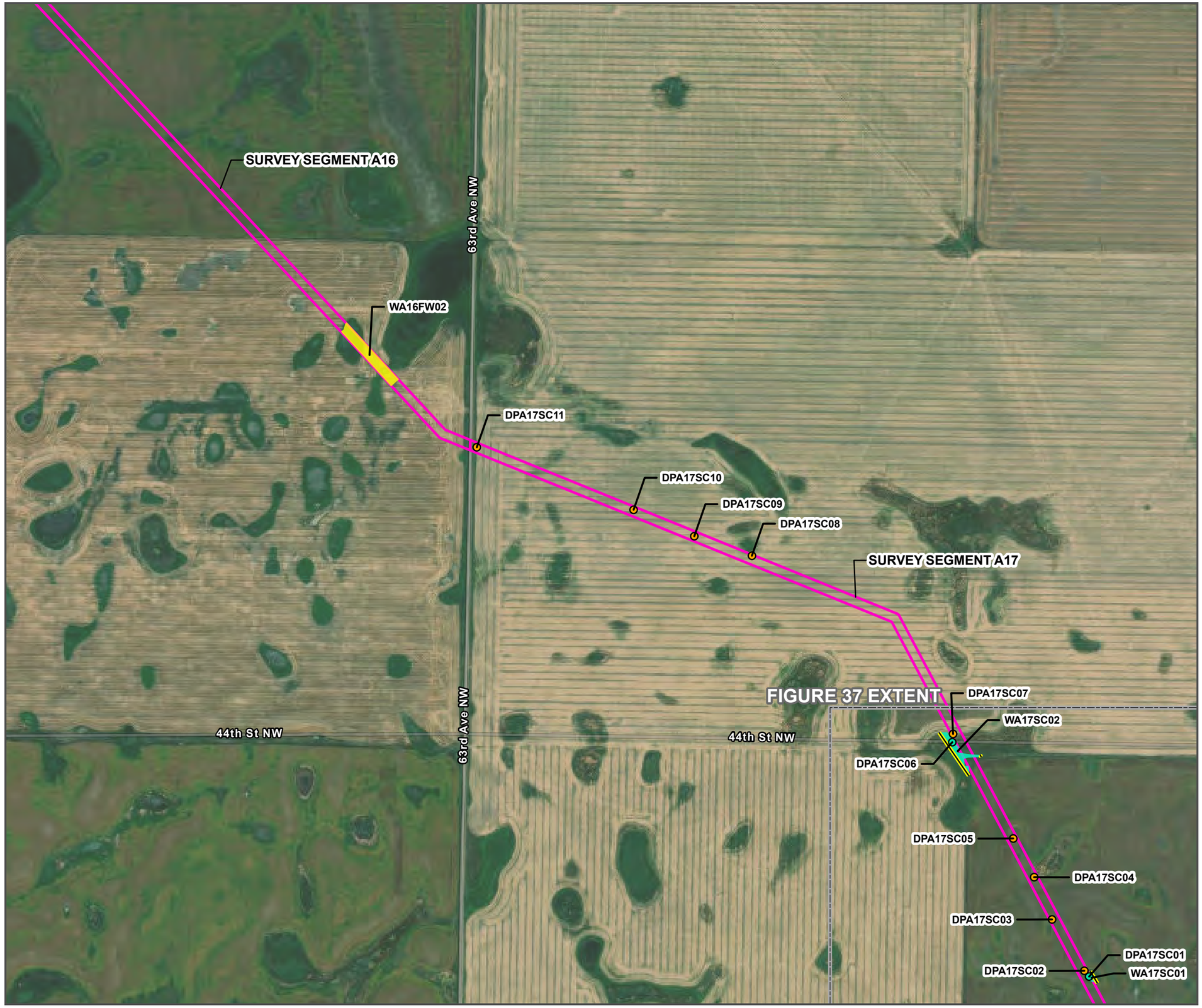
Legend

- Upland Data Point
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS



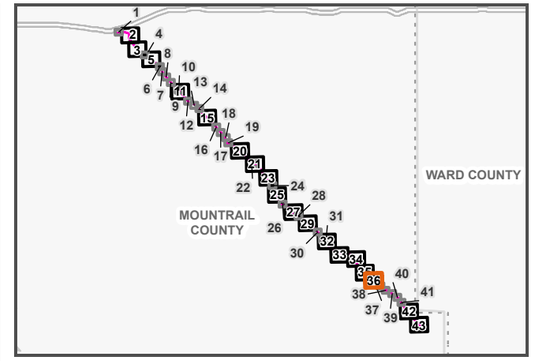


FIGURE 4-36

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

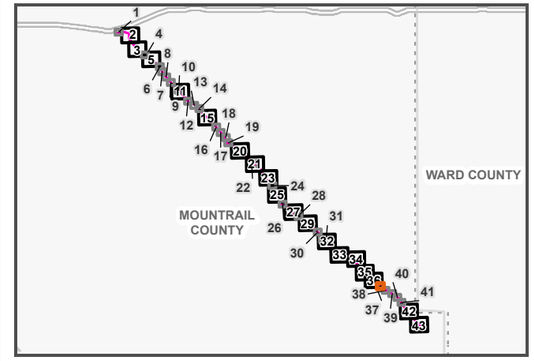


FIGURE 4-37

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

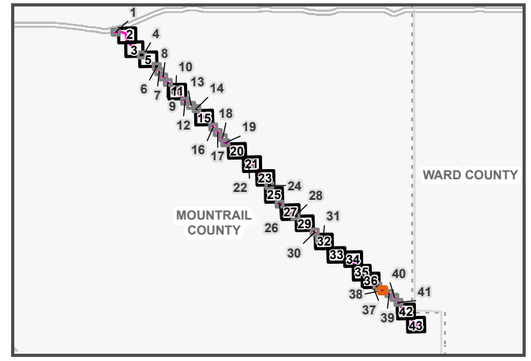


FIGURE 4-38

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

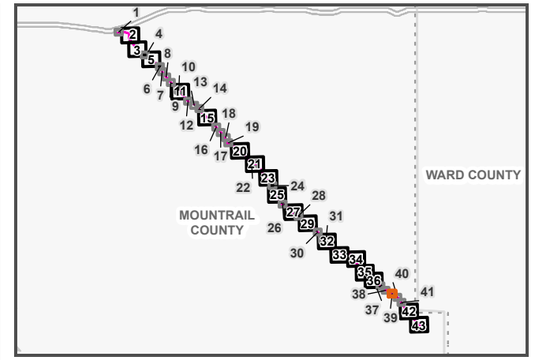


FIGURE 4-39

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Open-ended Feature
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

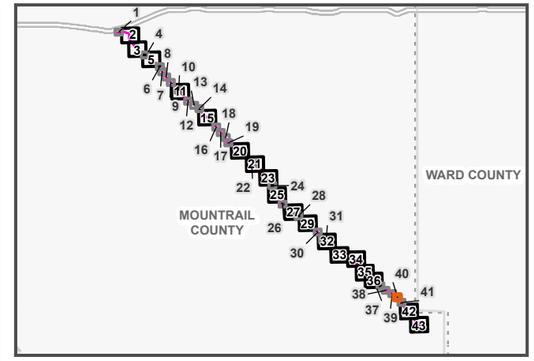


FIGURE 4-40

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Upland Data Point
- Wetland Data Point
- Delineated PEM Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

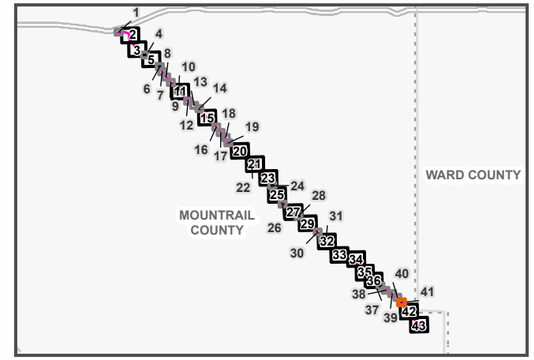


FIGURE 4-41

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features

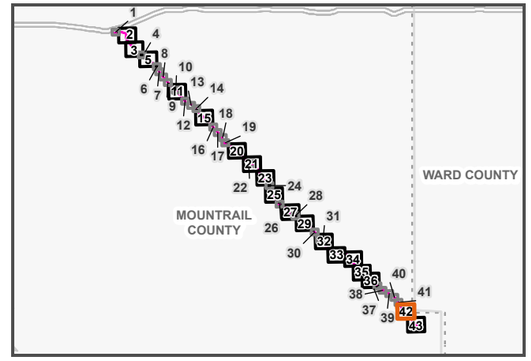


FIGURE 4-42

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

- Culvert
- Farmed Wetland
- Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

ARCADIS

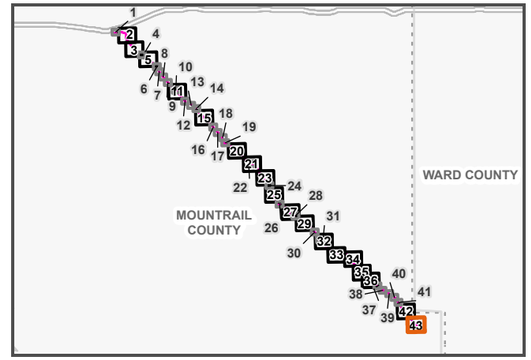


FIGURE 4-43

DELINEATED FEATURES MAP

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project
Mountrail County, North Dakota

Legend

Environmental Survey Area (ESA)

Notes:
1. See Wetland and Waterbodies Report for map sources.
2. No FEMA FIRM data is mapped within the ESA.

0 125 250 500 ft
0 37.5 75 150 m

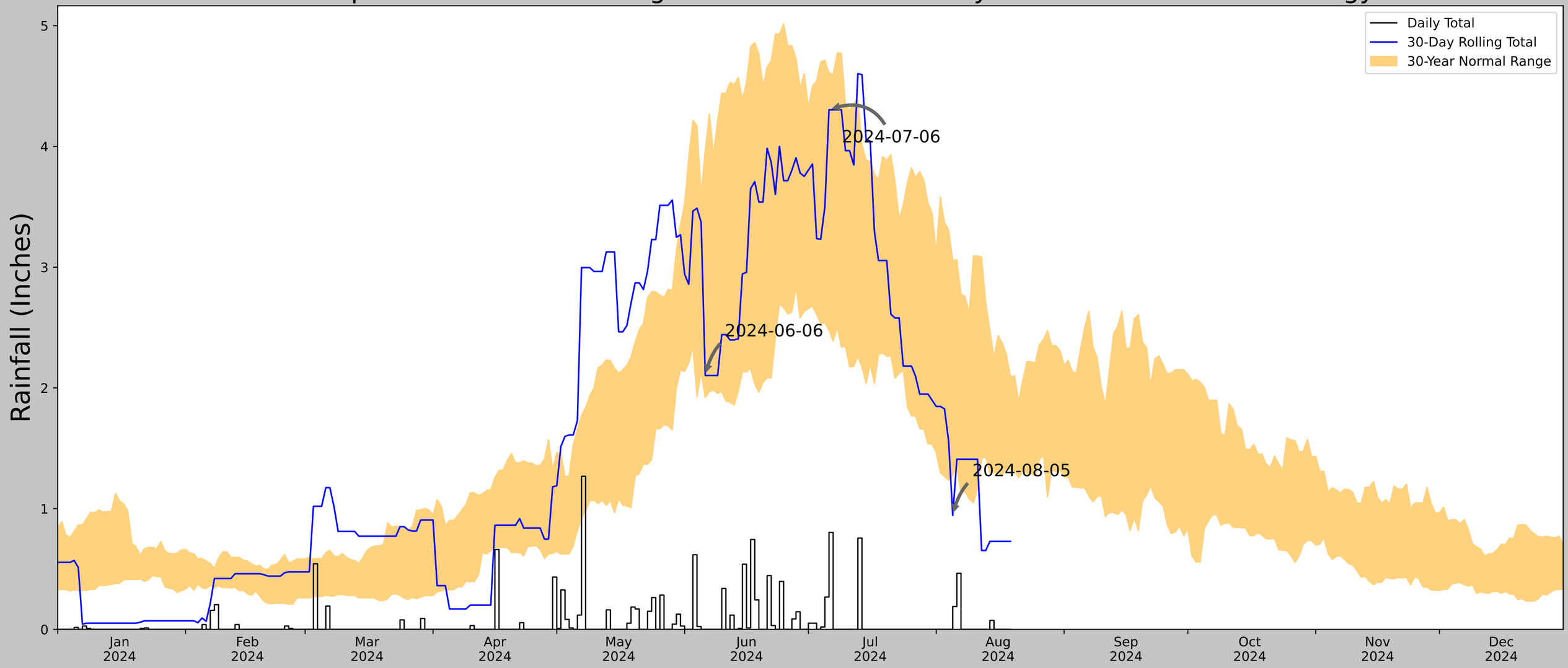
ARCADIS

Creator: NCochran Last Saved: 8/21/2024 3:04 PM
Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet
Location: T:_EPP\Thunder_Butte_Petroleum\Makoti_Pipeline_Project\MXD_Pro\Thunder_Butte_Makoti_WDR.aprx\Figure 4 Delineated Features
Disclaimer: the information shown in this map was assembled from GIS data created and/or acquired by Arcadis. The data is not to survey accuracy and is meant for planning and visualization purposes only.

Appendix A

Antecedent Precipitation Tool Output

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.303936, -102.373165
Observation Date	2024-08-05
Elevation (ft)	2213.509
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

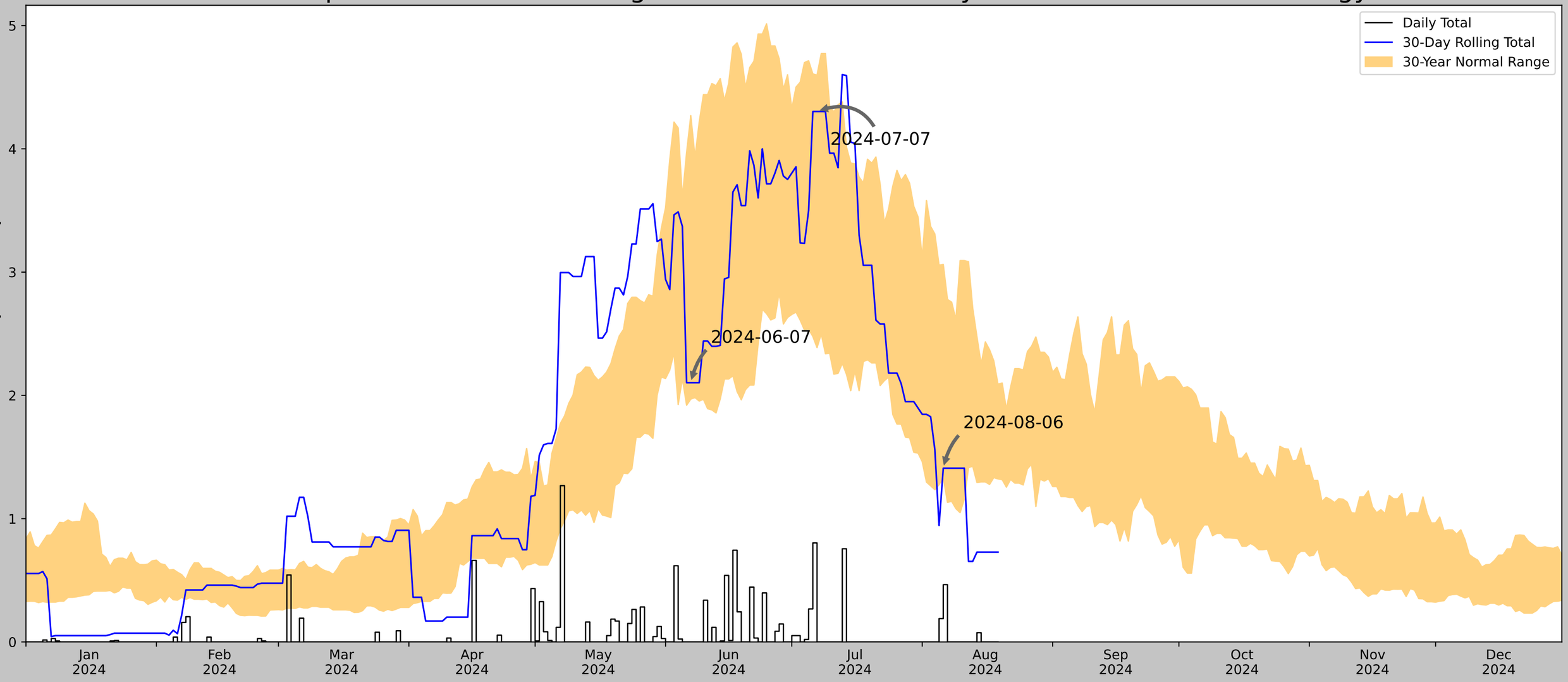
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-05	1.275591	3.055906	0.944882	Dry	1	3	3
2024-07-06	2.477953	4.60748	4.30315	Normal	2	2	4
2024-06-06	1.920079	3.970473	2.102362	Normal	2	1	2
Result							Drier than Normal - 9

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
NORTHGATE 5 ESE	48.9675, -102.1703	1841.864	46.774	371.645	38.432	6172	90
BOWBELLS	48.7994, -102.2464	1960.958	12.118	119.094	6.896	1746	0
TOLLEY 6.4 N	48.8214, -101.8494	1735.892	17.731	105.972	9.858	12	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	20.875	31.825	10.058	2257	0
COLUMBUS	48.9167, -102.8333	1950.131	30.292	108.267	16.911	386	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	44.582	166.995	27.507	668	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	34.88	363.189	28.364	76	0
BERTHOLD	48.3139, -101.7328	2080.053	49.379	238.189	33.982	30	0
TAGUS	48.3475, -101.9325	2169.948	44.191	328.084	34.384	5	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.303936, -102.373165
Observation Date	2024-08-06
Elevation (ft)	2213.509
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-06	1.333858	3.062992	1.409449	Normal	2	3	6
2024-07-07	2.387402	4.598032	4.30315	Normal	2	2	4
2024-06-07	1.970079	4.269685	2.102362	Normal	2	1	2
Result							Normal Conditions - 12

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

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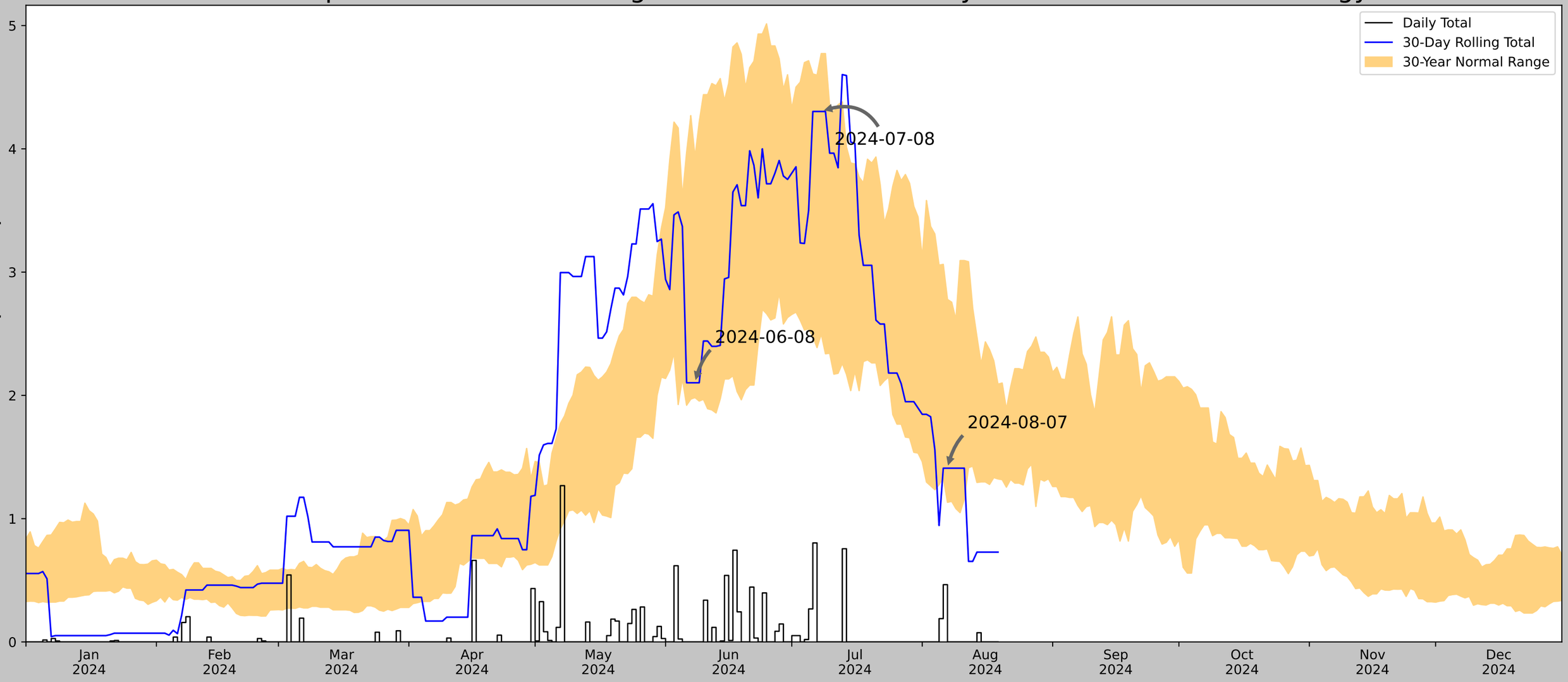
Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
NORTHGATE 5 ESE	48.9675, -102.1703	1841.864	46.774	371.645	38.432	6172	90
BOWBELLS	48.7994, -102.2464	1960.958	12.118	119.094	6.896	1746	0
TOLLEY 6.4 N	48.8214, -101.8494	1735.892	17.731	105.972	9.858	12	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	20.875	31.825	10.058	2257	0
COLUMBUS	48.9167, -102.8333	1950.131	30.292	108.267	16.911	386	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	44.582	166.995	27.507	668	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	34.88	363.189	28.364	76	0
BERTHOLD	48.3139, -101.7328	2080.053	49.379	238.189	33.982	30	0
TAGUS	48.3475, -101.9325	2169.948	44.191	328.084	34.384	5	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.303936, -102.373165
Observation Date	2024-08-07
Elevation (ft)	2213.509
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

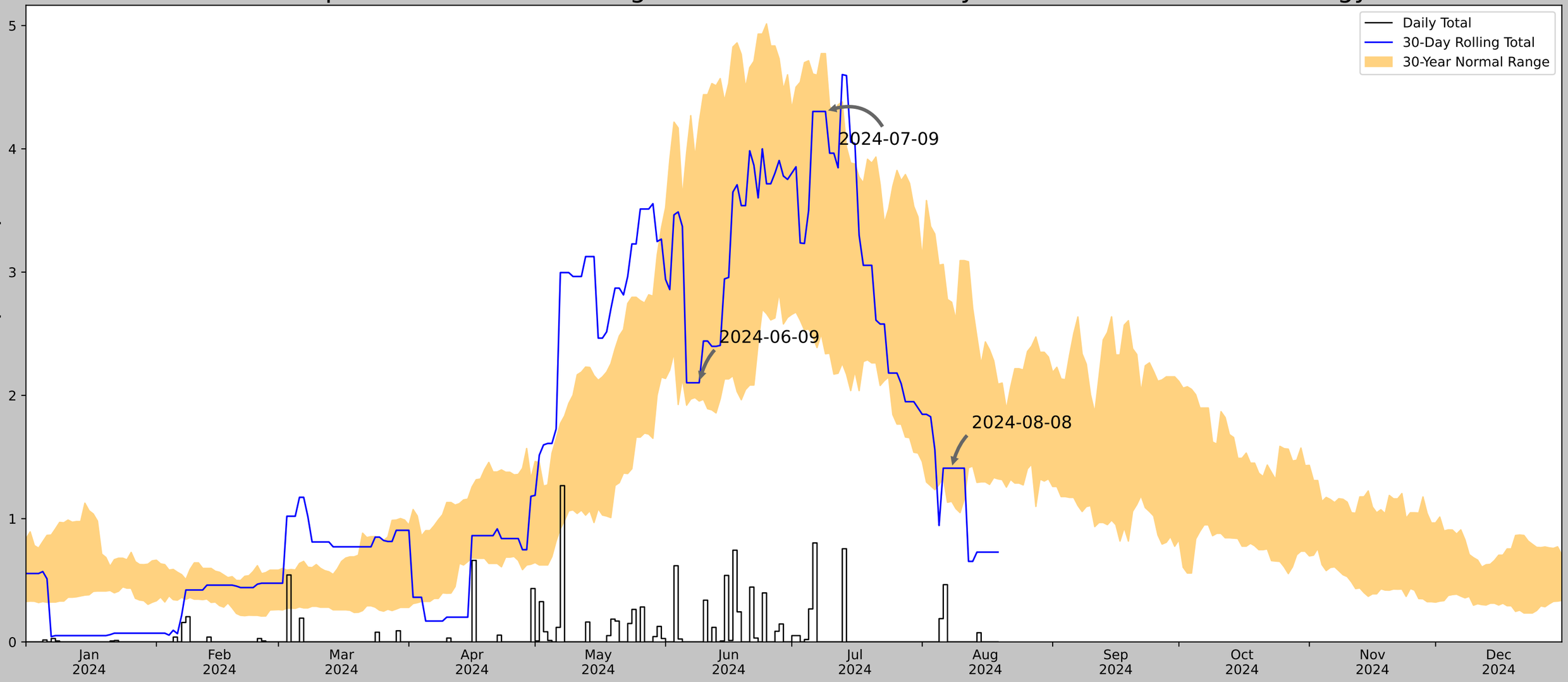
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-07	1.132284	2.778347	1.409449	Normal	2	3	6
2024-07-08	2.498819	4.772835	4.30315	Normal	2	2	4
2024-06-08	1.982284	3.932284	2.102362	Normal	2	1	2
Result							Normal Conditions - 12

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
NORTHGATE 5 ESE	48.9675, -102.1703	1841.864	46.774	371.645	38.432	6172	90
BOWBELLS	48.7994, -102.2464	1960.958	12.118	119.094	6.896	1746	0
TOLLEY 6.4 N	48.8214, -101.8494	1735.892	17.731	105.972	9.858	12	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	20.875	31.825	10.058	2257	0
COLUMBUS	48.9167, -102.8333	1950.131	30.292	108.267	16.911	386	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	44.582	166.995	27.507	668	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	34.88	363.189	28.364	76	0
BERTHOLD	48.3139, -101.7328	2080.053	49.379	238.189	33.982	30	0
TAGUS	48.3475, -101.9325	2169.948	44.191	328.084	34.384	5	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.303936, -102.373165
Observation Date	2024-08-08
Elevation (ft)	2213.509
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

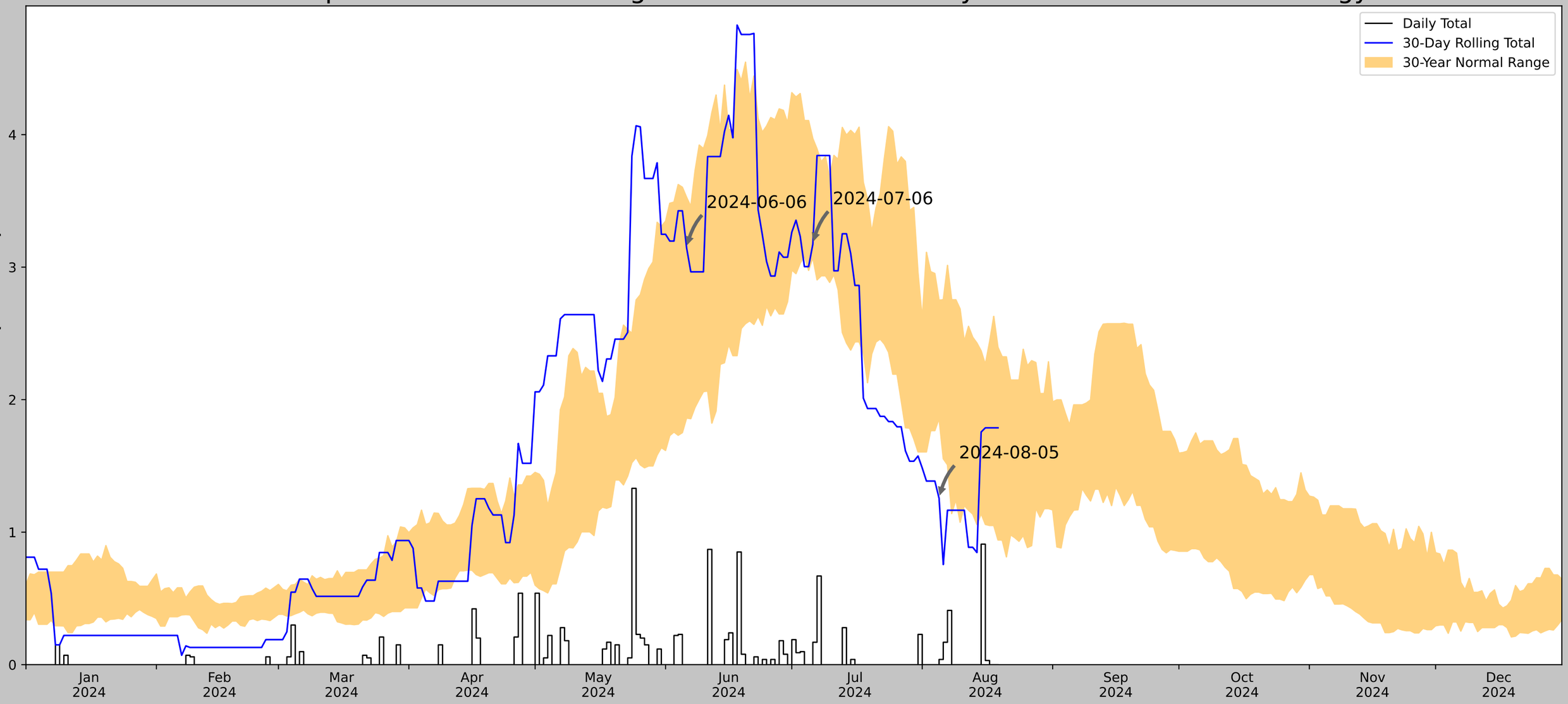
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-08	1.140551	2.755906	1.409449	Normal	2	3	6
2024-07-09	2.337402	4.772835	4.30315	Normal	2	2	4
2024-06-09	1.953937	4.215748	2.102362	Normal	2	1	2
Result							Normal Conditions - 12

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
NORTHGATE 5 ESE	48.9675, -102.1703	1841.864	46.774	371.645	38.432	6172	90
BOWBELLS	48.7994, -102.2464	1960.958	12.118	119.094	6.896	1746	0
TOLLEY 6.4 N	48.8214, -101.8494	1735.892	17.731	105.972	9.858	12	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	20.875	31.825	10.058	2257	0
COLUMBUS	48.9167, -102.8333	1950.131	30.292	108.267	16.911	386	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	44.582	166.995	27.507	668	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	34.88	363.189	28.364	76	0
BERTHOLD	48.3139, -101.7328	2080.053	49.379	238.189	33.982	30	0
TAGUS	48.3475, -101.9325	2169.948	44.191	328.084	34.384	5	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.010298, -101.914650
Observation Date	2024-08-05
Elevation (ft)	2085.735
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

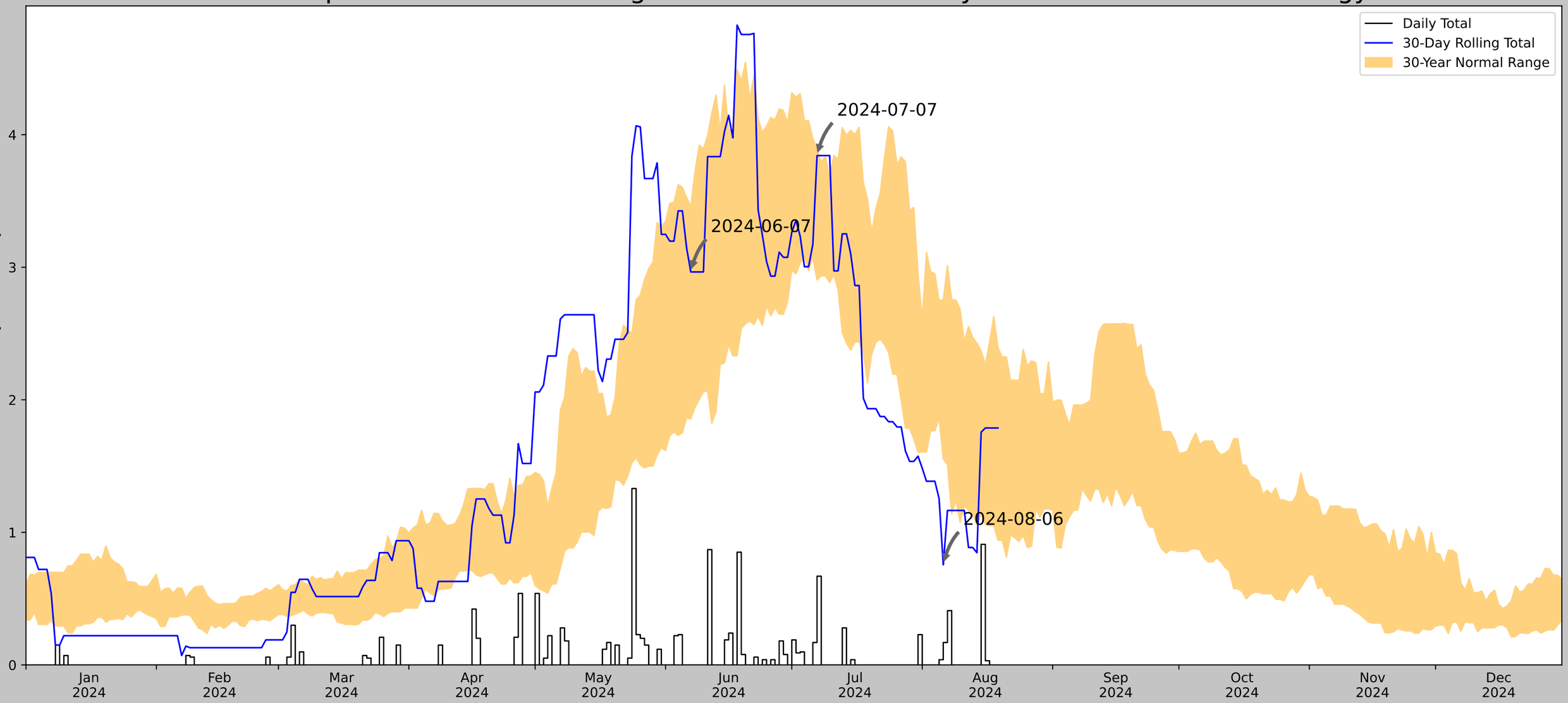
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-05	1.857087	2.751181	1.255906	Dry	1	3	3
2024-07-06	3.071654	3.970866	3.173228	Normal	2	2	4
2024-06-06	1.861417	3.527165	3.145669	Normal	2	1	2
Result							Drier than Normal - 9

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	31.641	24.173	15.004	11320	85
MAX 6.4 SE	47.7467, -101.2068	2020.997	6.508	88.911	3.507	0	1
GARRISON 5.2 E	47.6419, -101.312	1944.882	12.436	165.026	7.648	0	4
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	23	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.010298, -101.914650
Observation Date	2024-08-06
Elevation (ft)	2085.735
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

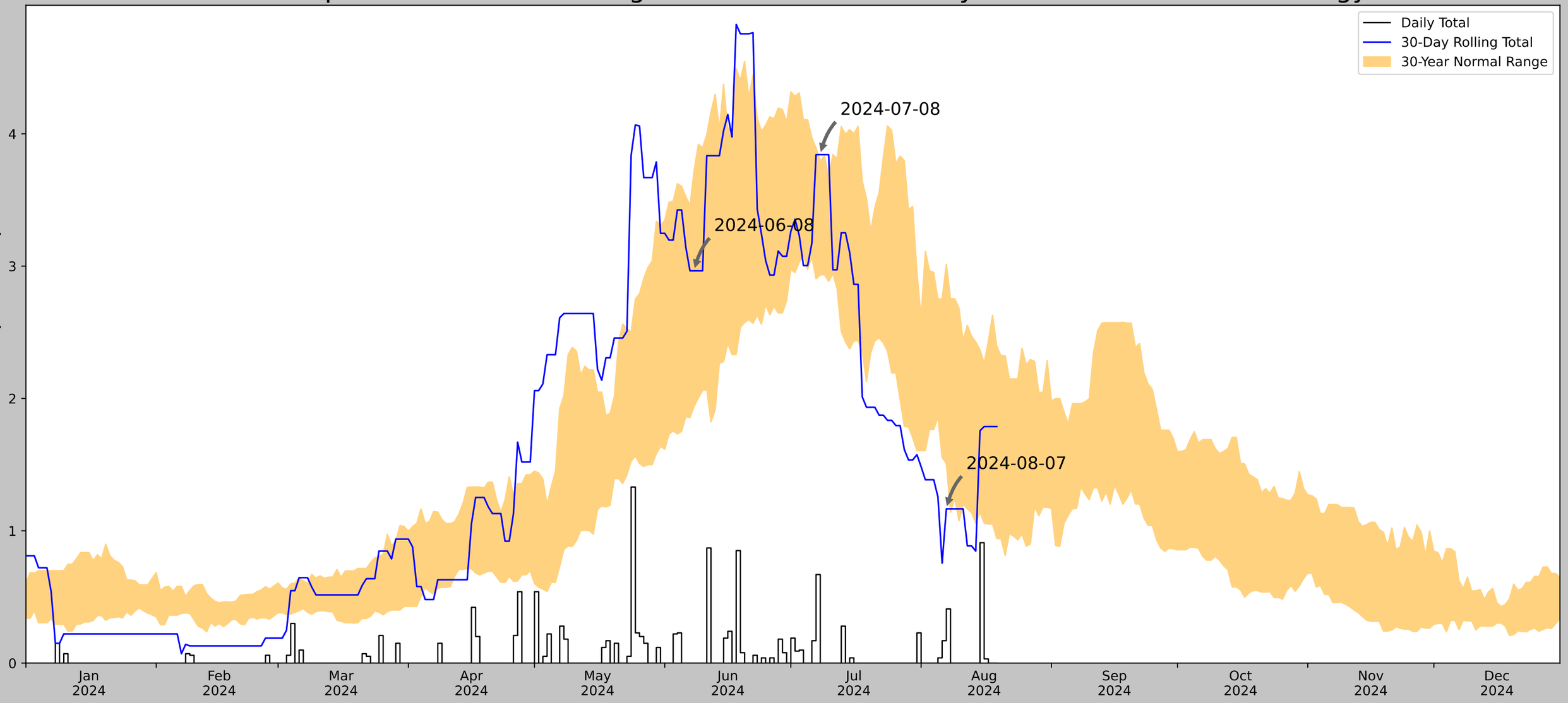
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-06	1.553937	2.753937	0.755906	Dry	1	3	3
2024-07-07	2.903937	3.89252	3.84252	Normal	2	2	4
2024-06-07	1.856299	3.458268	2.964567	Normal	2	1	2
Result							Drier than Normal - 9

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	31.641	24.173	15.003	11320	85
MAX 6.4 SE	47.7467, -101.2068	2020.997	6.508	88.911	3.507	0	1
GARRISON 5.2 E	47.6419, -101.312	1944.882	12.436	165.026	7.648	0	4
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	23	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.010298, -101.914650
Observation Date	2024-08-07
Elevation (ft)	2085.735
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

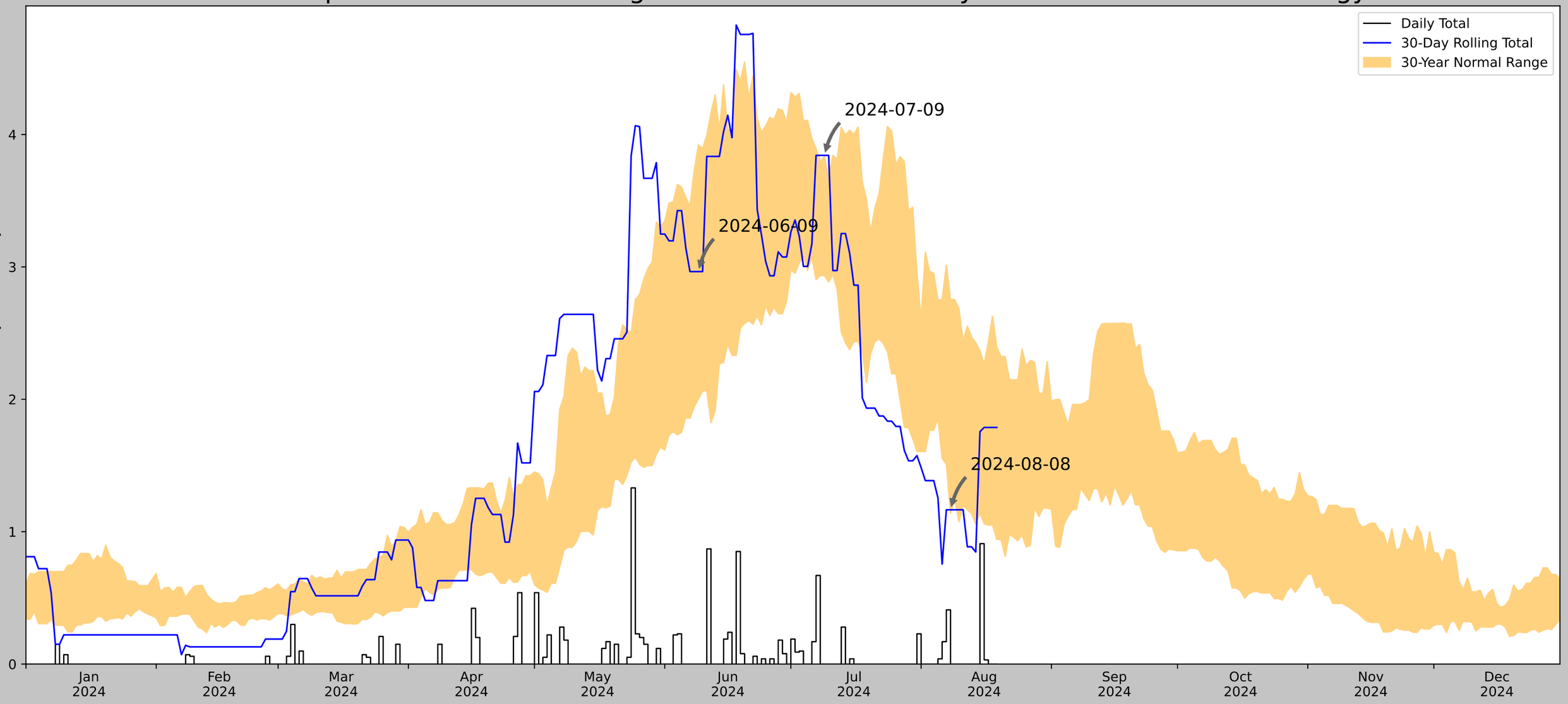
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-07	1.508268	3.01378	1.165354	Dry	1	3	3
2024-07-08	2.934646	3.794882	3.84252	Wet	3	2	6
2024-06-08	1.941339	3.725984	2.964567	Normal	2	1	2
Result							Normal Conditions - 11

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	31.641	24.173	15.003	11320	85
MAX 6.4 SE	47.7467, -101.2068	2020.997	6.508	88.911	3.507	0	1
GARRISON 5.2 E	47.6419, -101.312	1944.882	12.436	165.026	7.648	0	4
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	23	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.010298, -101.914650
Observation Date	2024-08-08
Elevation (ft)	2085.735
Drought Index (PDSI)	Moderate drought (2024-07)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-08	1.139764	2.753937	1.165354	Normal	2	3	6
2024-07-09	2.934646	3.835039	3.84252	Wet	3	2	6
2024-06-09	2.002756	3.921654	2.964567	Normal	2	1	2
Result							Normal Conditions - 14

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	31.641	24.173	15.003	11320	85
MAX 6.4 SE	47.7467, -101.2068	2020.997	6.508	88.911	3.507	0	1
GARRISON 5.2 E	47.6419, -101.312	1944.882	12.436	165.026	7.648	0	4
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	23	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Daily Data Between Two Dates
MINOT INTL AP (ND)
USW00024013

Date	Precipitation (in)
2024-08-05	0.16
2024-08-06	0.51
2024-08-07	0.00
2024-08-08	0.00
Sum:	0.67
Count:	4
Average:	0.17
Median:	0.08
Low Value:	0.00
High Value:	0.51

M = Missing
T = Trace

Time of observation may vary by station, date, and/or variable

Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 8/21/2024 3:38:22 PM EDT

Daily Data Between Two Dates
MINOT INTL AP (ND)
USW00024013

Date	Precipitation (in)
2024-07-08	0.00
2024-07-09	0.00
2024-07-10	0.00
2024-07-11	0.00
2024-07-12	0.03
2024-07-13	T
2024-07-14	0.31
2024-07-15	0.00
2024-07-16	0.00
2024-07-17	0.00
2024-07-18	0.00
2024-07-19	0.00
2024-07-20	0.00
2024-07-21	0.00
2024-07-22	0.00
2024-07-23	0.00
2024-07-24	0.00
2024-07-25	0.00
2024-07-26	T
2024-07-27	0.00
2024-07-28	0.00
2024-07-29	0.00
2024-07-30	T
2024-07-31	0.00
2024-08-01	0.00
2024-08-02	0.00
2024-08-03	0.00
2024-08-04	0.06
2024-08-05	0.16
2024-08-06	0.51
2024-08-07	0.00
2024-08-08	0.00
Sum:	1.07
Count:	32
Average:	0.03
Median:	0.00
Low Value:	0.00
High Value:	0.51

M = Missing

T = Trace

Time of observation may vary by station, date, and/or variable

Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 8/21/2024 3:41:07 PM EDT

Appendix B

Wetland Determination Data Forms

Arcadis Stream Forms

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A01 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA01RJ01

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S27, T156N, R91W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.3039631 Long: -102.3665471 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 9 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland: WA01RJ01.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Carex sp.*	75	Yes	FACW
2. *Scirpus atrovirens*	25	No	OBL
3. *typha latifolia*	15	No	OBL
4. *equisetum palustre*	15	No	FACW
5. *Poa pratensis*	5	No	FACU
6. *Carex lasiocarpa*	2	No	OBL
7.			
8.			
9.			
10.			
	137 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	42	x 1 =	42
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	137 (A)		242 (B)
Prevalence Index = B/A =			1.77

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA01RJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5YR 3/1	100						
4-16	2.5YR 3/1	90	7.5YR 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A01 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA01RJ02

Investigator(s): R. Jonson, K. Connolly Section, Township, Range: S27, T156N, R91W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.3039424 Long: -102.3665876 Datum: WGS 84

Soil Map Unit Name: Zahl-Williams loam, 9 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Cirsium discolor*	40	Yes	FACU
2. *Sonchus arvensis*	35	Yes	FAC
3. *Carex sp.*	25	Yes	FAC
4. *Prunus virginiana*	10	No	FACU
5. *Solidago juncea*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
	115 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	50	x 4 =	200
UPL species	5	x 5 =	25
Column Totals:	115 (A)		405 (B)
Prevalence Index = B/A =			3.52

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA01RJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A02 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA02RJ01

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S35, T156N, R91W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2843929 Long: -102.3335919 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 3 to 6 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Panicum virgatum*	50	Yes	FACU
2. *Elymus repens*	25	Yes	FACU
3. *Melilotus officinalis*	5	No	FAC
4. *Holcus lanatus*	5	No	FAC
5. *Solidago speciosa*	5	No	UPL
6. *Stachys palustris*	2	No	FAC
7.			
8.			
9.			
10.			
	92 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	12	x 3 =	36
FACU species	75	x 4 =	300
UPL species	5	x 5 =	25
Column Totals:	92 (A)		361 (B)
Prevalence Index = B/A =			3.92

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA02RJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A02 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA02RJ02

Investigator(s): R. Jonson, K. Connolly Section, Township, Range: S35, T156N, R91W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2863557 Long: -102.3374613 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 3 to 6 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Symphyotrichum ericoides*	40	Yes	FACU
2. *Solidago speciosa*	20	Yes	UPL
3. *Calamagrostis epigeios*	20	Yes	FAC
4. *Stachys palustris*	5	No	FAC
5. *Rumex crispus*	2	No	FAC
6.			
7.			
8.			
9.			
10.			
	87	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	27	x 3 =	81
FACU species	40	x 4 =	160
UPL species	20	x 5 =	100
Column Totals:	87 (A)		341 (B)
Prevalence Index = B/A =			3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA02RJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A3 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA3SJ01

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S1 T155N R91W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.282207 Long: -102.328962 Datum: WGS

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes (C3A) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation Y, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA3SJ01 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is partially farmed with Row Crop and is obscuring the natural vegetation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Typha latifolia*	95	Yes	OBL
2. *Phalaris arundinacea*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		105 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA3SJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					Mucky Loam/Clay	
14-16	10YR 4/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A3 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA3SJ02

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S1 T155N R91W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.282213 Long: -102.329011 Datum: WGS

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes - (C154C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Brassica napus*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA3SJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A3 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA3SJ03

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S6 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.271691 Long: -102.308961 Datum: WGS

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes - (C3A) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N , Soil Y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA3SJ02 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active cattle pasture.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Hordeum jubatum*	15	No	FACW
2. *Phalaris arundinacea*	10	No	FACW
3. *Potentilla gracilis*	70	Yes	FAC
4. *Carex vulpinoidea*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		270 (B)
Prevalence Index = B/A =			2.70

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA3SJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	N 2.5/	100					Loamy/Clayey	
8-14	N 2.5/	95	7.5R 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations
14-16	5Y 2.5/1	95	7.5R 3/4	5	C	PL		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A3 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA3SJ04

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S6 T155N R90W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.271516 Long: -102.308925 Datum: WGS

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes - (C3A) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an Active pasture; All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	45	Yes	FACU
2. *Solidago rigida*	25	Yes	FACU
3. *Liatris aestivalis*	5	No	UPL
4. *Glycyrrhiza lepidota*	25	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	5	x 5 =	25
Column Totals:	100 (A)		405 (B)
Prevalence Index = B/A =			4.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA3SJ04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	N 2.5/	100					Mucky Peat	
2-14	5Y 3/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ01

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.268815 Long: -102.305981 Datum: WGS

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes - (C3A) NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation Y, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA3SJ01 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is partially farmed with Row Crop and is obscuring the natural vegetation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Typha latifolia*	65	Yes	OBL
2. *Phalaris arundinacea*	10	No	FACW
3. *Spartina pectinata*	8	No	FACW
4. *Bidens frondosa*	2	No	FACW
5. *Lycopus americanus*	10	No	OBL
6. *Schoenoplectus tabernaemontani*	5	No	OBL
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		120 (B)
Prevalence Index = B/A =			1.20

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	N 2.5/	100					Mucky Loam/Clay	
7-16	N 2.5/	95	7.5R 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ02

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): convex Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.268885 Long: -102.306009 Datum: WGS

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes - (C3A) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Solidago rigida*	15	Yes	FACU
2. *Melilotus officinalis*	15	Yes	FACU
3. *Erigeron philadelphicus*	5	No	FAC
4. *Taraxacum officinale*	5	No	FACU
5. *Symphoricarpos occidentalis*	15	Yes	UPL
6. *Poa pratensis*	45	Yes	FACU
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	80	x 4 =	320
UPL species	15	x 5 =	75
Column Totals:	100 (A)		410 (B)
Prevalence Index = B/A =			4.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ03

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.266666 Long: -102.303801 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The NWI data is incorrect.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Bromus inermis*	10	No	UPL
2. *Melilotus officinalis*	5	No	FACU
3. *Rosa woodsii*	20	Yes	FACU
4. *Artemisia frigida*	30	Yes	UPL
5. *Symphoricarpos occidentalis*	20	Yes	UPL
6. *Poa pratensis*	15	No	FACU
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	60	x 5 =	300
Column Totals:	100 (A)		460 (B)

Prevalence Index = B/A = 4.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					Loamy/Clayey	Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 12

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils are friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ04

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.265544 Long: -102.302708 Datum: WGS

Soil Map Unit Name: Zahl-Max-Parnell complex, 0 to 35 percent slopes - (C165F) NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation Y, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA4SJ02 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active pasture.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Spartina pectinata*	70	Yes	FACW
2. *Phalaris arundinacea*	8	No	FACW
3. *Lycopus americanus*	5	No	OBL
4. *Persicaria amphibia*	15	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	98 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	78	x 2 =	156
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	98 (A)		176 (B)
Prevalence Index = B/A =			1.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	N 2.5/	100					Loamy/Clayey	Gley
14-16	10YR 3/1	95	5YR 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ05

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillslpoe Local relief (concave, convex, none): convex Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.265608 Long: -102.30272 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The NWI data is incorrect.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	65	Yes	FACU
2. *Symphoricarpos occidentalis*	10	No	UPL
3. *Rosa woodsii*	10	No	FACU
4. *Spartina pectinata*	15	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	10	x 5 =	50
Column Totals:	100 (A)		380 (B)
Prevalence Index = B/A =			3.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 7

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils are friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ06

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.264865 Long: -102.302169 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. Data point is not in a wetland. The NWI data is incorrect.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	15	Yes	FACU
2. *Symphoricarpos occidentalis*	10	No	UPL
3. *Poa pratensis*	40	Yes	FACU
4. *Artemisia frigida*	15	Yes	UPL
5. *Bromus inermis*	10	No	UPL
6. *Medicago lupulina*	5	No	FACU
7. *Schizachyrium scoparium*	5	No	FACU
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	65	x 4 =	260
UPL species	35	x 5 =	175
Column Totals:	100 (A)		435 (B)
Prevalence Index = B/A =			4.35

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					Loamy/Clayey	Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 12

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils are friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two Secondary indicators of hydrology were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ07

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.263671 Long: -102.300946 Datum: WGS

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes - (C134C) NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland. The NWI polygon as shown is larger then represented in the field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	40	Yes	FACU
2. *Phalaris arundinacea*	15	Yes	FACW
3. *Solidago rigida*	15	Yes	FACU
4. *Cirsium undulatum*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	80 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	80 (A)		290 (B)

Prevalence Index = B/A = 3.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	100					Loamy/Clayey	Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils are friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two secondary indicators of hydrology were observed; hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ08

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.261551 Long: -102.298894 Datum: WGS

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes - (C154C) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation Y , Soil n , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA4SJ03 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active pasture.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Echinochloa crus-galli*	90	Yes	FAC
2. *Alisma subcordatum*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		280 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	N 2.5/	100					Loamy/Clayey	Gley
14-18	10YR 3/1	95	7.5R 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ09

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Ag Field Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.261568 Long: -102.298974 Datum: WGS

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes - (C134C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed; hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ10

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.260240 Long: -102.297125 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland. The NWI polygon as shown is larger then represented in the field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	60	Yes	FACU
2. *Artemisia frigida*	15	No	UPL
3. *Symphoricarpos occidentalis*	10	No	UPL
4. *Achillea millefolium*	5	No	FACU
5. *Medicago lupulina*	10	No	FACU
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	25	x 5 =	125
Column Totals:	100 (A)		425 (B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Loamy/Clayey	Friable
7-16	10YR 3/1	95	7.5R 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils are friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two secondary indicators of hydrology were observed; hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ11

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.258003 Long: -102.29419 Datum: WGS

Soil Map Unit Name: Zahl-Max-Parnell complex, 0 to 35 percent slopes - (C165F) NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA4SJ04 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active pasture.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Phalaris arundinacea*	20	Yes	FACW
2. *Persicaria amphibia*	70	Yes	OBL
3. *Hordeum jubatum*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		130 (B)
Prevalence Index = B/A =			1.30

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	95	7.5R 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations
3-16	N 2.5/	100					Loamy/Clayey	Gley

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ12

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.258047 Long: -102.294288 Datum: WGS

Soil Map Unit Name: Zahl-Max-Parnell complex, 0 to 35 percent slopes - (C165F) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	30	Yes	FACU
2. *Symphoricarpos occidentalis*	10	No	UPL
3. *Artemisia frigida*	10	No	UPL
4. *Poa pratensis*	40	Yes	FACU
5. *Solidago rigida*	5	No	FACU
6. *Achillea millefolium*	5	No	FACU
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	80	x 4 =	320
UPL species	20	x 5 =	100
Column Totals:	100 (A)		420 (B)
Prevalence Index = B/A =			4.20

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Loamy/Clayey	friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils were friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed; hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ13

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.257399 Long: -102.293303 Datum: WGS

Soil Map Unit Name: Zahl-Max-Parnell complex, 0 to 35 percent slopes - (C165F) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland. The NWI polygon shows larger than what is represented in the field.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	35	Yes	FACU
2. *Symphoricarpos occidentalis*	25	Yes	UPL
3. *Poa pratensis*	40	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	25	x 5 =	125
Column Totals:	100 (A)		425 (B)
Prevalence Index = B/A =			4.25

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	friable
7-14	N 2.5/	95	10YR 3/4	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils were friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed; hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ14

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.257006 Long: -102.292737 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
WA4SJ05 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active pasture.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	45	Yes	OBL
2. *Persicaria amphibia*	30	Yes	OBL
3. *Hordeum jubatum*	10	No	FACW
4. *Lycopus americanus*	15	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		110 (B)
Prevalence Index = B/A =			1.10

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	90	7.5R 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations
8-16	N 2.5/	95	10YR 3/3	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ15

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.256941 Long: -102.292856 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland. The NWI polygon data is shown as larger than is represented in the field.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	25	Yes	FACU
2. *Symphoricarpos occidentalis*	10	No	UPL
3. *Artemisia frigida*	10	No	UPL
4. *Poa pratensis*	45	Yes	FACU
5. *Solidago rigida*	5	No	FACU
6. *Achillea millefolium*	5	No	FACU
7.			
8.			
9.			
10.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	80	x 4 =	320
UPL species	20	x 5 =	100
Column Totals:	100 (A)		420 (B)
Prevalence Index = B/A =			4.20

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 7

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils were friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed; hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ16

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.255756 Long: -102.291335 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
WA4SJ06 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is within an active pasture. The NWI polygon is undersized as shown.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Typha angustifolia*	10	No	OBL
2. *Eleocharis acicularis*	30	Yes	OBL
3. *Hordeum jubatum*	10	No	FACW
4. *Schoenoplectus tabernaemontani*	20	Yes	OBL
5. *Alopecurus pratensis*	10	No	FACW
6. *Lactuca serriola*	20	Yes	FAC
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		160 (B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA4SJ16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	95	7.5YR 3/4	5	C	M	Loamy/Clayey	Prominent redox concentrations
5-16	10YR 4/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A4 City/County: Mountrail County Sampling Date: 08/06/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA4SJ17

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S7 T155N R90W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.255827 Long: -102.291335 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes - (C135D) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil y, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an active pasture. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The Data point is not in wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Melilotus officinalis*	30	Yes	FACU
2. *Cirsium undulatum*	20	Yes	FACU
3. *Artemisia frigida*	10	No	UPL
4. *Poa pratensis*	40	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	10	x 5 =	50
Column Totals:	100 (A)		410 (B)

Prevalence Index = B/A = 4.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA4SJ17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Loamy/Clayey	friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed. Soils were friable.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed; hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A05 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA05RJ01

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S17, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2451787 Long: -102.2755467 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 9 to 15 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland: WA05RJ01.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30-ft)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	90	Yes	OBL
2. *Juncus effusus*	30	Yes	OBL
3. *Carex sp.*	15	No	
4. *Equisetum arvense*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	140	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	120	x 1 =	120
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		135 (B)

Prevalence Index = B/A = 1.08

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks:

SOIL

Sampling Point: DPA05RJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5YR 3/2	80	7.5YR 4/4	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A05 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA05RJ02

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S17, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2450967 Long: -102.2754619 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 9 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Carex pensylvanica*	40	Yes	UPL
2. *Solidago speciosa*	25	Yes	UPL
3. *Juncus tenuis*	20	No	FAC
4. *Melilotus officinalis*	15	No	FACU
5. *Symphyotrichum ericoides*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	105 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	65	x 5 =	325
Column Totals:	105 (A)		465 (B)
Prevalence Index = B/A =			4.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA05RJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A05 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA05RJ03

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S17, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2481207 Long: -102.2794022 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland: WA05RJ02.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Typha angustifolia*	30	Yes	OBL
3. *Cirsium arvense*	15	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	115 (A)		160 (B)

Prevalence Index = B/A = 1.39

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks:

SOIL

Sampling Point: DPA05RJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5YR 3/2	80	7.5YR 4/4	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 11		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A05 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA05RJ04

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S17, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2450967 Long: -102.2754619 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loams, 3 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *calamagrostis epigejos*	70	Yes	UPL
2. *Solidago speciosa*	20	No	UPL
3. *Sonchus arvensis*	15	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	105 (A)		495 (B)
Prevalence Index = B/A =			4.71

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA05RJ04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ01

Investigator(s): R. Jonson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2378775 Long: -102.2664229 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 9 to 15 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Typha angustifolia*	30	Yes	OBL
3. *Fallopia convolvulus*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		115 (B)
Prevalence Index = B/A =			1.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/1	80	2.5YR 3/4	20	C	M	Loamy/Clayey	Prominent redox concentrations
4-16	2.5YR 3/2	90	7.5YR 3/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ02

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2379038 Long: -102.2664775 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 9 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "I X Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling p X

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Pisum sativum*	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	100 (A)		400 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA06RJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ03

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2371049 Long: -102.2655183 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loam, 3 to 9 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland WA06RJ02

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Typha angustifolia*	30	Yes	OBL
3. *Fallopia convolvulus*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		115 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/1	80	2.5YR 3/4	20	C	M	Loamy/Clayey	Prominent redox concentrations
4-16	2.5YR 3/2	90	7.5YR 3/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 10		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ04

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2371370 Long: -102.2655545 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loam, 3 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Plantago major*	50	Yes	FACU
2. *Hordeum jubatum*	20	Yes	FACW
3. *Calamagrostis epigeios*	10	No	FAC
4. *Melilotus officinalis*	5	No	FAC
5. *Sonchus arvensis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	90 (A)		300 (B)
Prevalence Index = B/A =			3.33

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA06RJ04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ05

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2339216 Long: -102.260457 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loam, 3 to 9 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland: WA06RJ03

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Typha angustifolia*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5YR 3/2	90	7.5YR 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ06

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2338881 Long: -102.2605489 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loam, 3 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Miscanthus sinensis*	15	Yes	FACW
2. *Euonymus alatus*	10	Yes	OBL
3. *Pisum sativum*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	15	x 2 =	30
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		55 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ08

Investigator(s): R. Jonson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.3039631 Long: -102.3665471 Datum: WGS84

Soil Map Unit Name: Zahl-Williams loam, 9 to 15 percent slopes NWI classification: PEM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland: WA06RJ04

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Carex sp.*	75	Yes	FACW
2. *Scirpus atrovirens*	25	No	OBL
3. *typha latifolia*	15	No	OBL
4. *equisetum palustre*	15	No	FACW
5. *Poa pratensis*	5	No	FACU
6. *Carex lasiocarpa*	2	No	OBL
7.			
8.			
9.			
10.			
	137 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	42	x 1 =	42
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	137 (A)		242 (B)
Prevalence Index = B/A =			1.77

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5YR 3/1	100						
4-16	2.5YR 3/1	90	7.5YR 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ09

Investigator(s): R. Jonson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.256472 Long: -102.232992 Datum: WGS84

Soil Map Unit Name: Zahl-Williams-Bowbells loam, 3 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Triticum aestivum*	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	100 (A)		400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA06RJ09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ10

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2302984 Long: -102.2506199 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 9 to 15 percent slopes NWI classification: PEM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland WA06RJ05

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	60	Yes	OBL
2. *Typha angustifolia*	40	Yes	OBL
3. *Sonchus arvensis*	5	No	FAC
4. *Hordeum jubatum*	2	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	107 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	2	x 2 =	4
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	107 (A)		119 (B)

Prevalence Index = B/A = 1.11

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks:

SOIL

Sampling Point: DPA06RJ10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5YR 3/2	90	7.5YR 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A06 City/County: Mountrail County Sampling Date: 8/6/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA06RJ11

Investigator(s): R. Johnson, K. Connolly Section, Township, Range: S21, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2303473 Long: -102.2506933 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling p X

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absense of hydrophytic vegetation and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DPA06RJ11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5YR 3/2	90	7.5YR 4/4	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 City/ County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA08SC01

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 02, 154N 90W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.193025878595215 Long: -102.20391848720881 Datum: WGS84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Typha latifolia*	100	Yes	OBL
2 *Persicaria pensylvanica*	5	No	FACW
3 *Brassica rapa*	5	No	UPL
4			
5			
6			
7			
50% = 55% 20% = 22%	110	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	100	x 1 =	100
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Total	110 (A)		135 (B)

Prevalence Index = (B/A) = 1.23

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA08SC01

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** **X** **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** **X** **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 City/ County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA08SC03

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope(%): 2-5%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.2018838517049 Long: -102.21128844447655 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Pascopyrum smithii*	100	Yes	FACU
2				
3				
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA08SC03

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 7	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 7	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC04

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.205137464332374 | Long: -102.21555620426139 | Datum: WGS84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes | NWI Classification:

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Typha latifolia*	90	Yes	OBL
2 *Phalaris arundinacea*	20	No	FACW
3			
4			
5			
6			
7			
50% = 55% 20% = 22%	110	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	90	x 1 =	90
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Total	110 (A)		130 (B)

Prevalence Index = (B/A) = 1.18

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA08SC04

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC05

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.205831309389026 | Long: -102.21655636848813 | Datum: WGS84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes | NWI Classification:

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Typha latifolia*	100	Yes	OBL
2			
3			
4			
5			
6			
7			
50% = 50% 20% = 20%	100	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Total	100 (A)		100 (B)

Prevalence Index = (B/A) = 1

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA08SC05

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC06

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Convex | Slope(%): 1-2%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.20602123257174 | Long: -102.21686467267759 | Datum: WGS84

Soil Map Unit Name: Hamerly-Tonka complex, 0 to 3 percent slopes | NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Pascopyrum smithii*	100	Yes	FACU
2				
3				
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA08SC06

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 7	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 7	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC07

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.20658923333334 | Long: -102.21764925000001 | Datum: WGS84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes | NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Stratum (Plot size:)	% Cover	Species?	Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Herb Stratum (Plot size: Radius 78.5)			
1 *Typha latifolia*	100	Yes	OBL
2			
3			
4			
5			
6			
7			
50% = 50% 20% = 20%	100	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Total	100 (A)		100 (B)

Prevalence Index = (B/A) = 1

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA08SC07

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC08

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Convex | Slope(%): 1-2%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.20785758333333 | Long: -102.21911735 | Datum: WGS84

Soil Map Unit Name: Hamerly-Tonka complex, 0 to 3 percent slopes | NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Pascopyrum smithii*	100	Yes	FACU
2				
3				
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA08SC08

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 7	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 7	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC09

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Convex | Slope(%): 2-5%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.20991523313195 | Long: -102.22153865630959 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes | NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Stratum (Plot size:)	% Cover	Species?	Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Herb Stratum (Plot size: Radius 78.5)			
1 *Pascopyrum smithii*	100	Yes	FACU
2			
3			
4			
5			
6			
7			
50% = 50% 20% = 20%	100	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA08SC09

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 7	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 7	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A08 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA08SC10

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 35, 155N 90W

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Convex | Slope(%): 2-5%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.209407750000004 | Long: -102.22084766666667 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes | NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Pascopyrum smithii*	100	Yes	FACU
2				
3				
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA08SC10

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 7	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 20	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A8 City/County: Mountrail County Sampling Date: 8/8/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA8KM01

Investigator(s): K. Mageland Section, Township, Range: S26, T155N, R90W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2114381 Long: -102.2235388 Datum: WGS 84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Phalaris arundinacea*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		90 (B)
Prevalence Index = B/A =			1.13

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks:

SOIL

Sampling Point: DPA8KM01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	70	2.5Y 4/3	30	C	M	Sandy	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A8 City/County: Mountrail County Sampling Date: 8/8/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA8KM02

Investigator(s): K. Mageland Section, Township, Range: S26, T155N, R90W

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.2115634 Long: -102.2236332 Datum: WGS 84

Soil Map Unit Name: Divide loam, 0 to 2 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil yes, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	95	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals:	95 (A)		475 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA8KM02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: gravel

Depth (inches): 7

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A09 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA09SC01

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 02, 154N 90W

Landform (hillslope, terrace, etc.): Toe Slope | Local relief (concave, convex, none): Concave | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.19285153333334 | Long: -102.20280715 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: R4SBC

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Herb Stratum (Plot size: Radius 78.5)				
1	*Bromus arvensis*	90	Yes	FACU
2	*Helianthus petiolaris*	20	No	UPL
3	*Melilotus officinalis*	20	No	FACU
4	*Cirsium arvense*	5	No	FACU
5				
6				
7				
	50% = 67.5% 20% = 27%	135	=Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
3				
	50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	115	x 4 =	460
UPL species	20	x 5 =	100
Column Total	135 (A)		560 (B)

Prevalence Index = (B/A) = 4.15

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA09SC01

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 8	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
8 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A09 City/ County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA09SC02

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 01, 154N 90W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.190138187391824 Long: -102.19253480373726 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Glycine max*	90	Yes	FACU
2 *Helianthus petiolaris*	3	No	No assigned wetland indicator status
3			
4			
5			
6			
7			
50% = 46.5% 20% = 19%	93	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	0	x 5 =	0
Column Total	90 (A)		360 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA09SC02

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 12	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
12 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A09 City/ County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA09SC03

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 01, 154N 90W

Landform (hillslope, terrace, etc.): Foot Slope Local relief (concave, convex, none): Concave Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.189659418687 61 Long: -102.19218039100315 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Glycine max*	90	Yes	FACU
2	*Helianthus petiolaris*	15	No	UPL
3	*Ambrosia trifida*	10	No	FAC
4				
5				
6				
7				
	50% = 57.5% 20% = 23%	115	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
	50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	90	x 4 =	360
UPL species	15	x 5 =	75
Column Total	115 (A)		465 (B)

Prevalence Index = (B/A) = 4.04

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA09SC03

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 12	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
12 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A09 City/ County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA09SC04

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 01, 154N 90W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.18727311647356 Long: -102.18750710889458 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Pascopyrum smithii*	100	Yes	FACU
2 *Helianthus petiolaris*	1	No	UPL
3			
4			
5			
6			
7			
50% = 50.5% 20% = 20%	101	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA09SC04

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 11	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
11 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A09 | City/ County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA09SC05

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 01, 154N 90W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): Flat | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.18367749613351 | Long: -102.18227765213275 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Pascopyrum smithii*	100	Yes	FACU
2 *Helianthus petiolaris*	1	No	UPL
3			
4			
5			
6			
7			
50% = 50.5% 20% = 20%	101	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Total	100 (A)		400 (B)

Prevalence Index = (B/A) = 4

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: DPA09SC05

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 8	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
8 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10CK01

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.181589 Long: -102.179234 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil yes, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Triticum aestivum*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA10CK01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted soil/gravel

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10CK02

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.178488 Long: -102.173991 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil yes, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Triticum aestivum*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA10CK02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					Loamy/Clayey	
12-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10CK03

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.177019 Long: -102.171474 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil yes, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA10CK03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Compacted stone

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10CK04

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.172874 Long: -102.162617 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland. Wetland WA10CK01

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Phalaris arundinacea*	80	Yes	FACW
2. *Symphyotrichum lanceolatum*	20	No	FACW
3. *Bromus inermis*	15	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	15	x 5 =	75
Column Totals:	115 (A)		275 (B)
Prevalence Index = B/A =			2.39

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA10CK04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/1	90	7.5YR 3/3	10			Loamy/Clayey	
13-16	10YR 4/1	92	7.5YR 3/4	8	C	PL/M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10CK05

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.172983 Long: -102.162634 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Bromus inermis*	55	Yes	UPL
2. *Solidago speciosa*	45	Yes	UPL
3. *Melilotus officinalis*	25	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	125 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	100	x 5 =	500
Column Totals:	125 (A)		600 (B)
Prevalence Index = B/A =			4.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DPA10CK05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Loamy/Clayey	
7-16	10YR 5/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A10 City/County: Mountrail County Sampling Date: 8/8/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA10KM01

Investigator(s): K. Mageland Section, Township, Range: S7, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.171830 Long: -102.160117 Datum: WGS 84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1Cx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Triticum aestivum*	95	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals:	95 (A)		475 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA10KM01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	100						gravel in profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted gravel

Depth (inches): 10

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A11 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA11CK01

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S8, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.168732 Long: -102.155855 Datum:

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation yes, Soil yes, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No X**
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Bromus inermis*	50	Yes	UPL
2. *Elymus bakeri*	45	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals:	95 (A)		475 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No X**

Remarks:

SOIL

Sampling Point: DPA11CK01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 5/3	100					Loamy/Clayey	gravel in profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted gravel

Depth (inches): 10

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A11 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA11CK02

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S8, T154N, R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.168732 Long: -102.155855 Datum:

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes No X
Hydric Soil Present? Yes No X
Wetland Hydrology Present? Yes No X

Is the Sampled Area within a Wetland? **Yes** **No** X

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80 (A)		400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point: DPA11CK02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted gravel

Depth (inches): 10

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA11TN01

Investigator(s): T.Noel, H. Saxena Section, Township, Range: S20 T154N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.153307 Long: -102.140297 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA11TN01 is an NWI-mappped and ND-mapped PEM1A PEM wetland at the toe of a sloped flaxseed field and is open-ended to the west and southwest. ATP indicates that that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Typha angustifolia*	40	Yes	OBL
2. *Persicaria amphibia*	30	Yes	OBL
3. *Phalaris arundinacea*	20	Yes	FACW
4. *Bidens connata*	5	No	FACW
5. *Stachys pilosa*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		130 (B)
Prevalence Index = B/A =			1.30

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA11TN01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	95	10YR 4/6	5	C	PL/M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN02

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S20 T154N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.152575 Long: -102.138316 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "N X Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling p X

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN02 is the upland datapoint for WTNA1401. It was taken within an ND-mapped PEM1Cx resourced that is confined to a roadside ditch along 70th Avenue NW. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Convolvulus arvensis*	35	Yes	UPL
2. *Helianthus annuus*	25	Yes	FACU
3. *Parietaria pensylvanica*	20	Yes	FAC
4. *Setaria verticillata*	15	No	FAC
5. *Cirsium arvense*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1. *Convulvulus arvensis*	25	Yes	
2.			
	25 =Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	30	x 4 =	120
UPL species	35	x 5 =	175
Column Totals:	100 (A)		400 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA11TN03

Investigator(s): T.Noel, H. Saxena Section, Township, Range: S20 T154N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: Long: Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
WA11TN02 is an ND-mapped PEM1Cx PEM wetland that is confined to a ditch along 51st Street NW and is open-ended to the west. ATP inicates that that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Persicaria amphibia*	50	Yes	OBL
2. *Elymus virginicus*	30	Yes	FAC
3. *Typha angustifolia*	15	No	OBL
4. *Bidens connata*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	5	x 2 =	10
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		165 (B)

Prevalence Index = B/A = 1.65

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA11TN03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Loamy/Clayey	
6-16	10YR 4/1	95	10YR 5/4	5	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN04

Investigator(s): T.Noel, H. Saxena Section, Township, Range: S20 T154N R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.153552 Long: -102.140338 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA11TN04 is the upland datapoint for WA11TN02 It was taken within a small grassland area, adjacent to WA11TN02. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Melilotus officinalis*	60	Yes	FACU
2. *Bromus hordeaceus*	40	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1. *Convulvulus arvensis*	25	Yes	
2.			
	25 =Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	40	x 5 =	200
Column Totals:	100 (A)		440 (B)

Prevalence Index = B/A = 4.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	98	5YR 4/6	2	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A12 City/County: Mountrail County Sampling Date: 08/07/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA12SJ01

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S28 T154N R89W

Landform (hillside, terrace, etc.): Riparian Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.132291 Long: -102.122438 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA12SJ01 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Hordeum jubatum*	5	No	FACW
2. *Spartina pectinata*	63	Yes	FACW
3. *Schoenoplectus pungens*	15	No	OBL
4. *Alopecurus pratensis*	5	No	FACW
5. *Phalaris arundinacea*	10	No	FACW
6. *Epilobium palustre*	2	No	OBL
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	17	x 1 =	17
FACW species	83	x 2 =	166
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		183 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Area is completely vegetated; stream characteristics like a bed & bank were absent. A dominance of hydrophytic vegetation was observed;

SOIL

Sampling Point: DPA12SJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Loamy/Clayey	
2-16	10Y 2.5/1	80	10YR 4/1	20	D	M	Loamy/Clayey	Organic material in the matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A12 City/County: Mountrail County Sampling Date: 08/07/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA12SJ02

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S28 T154N R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 9%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.132404 Long: -102.122498 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
All three metrics were NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Solidago rigida*	20	Yes	FACU
2. *Bromus inermis*	5	No	UPL
3. *Rosa woodsii*	10	No	FACU
4. *Achillea millefolium*	5	No	FACU
5. *Elaeagnus commutata*	30	Yes	UPL
6. *Glycyrrhiza lepidota*	5	No	FACU
7. *Artemisia frigida*	10	No	UPL
8. *Schizachyrium scoparium*	15	Yes	FACU
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	55	x 4 =	220
UPL species	45	x 5 =	225
Column Totals:	100 (A)		445 (B)

Prevalence Index = B/A = 4.45

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA12SJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2	100					Loamy/Clayey	Soils were Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed; Soils metric is NOT met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were NOT observed; Hydrology metric is NOT met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A12 City/County: Mountrail County Sampling Date: 08/07/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA12SJ03

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S21 T154N R89W

Landform (hillside, terrace, etc.): Shallow Depression Local relief (concave, convex, none): Concave Slope (%): 9%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.144670 Long: -102.132046 Datum: WGS

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes (C132B) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation N, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
All three metrics were NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. The NWI was not corect.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA12SJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 2/1	100					Loamy/Clayey	Soils were Friable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed; Soils metric is NOT met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were NOT observed; However, two Secondary indicators of Hydrology were observed, therefore; Hydrology metric is

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA12TN01

Investigator(s): T.Noel, H. Saxena | Section, Township, Range: S21 T154N R89W

Landform (hillside, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0%

Subregion (LRR/MLRA): LRR F, MLRA 53B | Lat: 48.152595 | Long: -102.138035 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
DPA12TN01 is loacated within an ND-mapped PEM1Cx resource and is confined to a roadside ditch along 70th Avenue NW. Wetland hydrology, vegetation, and hydric soils were not present at the time of investigation. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Melilotus officinalis*	35	Yes	FACU
2. *Bromus hordeaceus*	25	Yes	UPL
3. *Amaranthus albus*	20	Yes	FACU
4. *Symphoricarpos occidentalis*	15	No	UPL
5. *Symphyotrichum ericoides*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1. *Convulvulus arvensis*	25	Yes	
2.			
	25 =Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	40	x 5 =	200
Column Totals:	100 (A)		440 (B)

Prevalence Index = B/A = 4.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA12TN01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA12TN02

Investigator(s): T.Noel, H. Saxena Section, Township, Range: S21 T154N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.151043 Long: -102.136607 Datum: WGS84

Soil Map Unit Name: Williams-Zahl loams, 3 to 6 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "I X Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling p X

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA12TN02 was taken within a ND-mapped PEM1Ad located within a flaxseed crop field. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Linum usitatissimum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1. *Convulvulus arvensis*	25	Yes	
2.			
	25 =Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA12TN02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA12TN03

Investigator(s): T.Noel, H. Saxena | Section, Township, Range: S21 T154N R89W

Landform (hillside, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0%

Subregion (LRR/MLRA): LRR F, MLRA 53B | Lat: 48.1485 | Long: -102.134815 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA12TN01 is an NWI-mappped PEM1A and ND-mapped PEM1Ad PEM wetland within a flaxseed field and is open-ended to the west and to the east. ATP indicates that that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Typha latifolia*	70	Yes	OBL
2. *Alisma triviale*	20	No	OBL
3. *Rumex crispus*	8	No	FAC
4. *Linum usitatissimum*	8	No	UPL
5. *Schoenoplectus pungens*	3	No	OBL
6. *Mentha arvensis*	3	No	FACW
7. *Persicaria lapathifolia*	2	No	OBL
8. *Hordeum jubatum*	2	No	FACW
9. *Bidens connata*	1	No	FACW
10.			
	117 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	6	x 2 =	12
FAC species	8	x 3 =	24
FACU species	0	x 4 =	0
UPL species	8	x 5 =	40
Column Totals:	117 (A)		171 (B)
Prevalence Index = B/A =			1.46

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA12TN03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A13 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA13CK01

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S34, T154N, R89W

Landform (hillside, terrace, etc.): Fringe along stream Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.1208977 Long: -102.099498 Datum: WGS 84

Soil Map Unit Name: Harriet loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Based on the presence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Hordeum jubatum*	60	Yes	FACW
2. *Schoenoplectus pungens*	40	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		160 (B)
Prevalence Index = B/A =			1.60

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA13CK01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 5/2	100					Loamy/Clayey	
5-16	10GY 5/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A13 City/County: Mountrail County Sampling Date: 8/7/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA13CK02

Investigator(s): C. Kammel, K. Mageland Section, Township, Range: S34, T154N, R89W

Landform (hillside, terrace, etc.): terrece Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.1210244 Long: -102.0997772 Datum: WGS 84

Soil Map Unit Name: Harriet loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation yes, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Based on the absence of hydrophytic vegetation, hydric soils and wetland hydrology, this data point is anticipated to be upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. *Bromus inermis*	50	Yes	UPL
2. *Sonchus arvensis*	20	Yes	FAC
3. *Symphyotrichum ericoides*	15	No	FACU
4. *Achillea millefolium*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	50	x 5 =	250
Column Totals:	90 (A)		390 (B)
Prevalence Index = B/A =			4.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA13CK02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 6/2	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA14TN01

Investigator(s): T.Noel, C. Kammel | Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B | Lat: 40.105976 | Long: -102.070566 | Datum: WGS84

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes | NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA14TN01 is a large, NWI-mappped and ND-mapped PEM1A marsh wetland that is bordered by row cropping and is open-ended to the northeast and southwest. ATP indicates that climatic conditions are drier than normal. Potential habitat for migrating Whooping Cranes was observed during the investigation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Typha angustifolia*	60	Yes	OBL
2. *Sparganium americanum*	15	No	OBL
3. *Persicaria amphibia*	15	No	OBL
4. *Sagittaria latifolia*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA14TN01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	90	10YR 4/6	10	C	PL/M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	X	No ___	Depth (inches):	24
Water Table Present?	Yes	X	No ___	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	X	No ___	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN02

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 2%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.105842 Long: -102.070426 Datum: WGS84

Soil Map Unit Name: Hamerly-Tonka complex, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN02 is the upland datapoint for WTNA1401. It was taken within an upland area between WA14TN01 and a soy crop field. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Artemisia biennis*	60	Yes	FACU
2. *Glycine max*	20	Yes	UPL
3. *Echinochloa muricata*	10	No	FACW
4. *Xanthium strumarium*	5	No	FAC
5. *Mentha arvensis*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	5	x 3 =	15
FACU species	60	x 4 =	240
UPL species	20	x 5 =	100
Column Totals:	100 (A)		385 (B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/2	100					Loamy/Clayey	
7-16	5Y 5/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN03

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Floodplain/Terrace Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.09657 Long: -102.060584 Datum: T

Soil Map Unit Name: Harriet loam, 0 to 2 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
WA14TN02 is a large, NWI-mapped and ND-mapped PEM1A floodplain wetland, that is open-ended to the northeast and southwest. It abuts stream SA14TN01 to the south. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Hordeum jubatum*	55	Yes	FACW
2. *Juncus effusus*	20	Yes	OBL
3. *Schoenoplectus pungens*	15	No	OBL
4. *Lycopus uniflorus*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	55	x 2 =	110
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		155 (B)

Prevalence Index = B/A = 1.55

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: DPA14TN03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	95	10YR 4/6	5	C	PL	Loamy/Clayey	Prominent redox concentrations
6-16	5Y 5/1	97	10YR 5/6	3	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN04

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 3-5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.096728 Long: -102.060874 Datum: WGS84

Soil Map Unit Name: Harriet loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN04 is the upland datapoint for WTNA1402. It was taken within a grassland area upslope from WA14TN02. ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Glycyrrhiza lepidota*	45	Yes	FACU
2. *Artemisia ludoviciana*	25	Yes	UPL
3. *Symphyotrichum ericoides*	15	No	FACU
4. *Melilotus officinalis*	10	No	FACU
5. *Symphoricarpos occidentalis*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	30	x 5 =	150
Column Totals:	100 (A)		430 (B)

Prevalence Index = B/A = 4.30

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN05

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.100701 Long: -102.0653 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN05 was taken within a NWI-mapped and ND-mapped PEM1A resource located within a wheat crop field. Wetland hydrology, vegetation, and hydric soils were not present at the time of investigation . ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5R 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN06

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R89W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.101993 Long: -102.066109 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN06 was taken within a ND-mapped PEM1A resource located within a wheat crop field. Wetland hydrology, vegetation, and hydric soils were not present at the time of investigation . ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5R 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA14TN07

Investigator(s): T.Noel, C. Kammel | Section, Township, Range: S1 T153N R88W

Landform (hillside, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B | Lat: 48.086273 | Long: -102.043117 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 0 to 3 percent slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN05 was taken within a ND-mapped PEM1A resource located within a wheat crop field. Wetland hydrology, vegetation, and hydric soils were not present at the time of investigation . ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5R 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project City/County: Mountrail County Sampling Date: 8/6/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA14TN08

Investigator(s): T.Noel, C. Kammel Section, Township, Range: S1 T153N R88W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.085564 Long: -102.041775 Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
DPA14TN08 was taken within a ND-mapped PEM1A resource located within a wheat crop field. Wetland hydrology, vegetation, and hydric soils were not present at the time of investigation . ATP indicates that the climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-Ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-Ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5-Ft)			
1. *Triticum aestivum*	90	Yes	UPL
2. *Convolvulus arvensis*	10	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 30-Ft)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: DPA14TN08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

National Wetland Inventory, National Hydrography Dataset, Google Aerial Imagery and USGS Topographic Maps

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 | City/ County: Mountrail County | Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA17SC01

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 27, 153N 88W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.048949883333336 | Long: -101.97342313333333 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Stratum (Plot size:)	% Cover	Species?	Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	
Herb Stratum (Plot size: Radius 78.5)			
1 *Bidens frondosa*	40	Yes	FACW
2 *Persicaria pensylvanica*	20	Yes	FACW
3			
4			
5			
6			
7			
50% = 30% 20% = 12%	60	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Total	60 (A)		120 (B)

Prevalence Index = (B/A) = 2

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA17SC01

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC02

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 27, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.049031733333 34 Long: -101.97357294999999 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Vicia lens*	80	Yes	UPL
2	*Helianthus petiolaris*	20	Yes	UPL
3				
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Total	100 (A)		500 (B)

Prevalence Index = (B/A) = 5

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC02

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 8	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
8 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC03

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 27, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.04975806666667 Long: -101.97429305 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Vicia lens*	90	Yes	UPL
2	*Helianthus petiolaris*	10	No	UPL
3	*Sonchus oleraceus*	5	No	UPL
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____	____	=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	105	x 5 =	525
Column Total	105 (A)		525 (B)

Prevalence Index = (B/A) = 5

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC03

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 8	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
8 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 | City/ County: Mountrail County | Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA17SC04

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 27, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope | Local relief (concave, convex, none): Flat | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.05031621666667 | Long: -101.97474581666665 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
	50% = ____ 20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Vicia lens*	60	Yes	UPL
2	*Helianthus petiolaris*	25	Yes	UPL
3	*Cirsium arvense*	25	Yes	FACU
4	*Sonchus oleraceus*	10	No	UPL
5				
6				
7				
	50% = 60% 20% = 24%	120	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
	50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	95	x 5 =	475
Column Total	120 (A)		575 (B)

Prevalence Index = (B/A) = 4.79

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC04

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 8	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
8 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC05

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 27, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.05091191666667 Long: -101.97515961666667 Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Vicia lens*	75	Yes	UPL
2	*Helianthus petiolaris*	15	No	UPL
3	*Cirsium arvense*	15	No	FACU
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	90	x 5 =	450
Column Total	105 (A)		510 (B)

Prevalence Index = (B/A) = 4.86

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC05

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC06

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.052285766666664 Long: -101.97649994999998 Datum: WGS84

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes X No ____**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the presence of all three parameters, this area is a wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
50% = ____ 20% = ____		=Total Cover	

Herb Stratum (Plot size: Radius 78.5)			
1 *Typha latifolia*	40	Yes	OBL
2 *Persicaria pensylvanica*	40	Yes	FACW
3 *Brassica rapa*	30	Yes	UPL
4			
5			
6			
7			
50% = 55% 20% = 22%	110	=Total Cover	

Woody Vine Stratum (Plot size:)			
1			
2			
3			
50% = ____ 20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	40	x 1 =	40
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	30	x 5 =	150
Column Total	110 (A)		270 (B)

Prevalence Index = (B/A) = 2.45

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: DPA17SC06

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
4 - 20	10YR 2/1	96	10YR 4/4	4	C	M	Silty Clay Loam	Distinct

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes	X	No	___	Depth (inches): 2
Water Table Present?	Yes	X	No	___	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC07

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.052340733333 33 Long: -101.97648855 Datum: WGS84

Soil Map Unit Name: Parnell silty clay loam, 0 to 1 percent slopes NWI Classification: PEM1C

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Brassica rapa*	100	Yes	UPL
2	*Cirsium arvense*	5	No	FACU
3				
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	100	x 5 =	500
Column Total	105 (A)		520 (B)

Prevalence Index = (B/A) = 4.95

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC07

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 | City/ County: Mountrail County | Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. | State: ND | Sampling Point: DPA17SC08

Investigator(S): Stephen W. Chu, SPWS | Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope | Local relief (concave, convex, none): Flat | Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) | Lat: 48.055032927114 68 | Long: -101.98074807252902 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 3 to 6 percent slopes | NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Brassica rapa*	100	Yes	UPL
2	*Cirsium arvense*	5	No	FACU
3				
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____	____	=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	100	x 5 =	500
Column Total	105 (A)		520 (B)

Prevalence Index = (B/A) = 4.95

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC08

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC09

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.055254138606 41 Long: -101.98201741411188 Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 3 to 6 percent slopes NWI Classification: PEM1A

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Brassica rapa*	100	Yes	UPL
2	*Cirsium arvense*	5	No	FACU
3				
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	100	x 5 =	500
Column Total	105 (A)		520 (B)

Prevalence Index = (B/A) = 4.95

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC09

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC10

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Summit Slope Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.055630950531 11 Long: -101.98348888333334 Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 3 to 6 percent slopes NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____	____	=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Brassica rapa*	100	Yes	UPL
2	*Cirsium arvense*	5	No	FACU
3				
4				
5				
6				
7				
50% = 52.5%	20% = 21%	105	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____	____	=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	100	x 5 =	500
Column Total	105 (A)		520 (B)

Prevalence Index = (B/A) = 4.95

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC10

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project: A17 City/ County: Mountrail County Sampling Date: 8/4/2024

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA17SC11

Investigator(S): Stephen W. Chu, SPWS Section, Township, Range: 22, 153N 88W

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Flat Slope(%): 0-1%

Subregion (LRR): Northern Great Plains (LRR F) Lat: 48.056386999999994 Long: -101.98682633333335 Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams, 3 to 6 percent slopes NWI Classification: PEM1Cx

Are climatic / hydrologic conditions on the site typical for time of year? Yes ____ No X (If no, explain in the Remarks)

Are Vegetation X Soil ____ or Hydrology ____ significantly disturbed? Are Normal Circumstances Present? Yes ____ No X

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes ____ No X**

Remarks: ATP indicates that climatic conditions are drier than normal. Based on the absence of all three parameters, this area is an upland

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Stratum	(Plot size:)	% Cover	Species?	Status
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1				
2				
3				
4				
5				
50% = ____	20% = ____		=Total Cover	
Herb Stratum	(Plot size: Radius 78.5)			
1	*Lactuca serriola*	50	Yes	FAC
2	*Brassica rapa*	25	Yes	UPL
3	*Cirsium arvense*	25	Yes	FACU
4				
5				
6				
7				
50% = 50%	20% = 20%	100	=Total Cover	
Woody Vine Stratum	(Plot size:)			
1				
2				
3				
50% = ____	20% = ____		=Total Cover	

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	25	x 4 =	100
UPL species	25	x 5 =	125
Column Total	100 (A)		375 (B)

Prevalence Index = (B/A) = 3.75

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0*

____ 4 - Morphological Adaptations* (Provide supporting data in remarks or on a separate sheet)

____ 5 - Problematic Hydrophytic Vegetation*

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? **Yes ____ No X**

Remarks: Vegetation significantly disturbed as a result of crop farming. Based on the absence of wetland hydrology, hydric soils, and presence of volunteer upland plants, it is expected that this location would not support a predominately hydrophytic plant community.

SOIL

Sampling Point: DPA17SC11

Profile Description:

Depths	Matrix		Redox Features					
(inches)	Color	%	Color	%	Type	Loc**	Texture	Remarks
0 - 5	10YR 2/1	100	NA	NA	NA	NA	Silt Loam	
2 - 18	10YR 3/2	100	NA	NA	NA	NA	Silty Clay Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Soils ***

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry Season Watertable (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidised Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Based on WETS analysis, antecedent hydrologic conditions are drier than normal. The criterion for wetland hydrology is not met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ01

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Linear Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.037799 Long: -101.946855 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes (C135D) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil n , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
WA18SJ01 - Area is within a utility corridor and roadside drainage; this area may get treated with herbicide at times. All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Lactuca serriola*	90	Yes	FAC
2. *Melilotus officinalis*	5	No	FACU
3. *Helianthus annuus*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	100 (A)		310 (B)

Prevalence Index = B/A = 3.10

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA18SJ01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Loamy/Clayey	
4-16	10YR 2/1	90	10YR 4/4	10	C	PL	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ02

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.037878 Long: -101.946889 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes (C135D) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Brassica napus*	60	Yes	UPL
2. *Lactuca serriola*	15	No	FAC
3. *Helianthus annuus*	5	No	FACU
4. *Hordeum jubatum*	15	No	FACW
5. *Medicago lupulina*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	60	x 5 =	300
Column Totals:	100 (A)		415 (B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Loamy/Clayey	
4-16	10YR 2/1	90	10YR 3/2	10	C	PL	Loamy/Clayey	Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) **(LRR F)**
___ 1 cm Muck (A9) **(LRR F, G, H)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR I, J)**
___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
___ Reduced Vertic (F18)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ03

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.045041 Long: -101.96314 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation n, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA18SJ02 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Setaria pumila*	10	Yes	FACU
2. *Echinochloa crus-galli*	15	Yes	FAC
3. *Epilobium coloratum*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	45 (A)		105 (B)

Prevalence Index = B/A = 2.33

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
A dominance of hydrophytic vegetation was observed; Vegetation metric is met.

SOIL

Sampling Point: DPA18SJ03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	90	5YR 4/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations
4-16	10YR 4/1	90	5YR 4/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ04

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.044994 Long: -101.96319 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Loamy/Clayey	
6-16	10YR 3/1	90	10YR 3/3	10	C	PL	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:
Hydric soil indicators were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ05

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.043769 Long: -101.959821 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation Y, Soil n, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n, Soil n, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
WA18SJ03 - All three metrics are met, this area is a wetland. ATP indicates that climatic conditions are drier than normal. Area is partially farmed with Row Crop and is obscuring the natural vegetation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Setaria pumila*	5	No	FACU
2. *Echinochloa crus-galli*	30	Yes	FAC
3. *Epilobium coloratum*	5	No	OBL
4. *Triticum aestivum*	60	Yes	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	5	x 4 =	20
UPL species	60	x 5 =	300
Column Totals:	100 (A)		415 (B)
Prevalence Index = B/A =			4.15

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Area is partially farmed with Row Crop; and is not a natural landscape - The Echinochola crus-galli is dominant and outside the presence of the

SOIL

Sampling Point: DPA18SJ05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Loamy/Clayey	
5-16	10YR 4/1	90	7.5R 4/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soil indicators were observed; Soils metric is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed; Hydrology metric is met.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ06

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.043754 Long: -101.960008 Datum: WGS

Soil Map Unit Name: Zahl-Williams loams, 9 to 15 percent slopes (C135D) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Loamy/Clayey	
6-16	10YR 4/1	95	10YR 4/6	5	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:
Hydric soil indicators were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ07

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.041527 Long: -101.954737 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. NWI is not accurate here.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Loamy/Clayey	
6-16	10YR 3/1	95	10YR 3/2	5	C	PL	Loamy/Clayey	Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ08

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.045657 Long: -101.964733 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. NWI is not accurate here.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Thunder Butte Pipeline Project: A18 City/County: Mountrail County Sampling Date: 08/05/24

Applicant/Owner: Thunder Butte Petroleum Services, Inc. State: ND Sampling Point: DPA18SJ09

Investigator(s): Stu Jennings, SPWS Section, Township, Range: S26 T153N R88W

Landform (hillside, terrace, etc.): Ag Land Local relief (concave, convex, none): Flat Slope (%): 5%

Subregion (LRR/MLRA): LRR F, MLRA 53B Lat: 48.045439 Long: -101.964212 Datum: WGS

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation y , Soil y , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation n , Soil n , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Area is within an agricultural Row Crop area; this location may get treated with herbicide at times and tilled. All three metrics are NOT met, this area is NOT a wetland. ATP indicates that climatic conditions are drier than normal. NWI is not accurate here.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Triticum aestivum*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 10)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
A dominance of hydrophytic vegetation was NOT observed; Vegetation metric is NOT met.

SOIL

Sampling Point: DPA18SJ09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soil indicators were NOT observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Primary hydrology indicators were not observed.

STREAM DATA FORM

STREAM ID NO.: SA1RJ01	**STREAM NAME: LITTLE KNIFE RIVER**
SURVEY TYPE: Wetland and Stream Delineation	
DATE: 8/6/2024	**CLIENT/PROJECT NAME: THUNDER BUTTE PIPELINE PROJECT**
INVESTIGATORS: R. Johnson, K. Connolly	
STATE/COUNTY: NORTH DAKOTA/MONTRAIL COUNTY	**QUAD NAME: STANLEY SE**

STREAM CHARACTERISTICS

FLOW EVENTS/YEAR:	Regular	
FLOW REGIME:	Perennial	
AVG. WATER SURFACE DEPTH: 3-FEET	**AVG. WATER SURFACE WIDTH: 95-FEET**	
OHWM INDICATORS: BED AND BANK, VEGETATION LINE, EROSIONAL PATTERNS	**OHWM AVG. DEPTH (AT CROSSING): 2-feet**	**OHWM AVG. WIDTH (AT CROSSING): 95-FEET**
TOP OF BANK WIDTH (AT CROSSING): 99-feet	**AVG. TOP OF BANK HEIGHT (AT CROSSING): 3-FEET**	
AVG. BANK SLOPE (RATIO):	2-5%	

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATES:	Muck	
POTENTIAL HABITAT FOR:	Macroinvertebrates; amphibians; fish; aquatic/migratory birds.	
RIPARIAN ZONE:	**WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOODPLAIN: 0'**	
	TYPE OF VEGETATION PRESENT: *Hordeum jubatum*; *Juncus effusus*; *Schoenoplectus pungens*; *Typha lattifolia*	
WETLAND FRINGE (IF PRESENT):	WA1RJ01	
CHANNEL CONDITION:	Good	
CHANNEL TYPE:	A4	**CHANNEL GEOMETRY:** Sinuous

COMMENTS

STREAM DATA FORM

STREAM ID NO.: SA13CK01	**STREAM NAME: SHELL CREEK**
SURVEY TYPE: Wetland and Steam Delineation	
DATE: 8/7/2024	**CLIENT/PROJECT NAME: THUNDER BUTTE PIPELINE PROJECT**
INVESTIGATORS: K. Mageland, C. Kammel	
STATE/COUNTY: North Dakota/Montrail County	**QUAD NAME: SHELL LAKE**

STREAM CHARACTERISTICS

FLOW EVENTS/YEAR:	Regular	
FLOW REGIME:	Perennial	
AVG. WATER SURFACE DEPTH: 2	**AVG. WATER SURFACE WIDTH: 15-FEET**	
OHWM INDICATORS: BED AND BANK, VEGETATION LINE, EROSIONAL PATTERNS	**OHWM AVG. DEPTH (AT CROSSING): 2**	**OHWM AVG. WIDTH (AT CROSSING): 15**
TOP OF BANK WIDTH (AT CROSSING): 20	**AVG. TOP OF BANK HEIGHT (AT CROSSING): 1.5**	
AVG. BANK SLOPE (RATIO):	0-5	

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	clear	
PRIMARY SUBSTRATES:	Muck	
POTENTIAL HABITAT FOR:	Macroinvertebrates; amphibians; fish; aquatic/migratory birds.	
RIPARIAN ZONE:	**WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOODPLAIN: 0**	
	TYPE OF VEGETATION PRESENT: Hordeum jubatum, Schoenoplectus pungens, typha angustifolia.	
WETLAND FRINGE (IF PRESENT):	WA13CK01	
CHANNEL CONDITION:	Good	
CHANNEL TYPE:	A4	**CHANNEL GEOMETRY:** Sinuous

COMMENTS

STREAM DATA FORM

STREAM ID NO.: SA14TN01	**STREAM NAME: UNT TO SHELL CREEK**
SURVEY TYPE: Wetland and Stream Delineation	
DATE: 8/6/2024	**CLIENT/PROJECT NAME: THUNDER BUTTE PIPELINE PROJECT**
INVESTIGATORS: T. Noel, C. Kammel	
STATE/COUNTY: North Dakota/Montrail County	**QUAD NAME: EPWORTH SE**

STREAM CHARACTERISTICS

FLOW EVENTS/YEAR:	Regular	
FLOW REGIME:	Perennial	
AVG. WATER SURFACE DEPTH: 1-FEET	**AVG. WATER SURFACE WIDTH: 24-FEET**	
OHWM INDICATORS: BED AND BANK, VEGETATION LINE, EROSIONAL PATTERNS	**OHWM AVG. DEPTH (AT CROSSING): 0.5-feet**	**OHWM AVG. WIDTH (AT CROSSING): 25-FEET**
TOP OF BANK WIDTH (AT CROSSING): 25-FEET	**AVG. TOP OF BANK HEIGHT (AT CROSSING): 2-FEET**	
AVG. BANK SLOPE (RATIO):	0-5	

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATES:	Muck	
POTENTIAL HABITAT FOR:	Macroinvertebrates; amphibians; fish; aquatic birds	
RIPARIAN ZONE:	**WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOODPLAIN: 0'**	
	TYPE OF VEGETATION PRESENT: *Hordeum jubatum*; *Juncus effusus*; *Schoenoplectus pungens*; *Lycopus uniflorus*	
WETLAND FRINGE (IF PRESENT):	WA14TN02	
CHANNEL CONDITION:	Good	
CHANNEL TYPE:	A4	**CHANNEL GEOMETRY:** Sinuous

COMMENTS

SA14TN01 is a perennial stream that drains from a pond outside of the ESA. It flows through the ESA in a northeast direciton and is adjoined by WA14TN02. Aquatic birds were observed during the investigation.

Appendix C

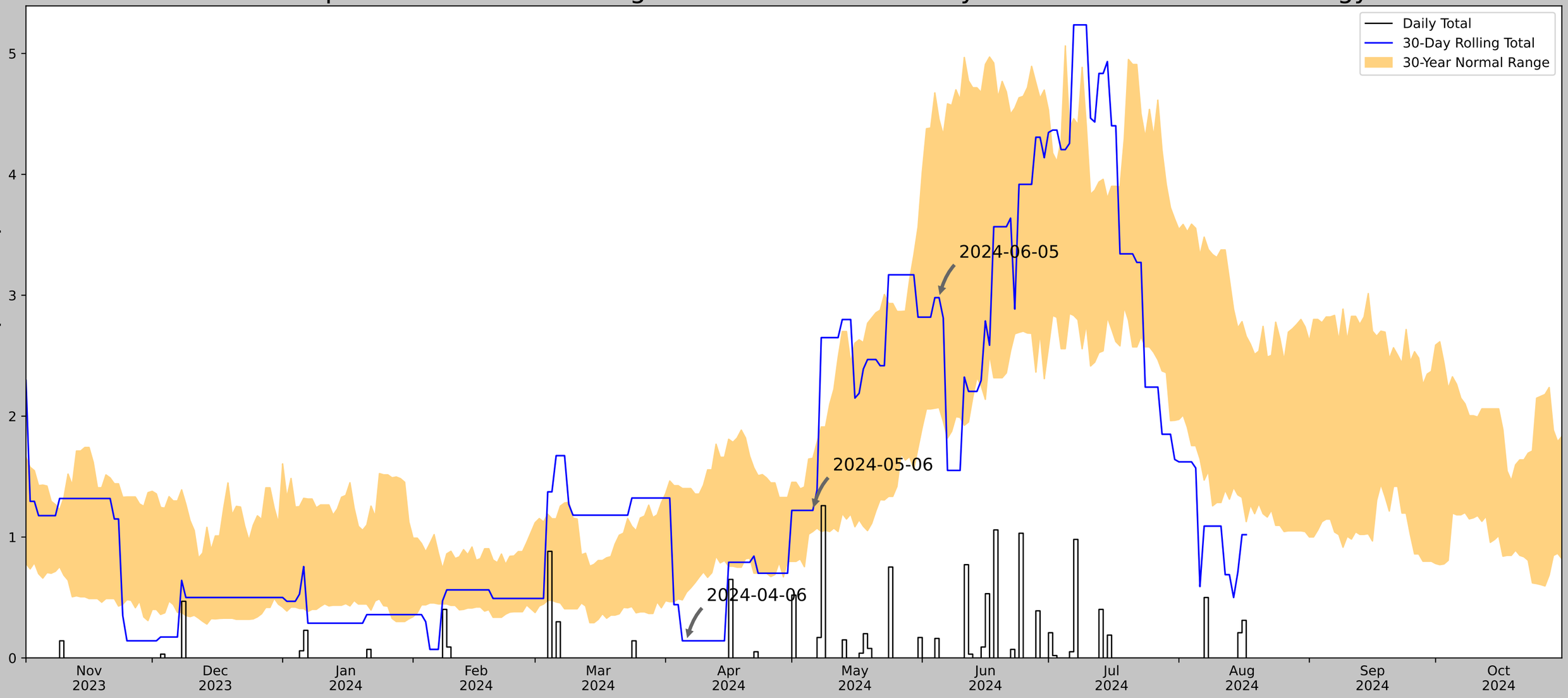
Farmed Wetland Slide Review

Historic Antecedent Precipitation Summary: Segment A03

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
6/5/2024	-1.3	Mild drought	Dry Season	14	Normal Conditions
10/12/2020	-1.42	Mild drought	Dry Season	8	Drier than Normal
5/7/2016	-1.17	Mild drought	Dry Season	16	Wetter than Normal
8/19/2013	6.6	Extreme wetness	Dry Season	15	Wetter than Normal
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	12	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	15	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	12	Normal Conditions
9/23/1997	4.59	Extreme wetness	Dry Season	13	Normal Conditions

Notes:

* Aerial imagery reviewed the five of the most recent aerials exhibiting normal conditions.



Coordinates	48.280289, -102.325458
Observation Date	2024-06-05
Elevation (ft)	2223.396
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-06-05	2.07126	4.453937	2.980315	Normal	2	3	6
2024-05-06	1.045669	1.651575	1.220472	Normal	2	2	4
2024-04-06	0.544095	1.401575	0.141732	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

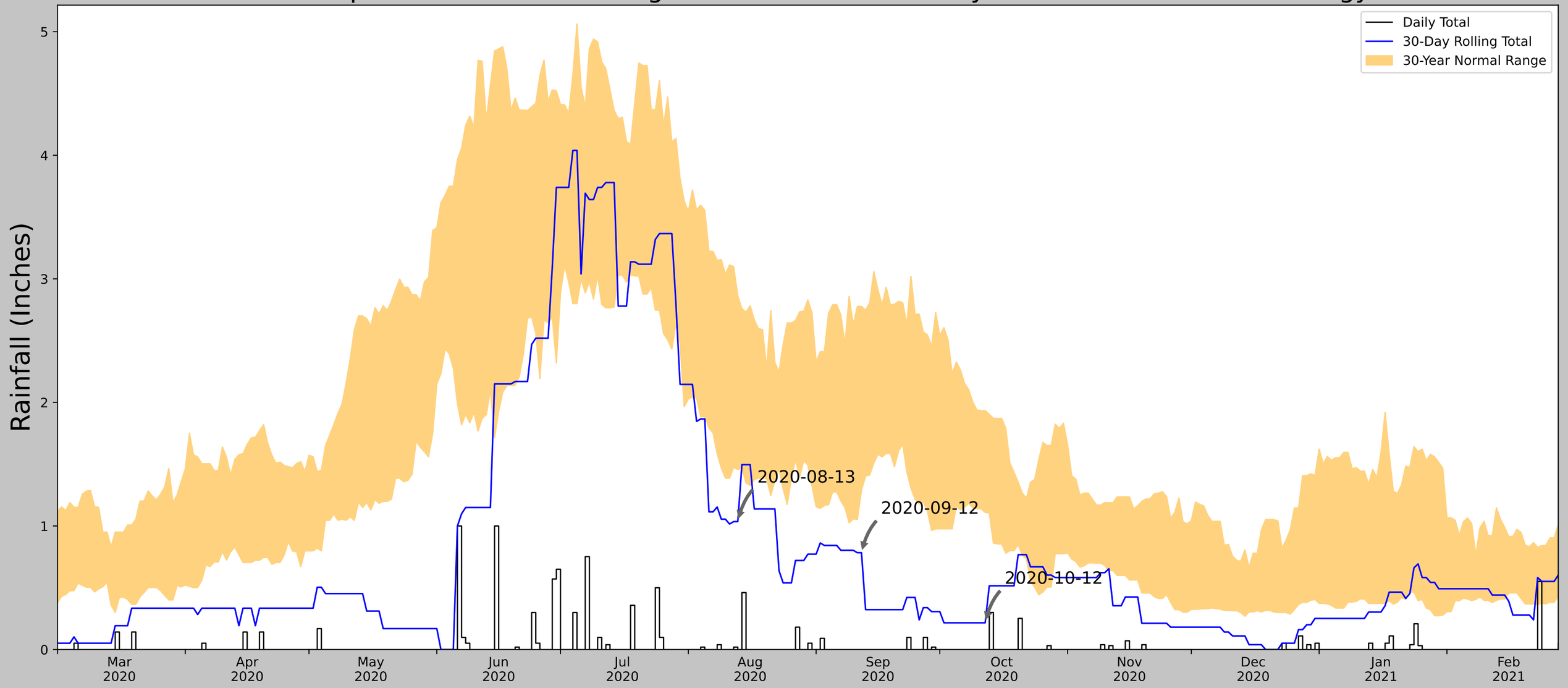
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KENMARE 1 WSW	48.6692, -102.0975	1810.039	28.829	413.357	24.889	9022	85
BOWBELLS	48.7994, -102.2464	1960.958	11.268	150.919	6.771	562	0
TOLLEY 6.4 N	48.8214, -101.8494	1735.892	15.439	74.147	8.092	299	5
NORTHGATE 5 ESE	48.9675, -102.1703	1841.864	20.875	31.825	10.058	304	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	28.192	135.17	16.497	890	0
MOHALL	48.7603, -101.5089	1641.076	27.562	168.963	17.06	250	0
TAGUS	48.3475, -101.9325	2169.948	23.476	359.909	19.013	25	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2020-10-12
Elevation (ft)	2223.396
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-10-12	1.110236	1.933858	0.216535	Dry	1	3	3
2020-09-12	1.288583	2.776772	0.783465	Dry	1	2	2
2020-08-13	1.456299	2.862599	1.035433	Dry	1	1	1
Result							Drier than Normal - 6

US Army Corps of Engineers

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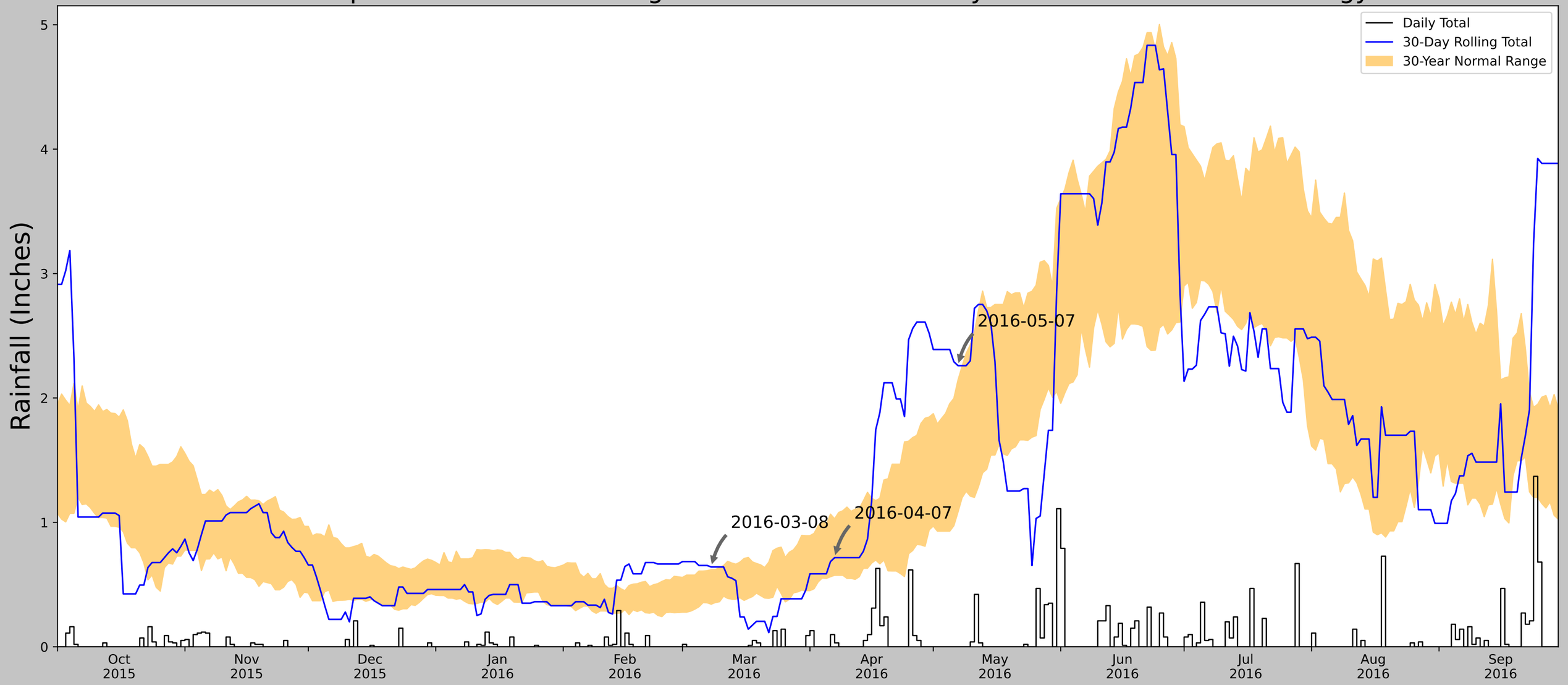
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KENMARE 1 WSW	48.6692, -102.0975	1810.039	28.829	413.357	24.889	8948	90
BOWBELLS	48.7994, -102.2464	1960.958	11.268	150.919	6.771	646	0
FOXHOLM 7 N	48.4583, -101.5697	1674.869	28.192	135.17	16.497	1411	0
TAGUS	48.3475, -101.9325	2169.948	23.476	359.909	19.013	330	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	25.943	469.817	23.863	18	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2016-05-07
Elevation (ft)	2223.396
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-05-07	1.082283	2.14252	2.259843	Wet	3	3	9
2016-04-07	0.575197	1.02874	0.716535	Normal	2	2	4
2016-03-08	0.34252	0.620079	0.641732	Wet	3	1	3
Result							Wetter than Normal - 16

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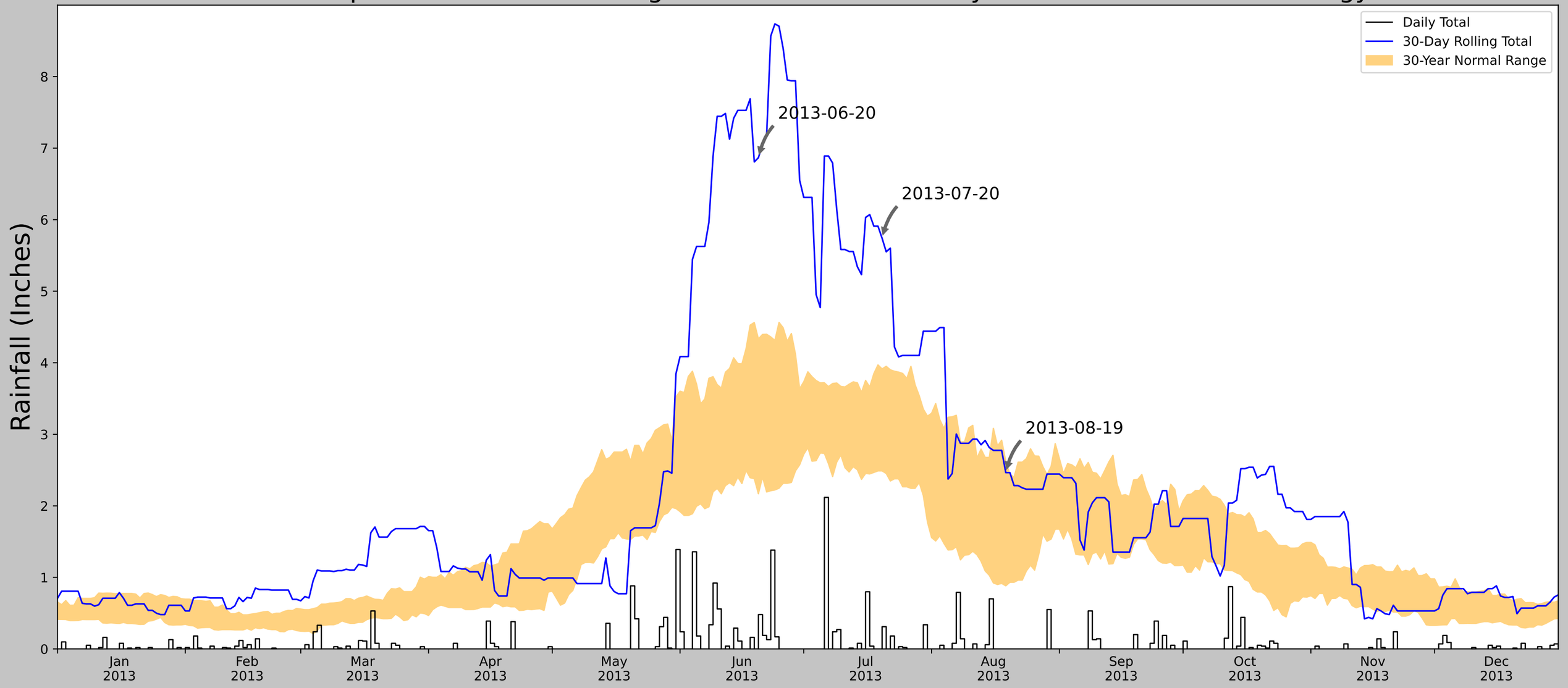
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	11064	90
STANLEY 1.0 SE	48.308, -102.3702	2236.877	3.867	42.979	1.906	2	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	52	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	37	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2013-08-19
Elevation (ft)	2223.396
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-08-19	0.882283	2.621654	2.464567	Normal	2	3	6
2013-07-20	2.488583	3.914173	5.740158	Wet	3	2	6
2013-06-20	2.168898	4.332677	6.866142	Wet	3	1	3
Result							Wetter than Normal - 15

US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	11068	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	53	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	35	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.280289, -102.325458
Observation Date	2009-12-30
Elevation (ft)	2223.396
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-12-30	0.382283	0.607087	0.73622	Wet	3	3	9
2009-11-30	0.329528	0.891339	0.011811	Dry	1	2	2
2009-10-31	0.674803	1.488976	1.956693	Wet	3	1	3
Result							Normal Conditions - 14

US Army Corps of Engineers

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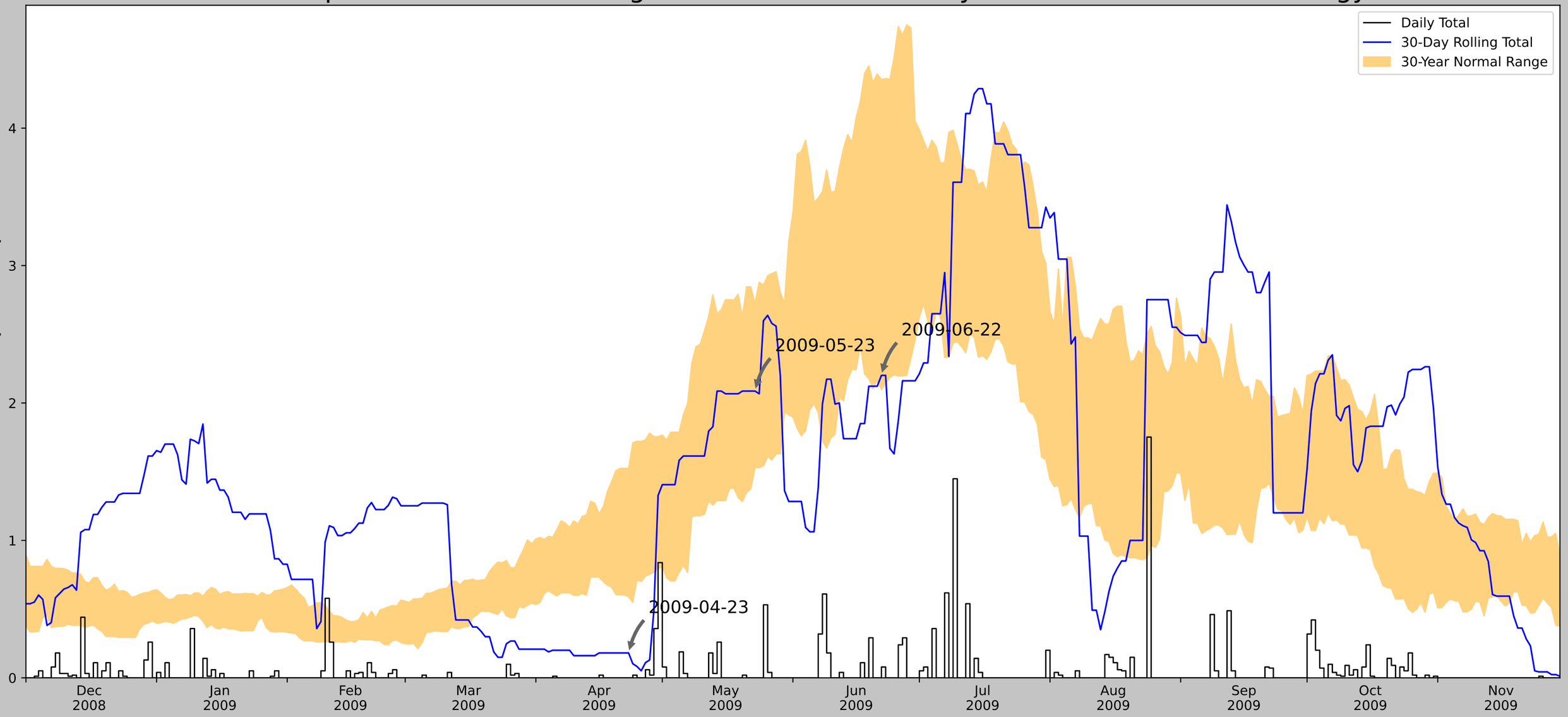
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10561	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	784	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	8	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2009-06-22
Elevation (ft)	2223.396
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	2.098425	4.353543	2.200787	Normal	2	3	6
2009-05-23	1.529528	2.725197	2.086614	Normal	2	2	4
2009-04-23	0.588976	1.524409	0.181102	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

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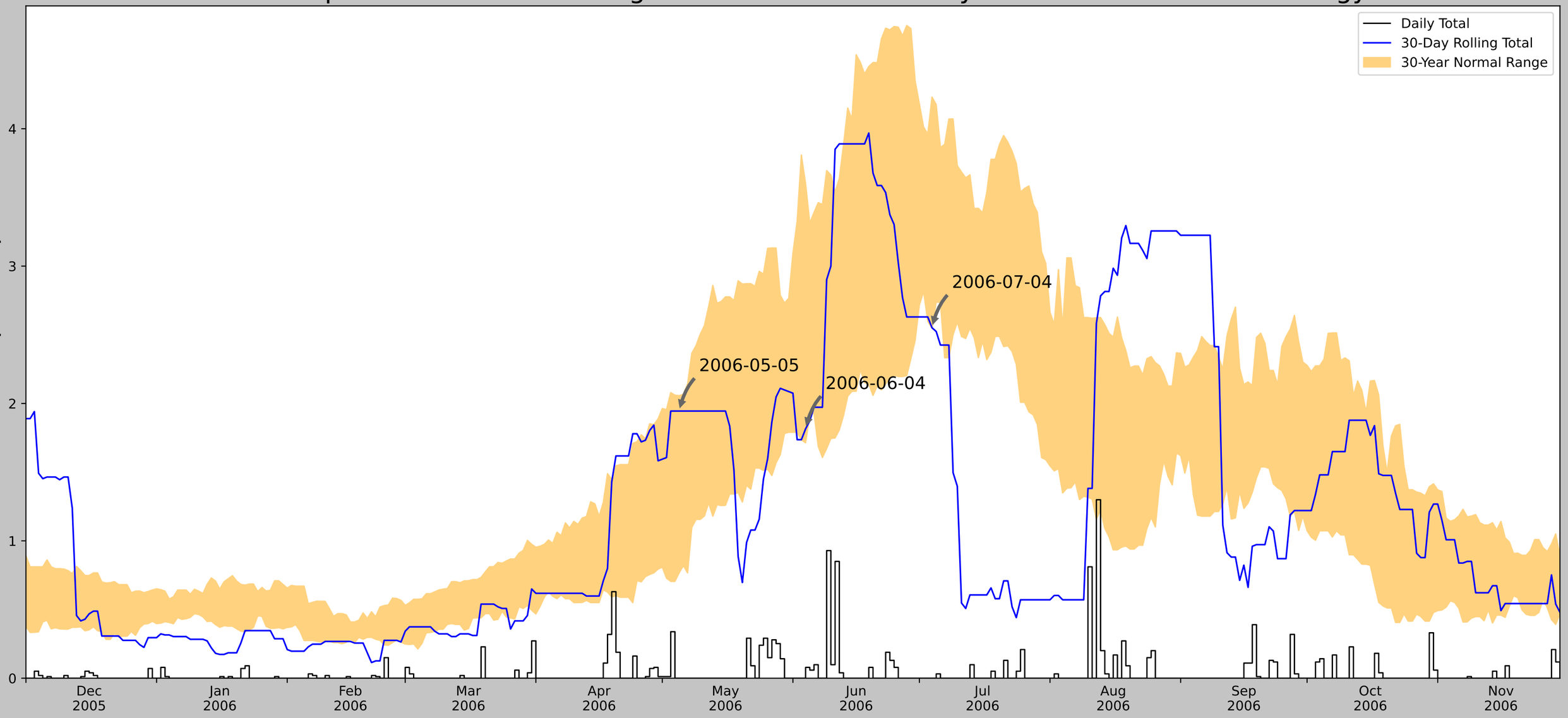
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10530	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	815	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	8	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2006-07-04
Elevation (ft)	2223.396
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.54685	4.230315	2.551181	Normal	2	3	6
2006-06-04	1.71378	3.6	1.814961	Normal	2	2	4
2006-05-05	0.766929	2.056693	1.944882	Normal	2	1	2
Result							Normal Conditions - 12

US Army Corps of Engineers

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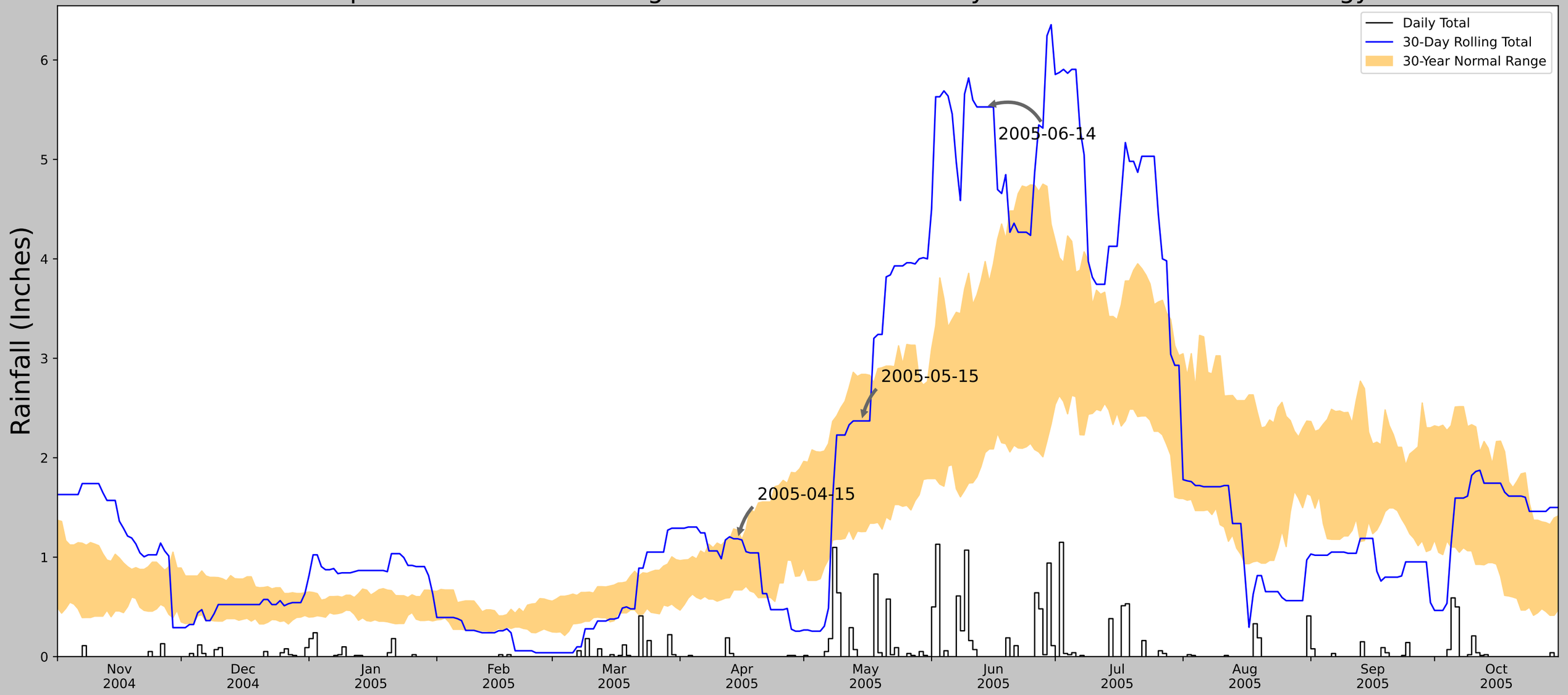
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10530	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	815	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	8	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.280289, -102.325458
Observation Date	2005-06-14
Elevation (ft)	2223.396
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	2.052756	3.972835	5.527559	Wet	3	3	9
2005-05-15	1.256693	2.838583	2.370079	Normal	2	2	4
2005-04-15	0.670866	1.270079	1.185039	Normal	2	1	2
Result							Wetter than Normal - 15

US Army Corps of Engineers

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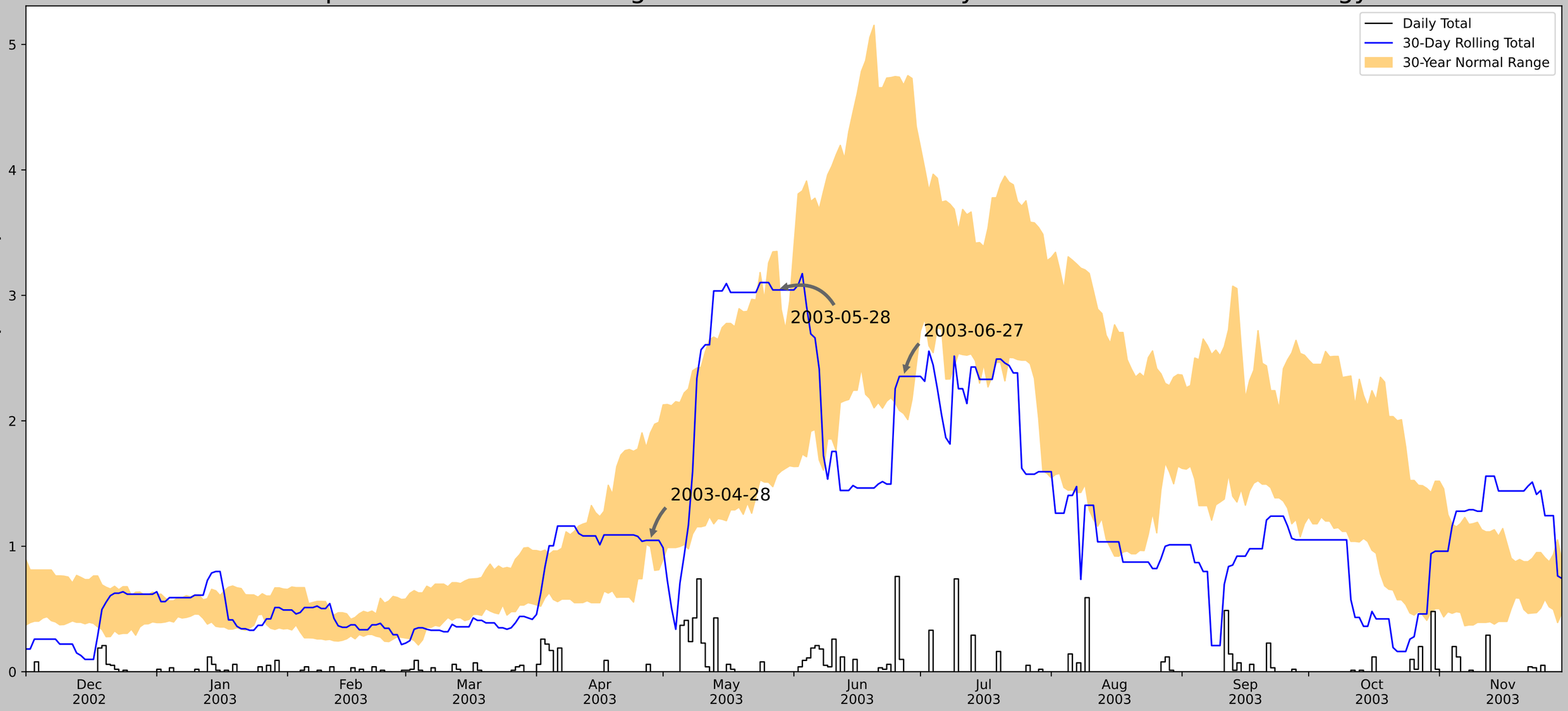
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10509	82
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	30	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	813	1
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	1	7



Coordinates	48.280289, -102.325458
Observation Date	2003-06-27
Elevation (ft)	2223.396
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	2.059055	4.676772	2.354331	Normal	2	3	6
2003-05-28	1.567717	3.350394	3.043307	Normal	2	2	4
2003-04-28	0.998425	1.904331	1.047244	Normal	2	1	2
Result							Normal Conditions - 12

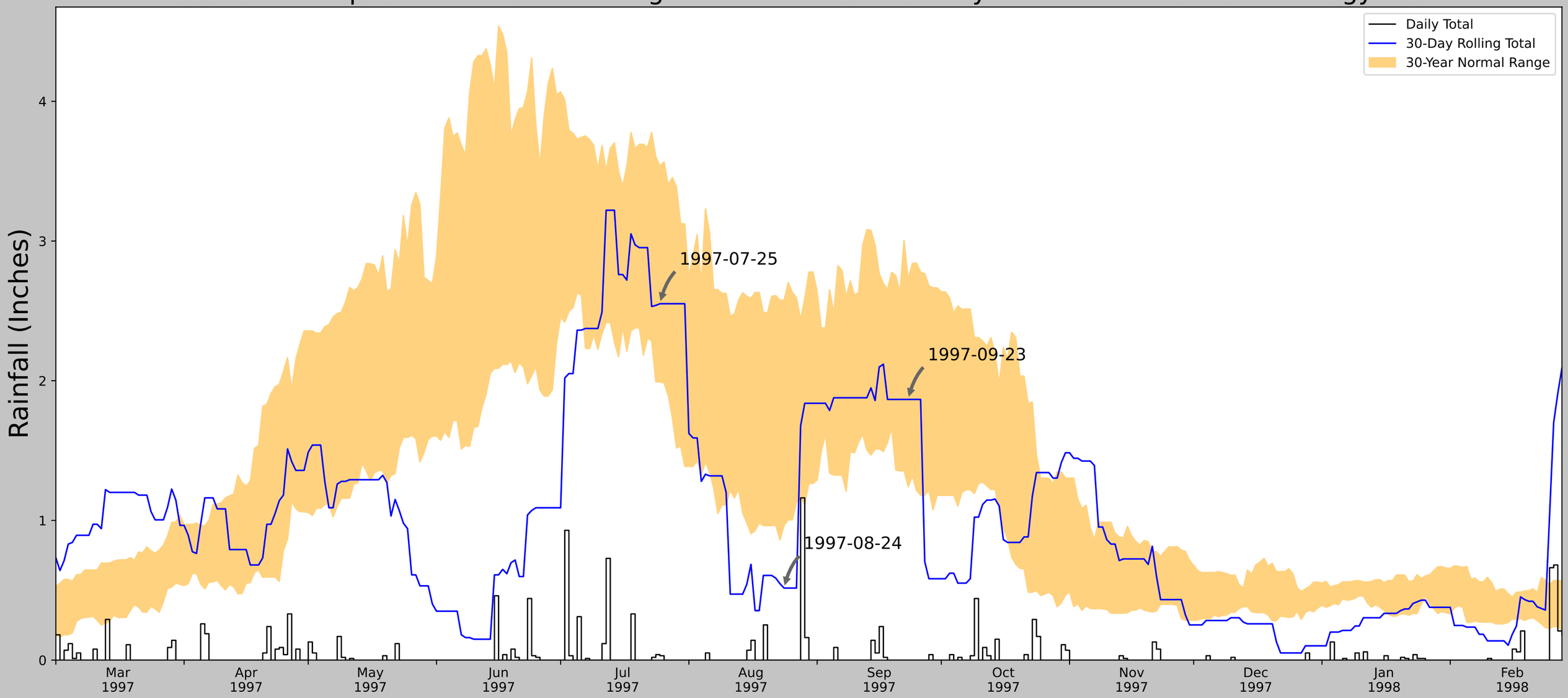
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10510	89
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	30	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	812	1
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	1	0



Coordinates	48.280289, -102.325458
Observation Date	1997-09-23
Elevation (ft)	2223.396
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1997-09-23	1.240551	2.727165	1.866142	Normal	2	3	6
1997-08-24	0.962598	2.576772	0.515748	Dry	1	2	2
1997-07-25	1.991732	3.538976	2.551181	Normal	2	1	2
Result							Normal Conditions - 10

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	6.601	56.46	3.343	10484	90
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	57	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	811	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	1	0

Farmed Wetland Determination - Aerial Slide Review

Project Name: Thunder Butte Pipeline Project: Segment A03
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation
			PFW01
6/5/2024	Google Earth Pro, 2024	Normal Conditions	2024-PFW01
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009-PFW01
7/4/2006	Google Earth Pro, 2024	Normal Conditions	2006-PFW01
6/27/2003	Google Earth Pro, 2024	Normal Conditions	2003-PFW01
9/23/1997	Google Earth Pro, 2024	Normal Conditions	1997-PFW01

Summary Table	PFW01
Number of Normal Years	5
Number of Normal Years with Wet Signatures	5
Percent of Normal Years with Wet Signatures	100%
Hydric Soils present?	C874C[1]
Farmed wetland present?	Potential Farmed Wetland Present: **WA03FW01**

[1] - Soil map unit is classified as predominantly non-hydric.

Thunder Butte Pipeline Project

Historic Aerial Imagery
(Segment A03)
Aerial Date:09/23/1997
APT: Normal Conditions

Legend

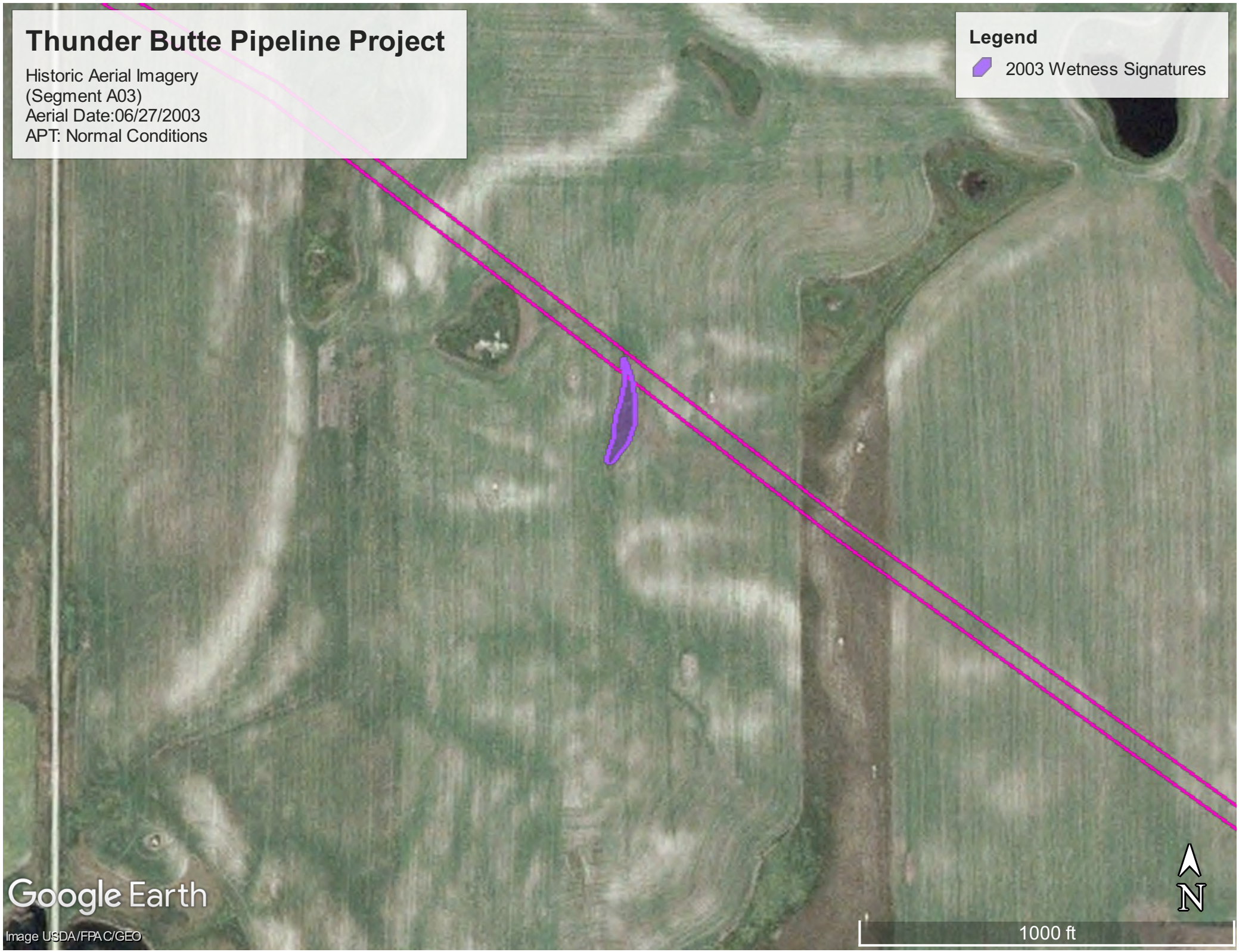
1997 Wetness Signatures

Thunder Butte Pipeline Project

Historic Aerial Imagery
(Segment A03)
Aerial Date:06/27/2003
APT: Normal Conditions

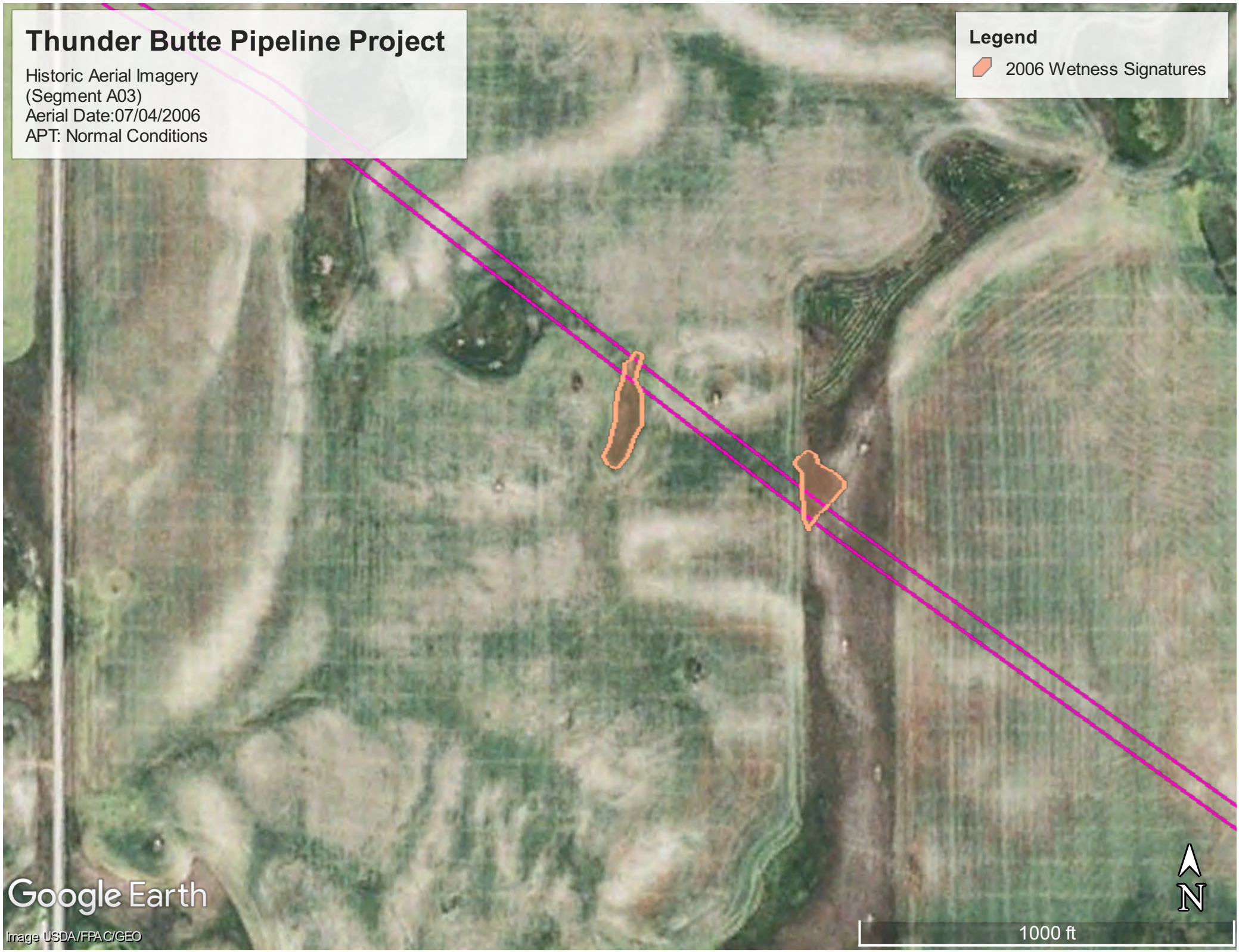
Legend

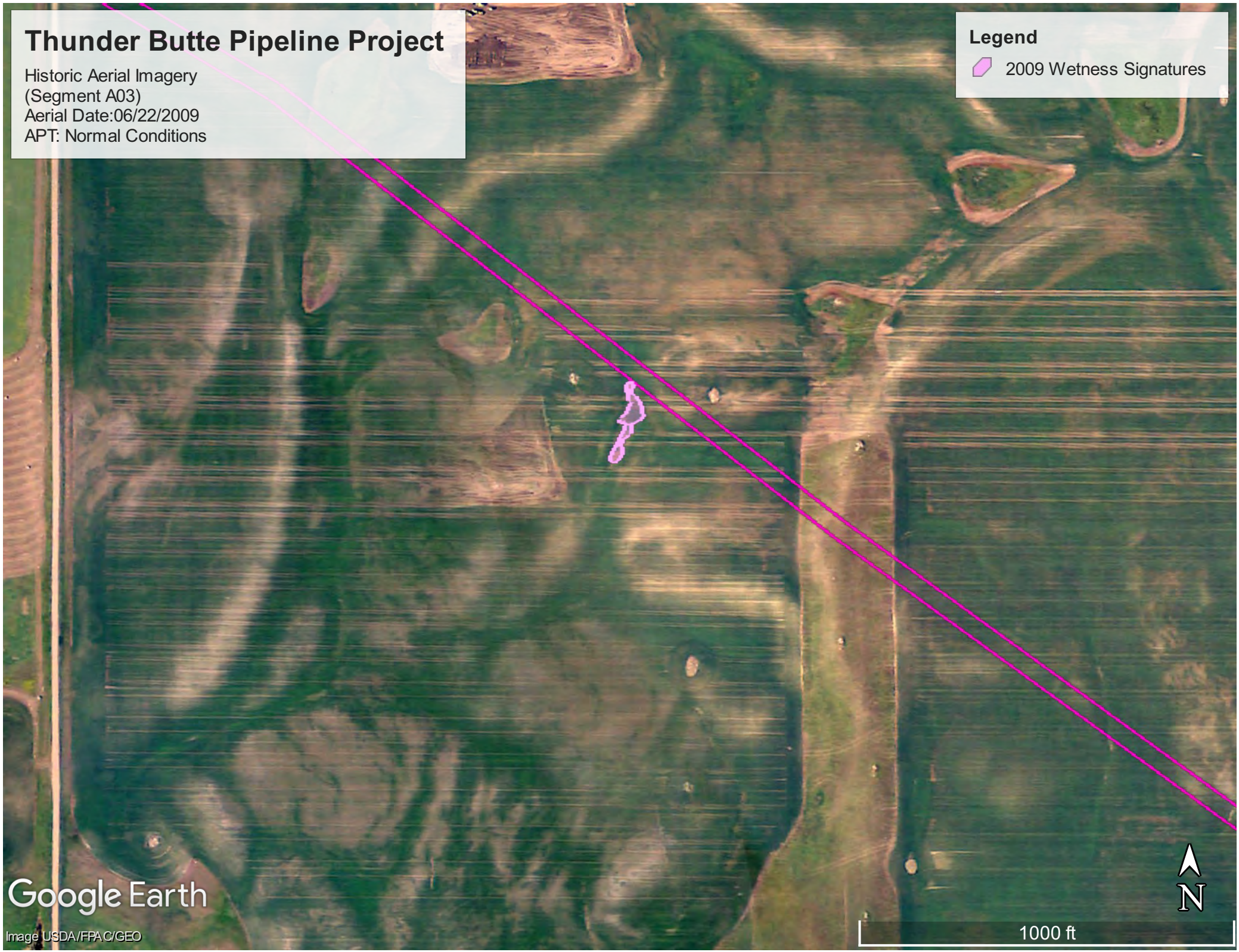
2003 Wetness Signatures



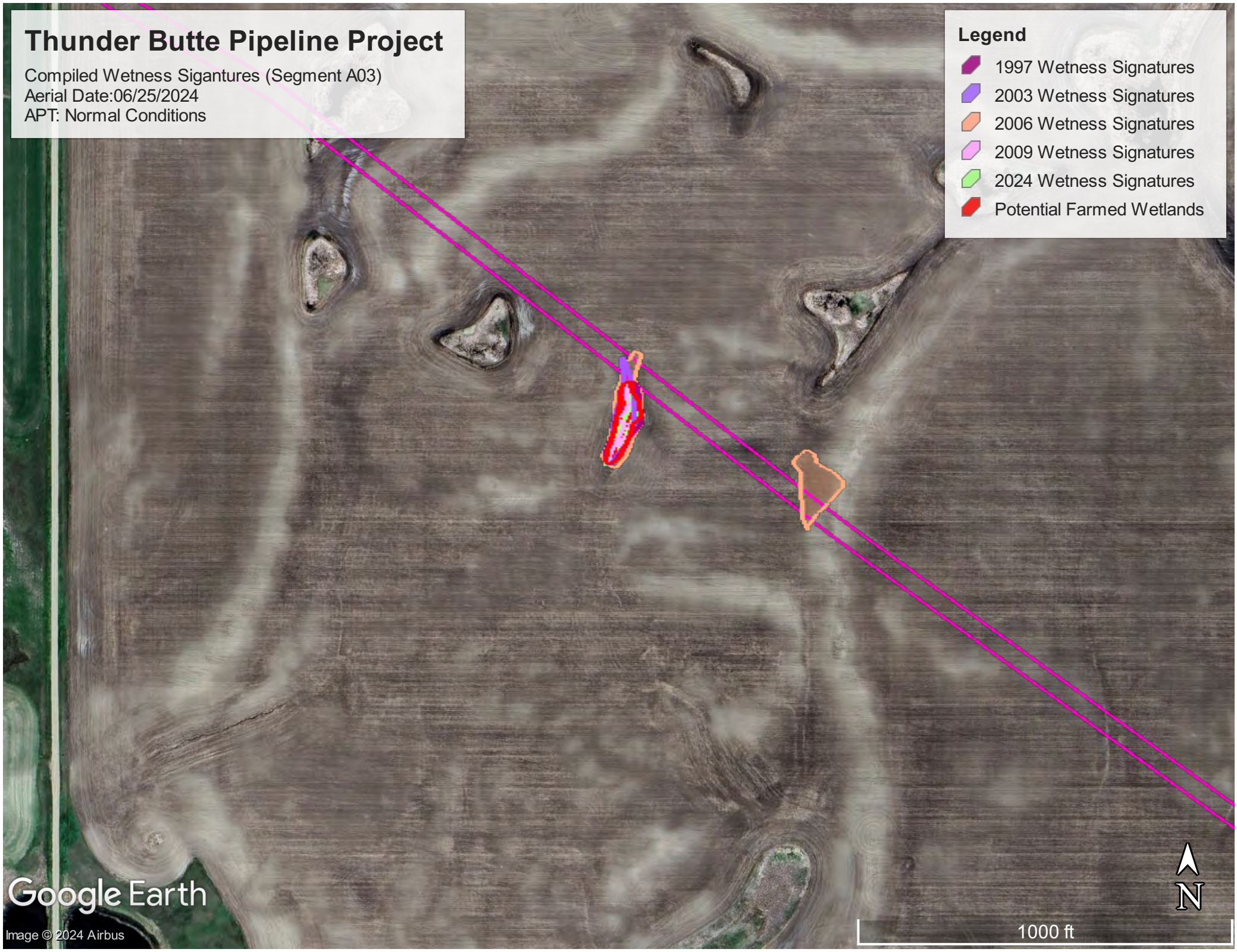
Thunder Butte Pipeline Project

Historic Aerial Imagery
(Segment A03)
Aerial Date:07/04/2006
APT: Normal Conditions




Thunder Butte Pipeline Project
Historic Aerial Imagery
(Segment A03)
Aerial Date:06/22/2009
APT: Normal Conditions
Legend
2009 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
1000 ft


Thunder Butte Pipeline Project
Historic Aerial Imagery
(Segment A03)
Aerial Date:06/25/2024
APT: Normal Conditions
Legend
2024 Wetness Signatures
Google Earth
Image © 2024 Airbus
N
1000 ft


Thunder Butte Pipeline Project
Compiled Wetness Sigantures (Segment A03)
Aerial Date:06/25/2024
APT: Normal Conditions
Legend
1997 Wetness Signatures
2003 Wetness Signatures
2006 Wetness Signatures
2009 Wetness Signatures
2024 Wetness Signatures
Potential Farmed Wetlands
Google Earth
Image © 2024 Airbus
N
1000 ft

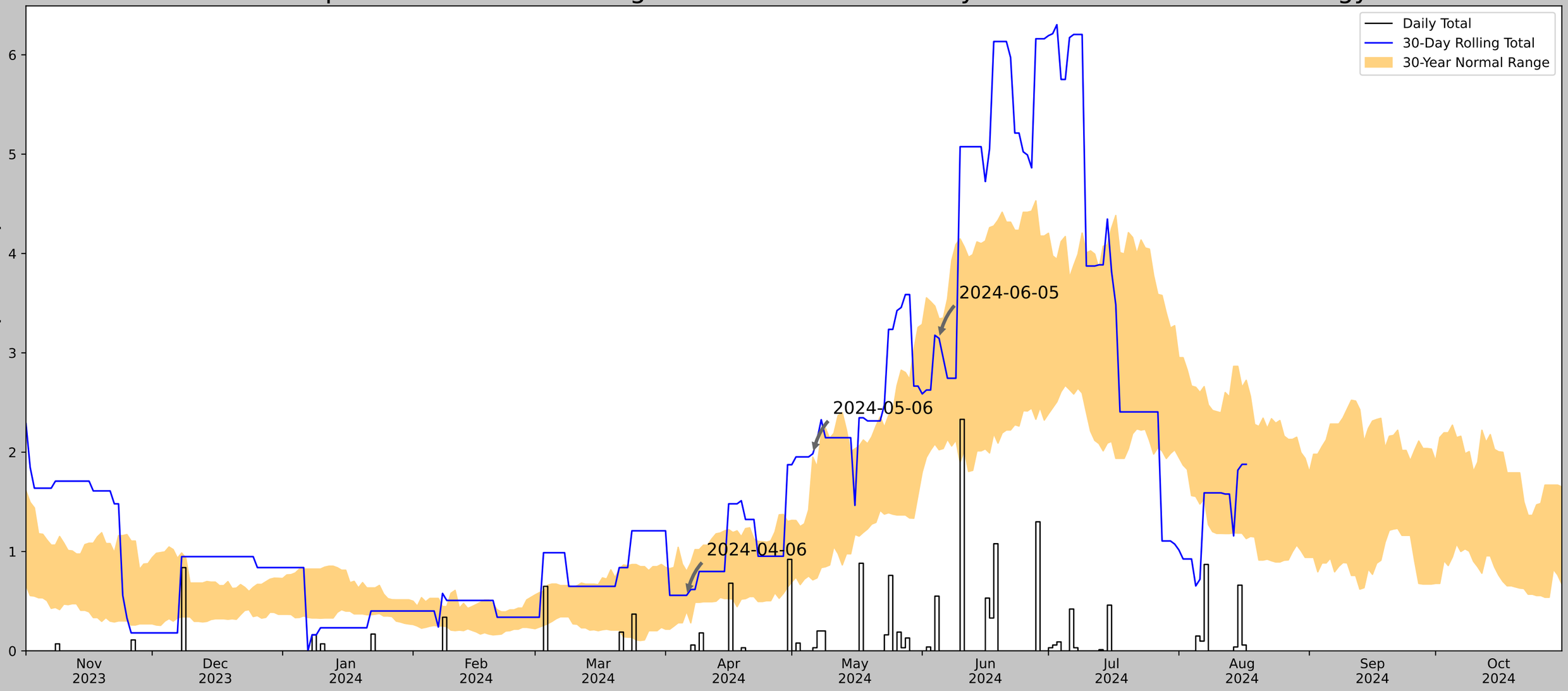

Thunder Butte Pipeline Project
Potential Farmed Wetlands (Segment A03)
Aerial Date:06/25/2024
APT: Normal Conditions
Legend
Potential Farmed Wetlands
Google Earth
Image © 2024 Airbus
N
1000 ft

Historic Antecedent Precipitation Summary: Segment A05

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
6/5/2024	-1.3	Mild drought	Dry Season	14	Normal Conditions
10/12/2020	-1.42	Mild drought	Dry Season	8	Drier than Normal
5/7/2016	-1.17	Mild drought	Dry Season	16	Wetter than Normal
8/19/2013	6.6	Extreme wetness	Dry Season	15	Wetter than Normal
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	12	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	15	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	12	Normal Conditions
7/27/1995	4.59	Extreme wetness	Dry Season	13	Normal Conditions

Notes:

* Aerial imagery reviewed the five of the most recent aerials exhibiting normal conditions.



Coordinates	48.251559, -102.285315
Observation Date	2024-06-05
Elevation (ft)	2268.534
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-06-05	2.02441	3.342913	3.145669	Normal	2	3	6
2024-05-06	0.714567	1.950394	1.984252	Wet	3	2	6
2024-04-06	0.398425	0.801575	0.559055	Normal	2	1	2
Result							Normal Conditions - 14

US Army Corps of Engineers

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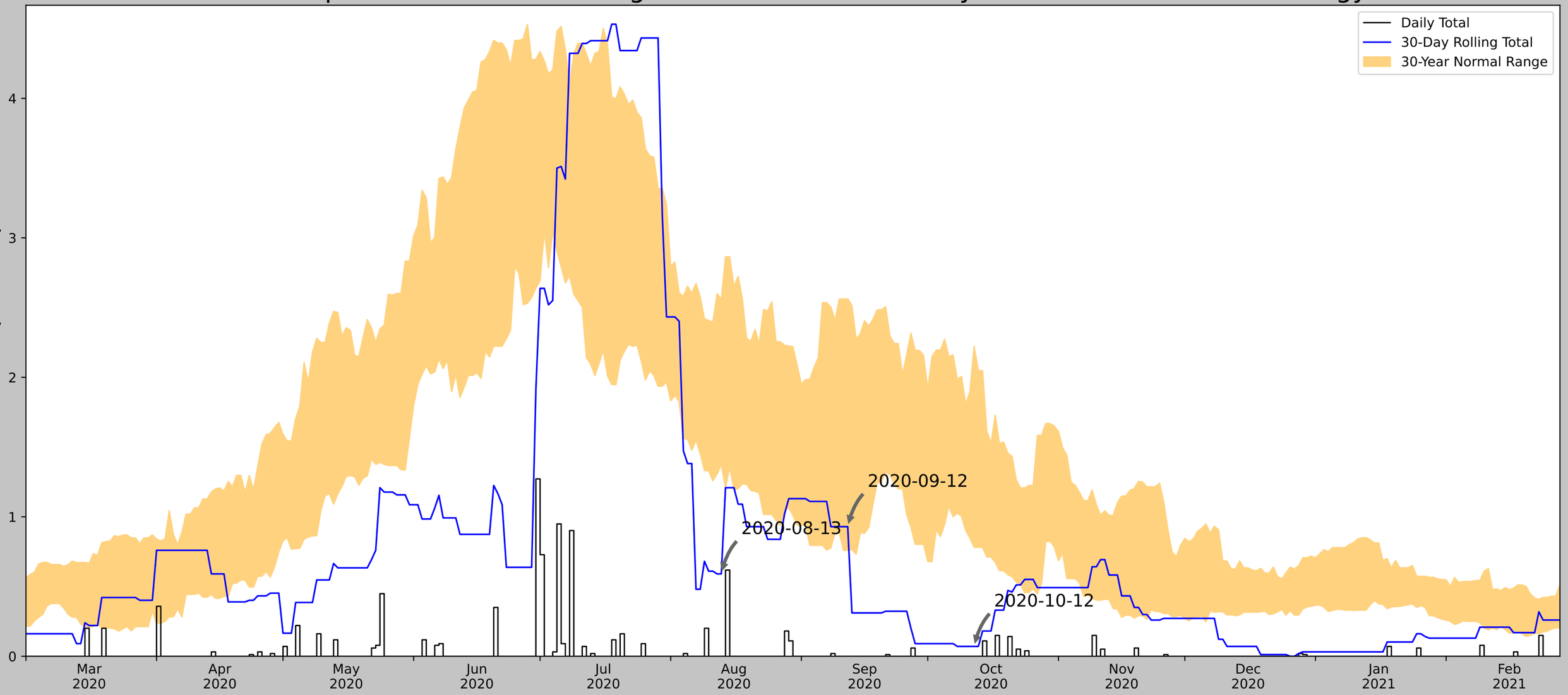
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	38.234	201.61	24.914	11008	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	57	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
BERTHOLD 3.5 SSE	48.2688, -101.7048	2101.05	61.736	369.094	50.568	7	0
BOWBELLS	48.7994, -102.2464	1960.958	69.635	509.186	66.793	4	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	71	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	2020-10-12
Elevation (ft)	2268.534
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-10-12	0.781102	2.221654	0.070866	Dry	1	3	3
2020-09-12	0.759055	2.562205	0.929134	Normal	2	2	4
2020-08-13	1.373622	2.556693	0.590551	Dry	1	1	1
Result							Drier than Normal - 8

US Army Corps of Engineers

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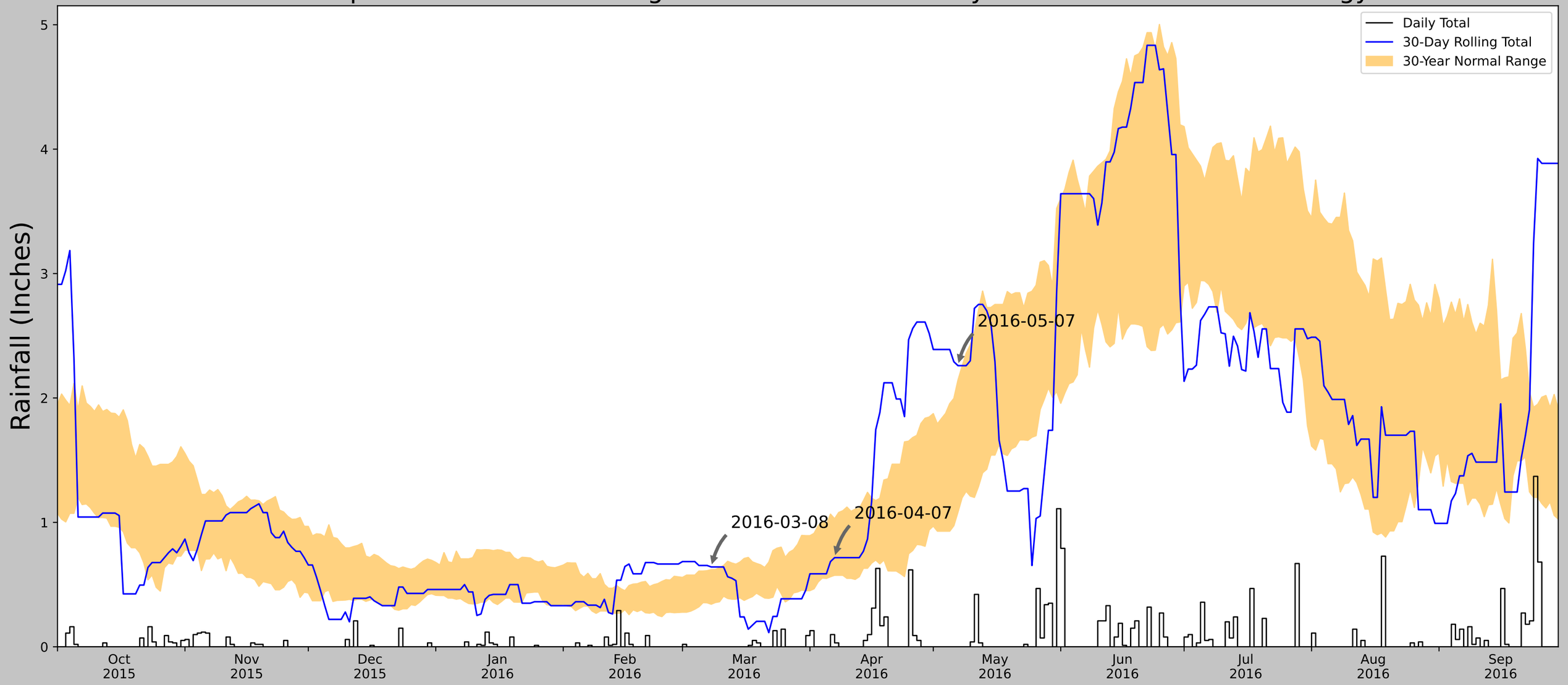
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	38.234	201.61	24.914	11014	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	59	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
BOWBELLS	48.7994, -102.2464	1960.958	69.635	509.186	66.793	4	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	71	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	2016-05-07
Elevation (ft)	2268.534
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-05-07	1.082283	2.14252	2.259843	Wet	3	3	9
2016-04-07	0.575197	1.02874	0.716535	Normal	2	2	4
2016-03-08	0.34252	0.620079	0.641732	Wet	3	1	3
Result							Wetter than Normal - 16

US Army Corps of Engineers

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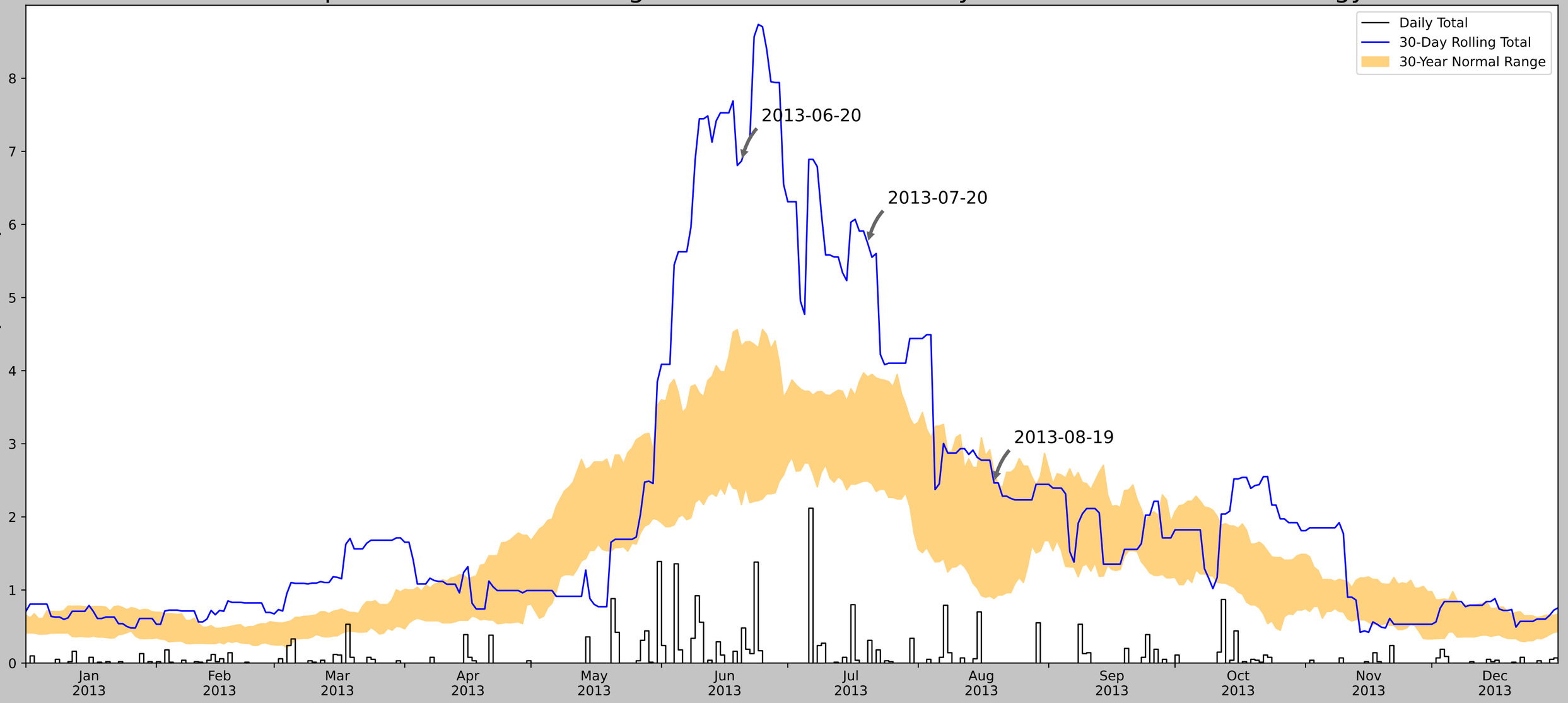
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	11064	90
STANLEY 1.0 SE	48.308, -102.3702	2236.877	3.867	42.979	1.906	2	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	52	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	37	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	2013-08-19
Elevation (ft)	2268.534
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-08-19	0.882283	2.621654	2.464567	Normal	2	3	6
2013-07-20	2.488583	3.914173	5.740158	Wet	3	2	6
2013-06-20	2.168898	4.332677	6.866142	Wet	3	1	3
Result							Wetter than Normal - 15

US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	11068	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	53	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	35	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.251559, -102.285315
Observation Date	2009-12-30
Elevation (ft)	2268.534
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-12-30	0.382283	0.607087	0.73622	Wet	3	3	9
2009-11-30	0.329528	0.891339	0.011811	Dry	1	2	2
2009-10-31	0.674803	1.488976	1.956693	Wet	3	1	3
Result							Normal Conditions - 14

US Army Corps of Engineers

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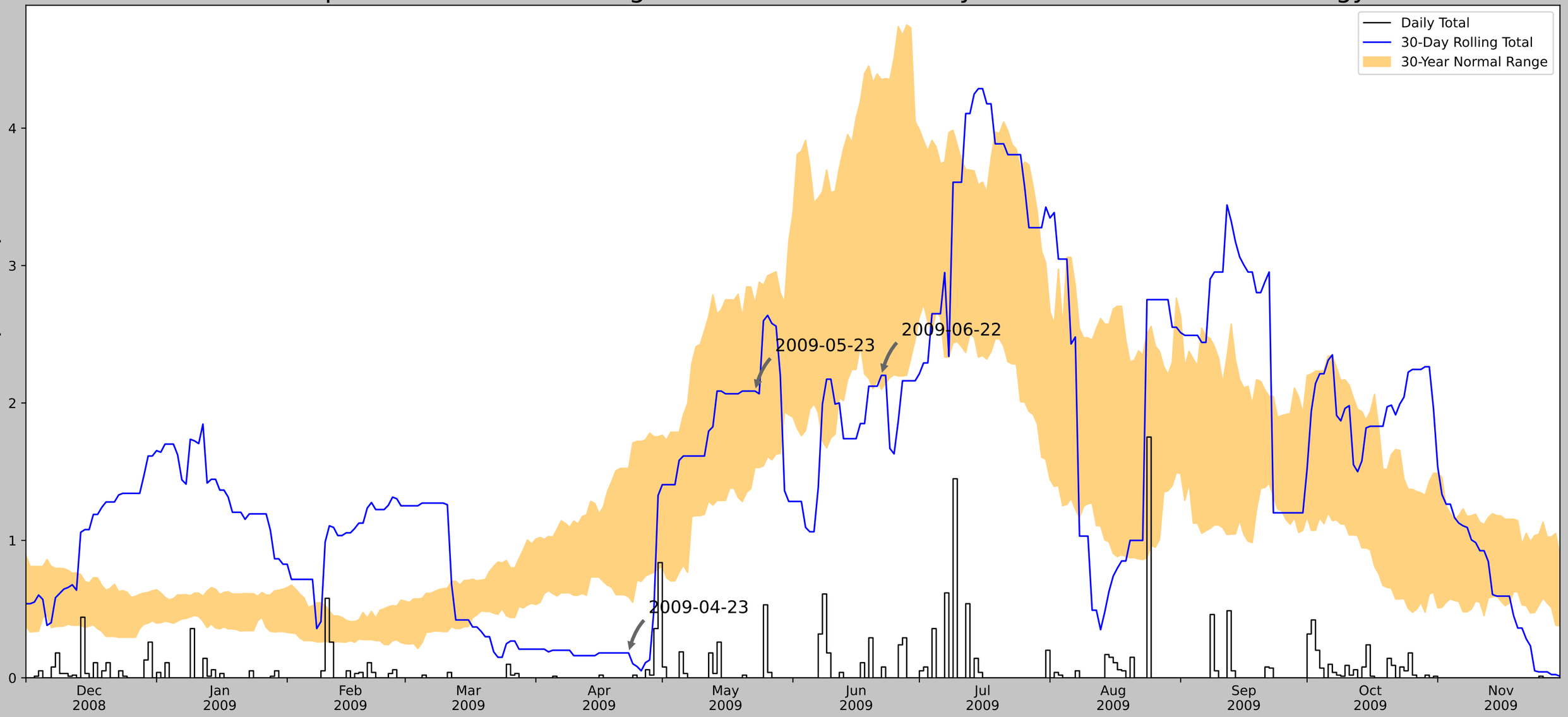
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10561	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	784	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	8	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	2009-06-22
Elevation (ft)	2268.534
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	2.098425	4.353543	2.200787	Normal	2	3	6
2009-05-23	1.529528	2.725197	2.086614	Normal	2	2	4
2009-04-23	0.588976	1.524409	0.181102	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

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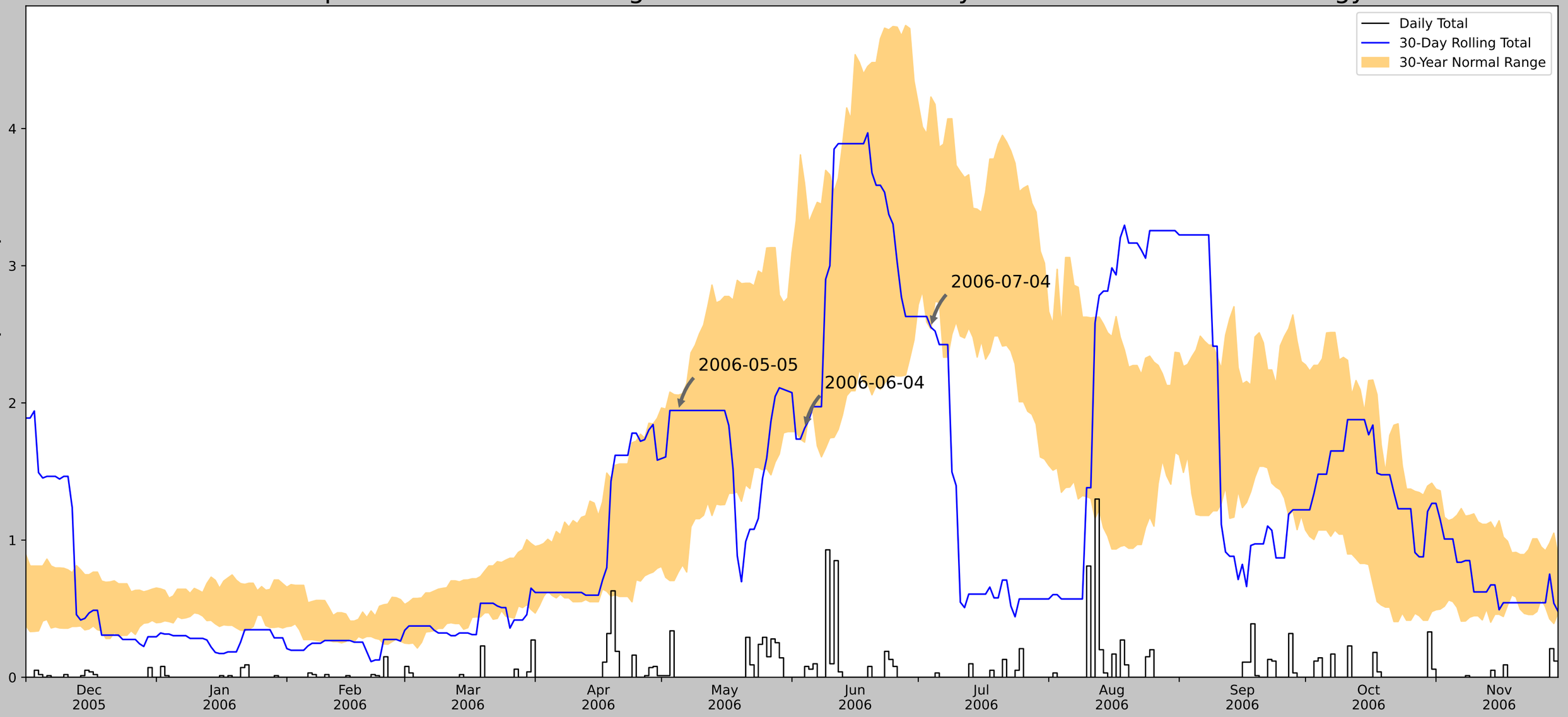
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10530	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	815	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	8	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	2006-07-04
Elevation (ft)	2268.534
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.538583	4.230315	2.551181	Normal	2	3	6
2006-06-04	1.71378	3.6	1.814961	Normal	2	2	4
2006-05-05	0.766929	2.056693	1.944882	Normal	2	1	2
Result							Normal Conditions - 12

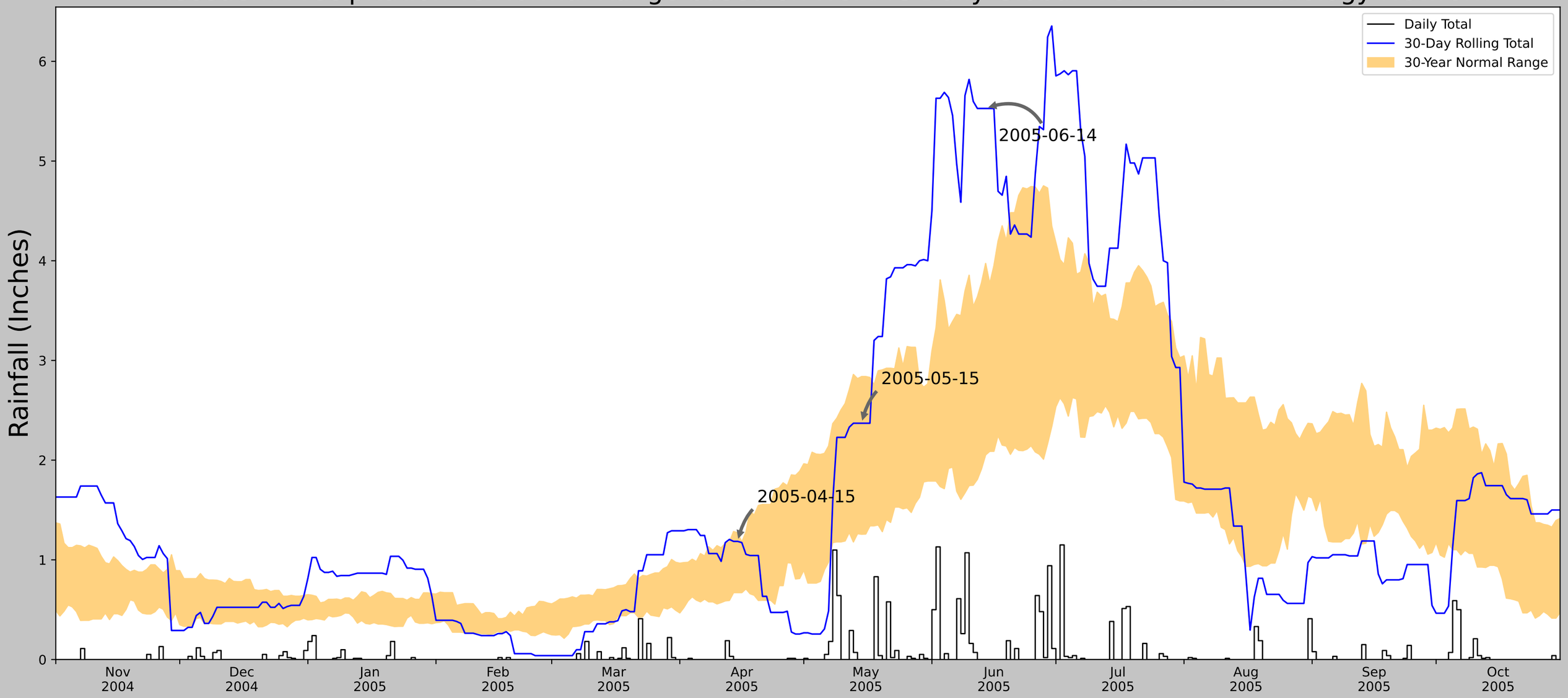
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10530	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	815	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	8	0



Coordinates	48.251559, -102.285315
Observation Date	2005-06-14
Elevation (ft)	2268.534
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	2.052756	3.972835	5.527559	Wet	3	3	9
2005-05-15	1.256693	2.838583	2.370079	Normal	2	2	4
2005-04-15	0.670866	1.270079	1.185039	Normal	2	1	2
Result							Wetter than Normal - 15

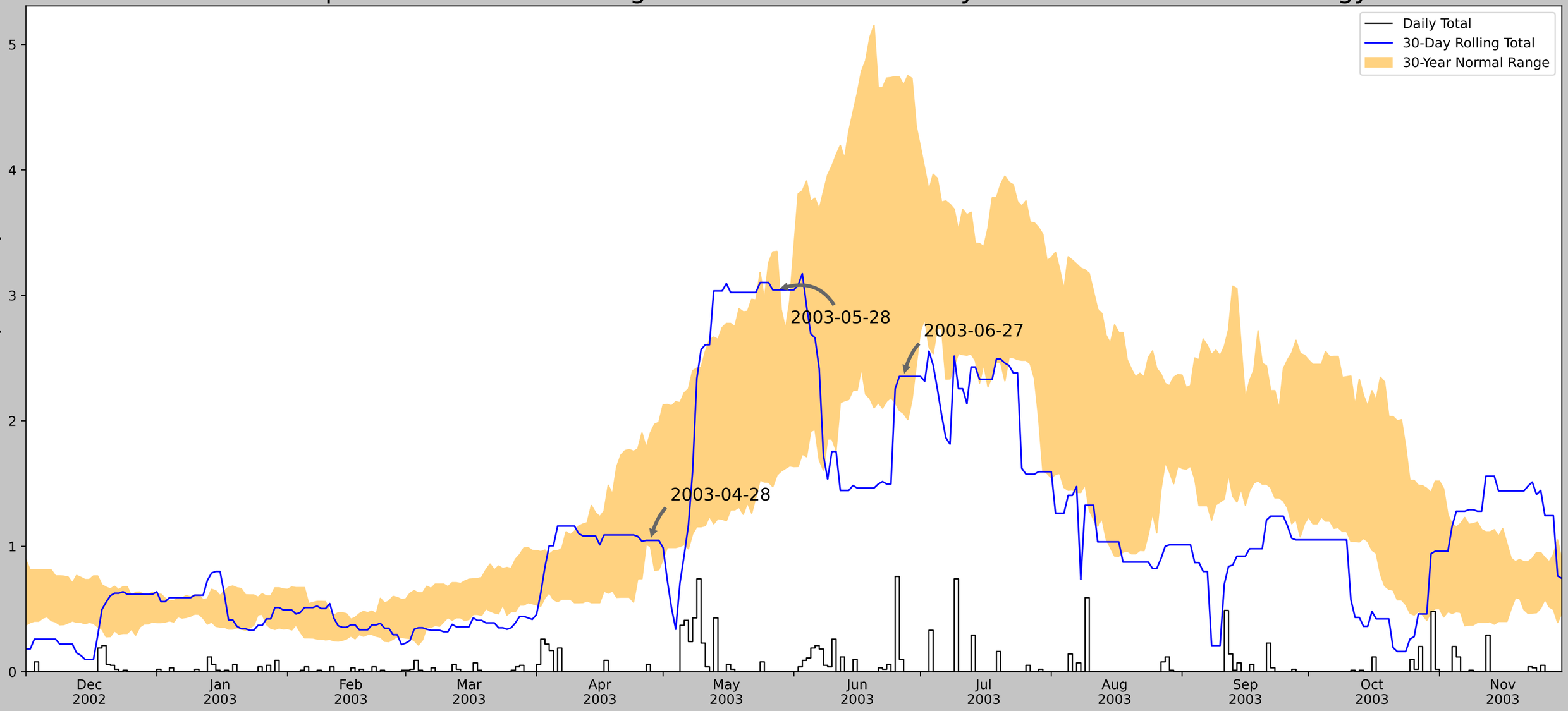
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10509	82
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	30	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	813	1
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	1	7



Coordinates	48.251559, -102.285315
Observation Date	2003-06-27
Elevation (ft)	2268.534
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	2.059055	4.676772	2.354331	Normal	2	3	6
2003-05-28	1.567717	3.350394	3.043307	Normal	2	2	4
2003-04-28	0.998425	1.904331	1.047244	Normal	2	1	2
Result							Normal Conditions - 12

US Army Corps of Engineers

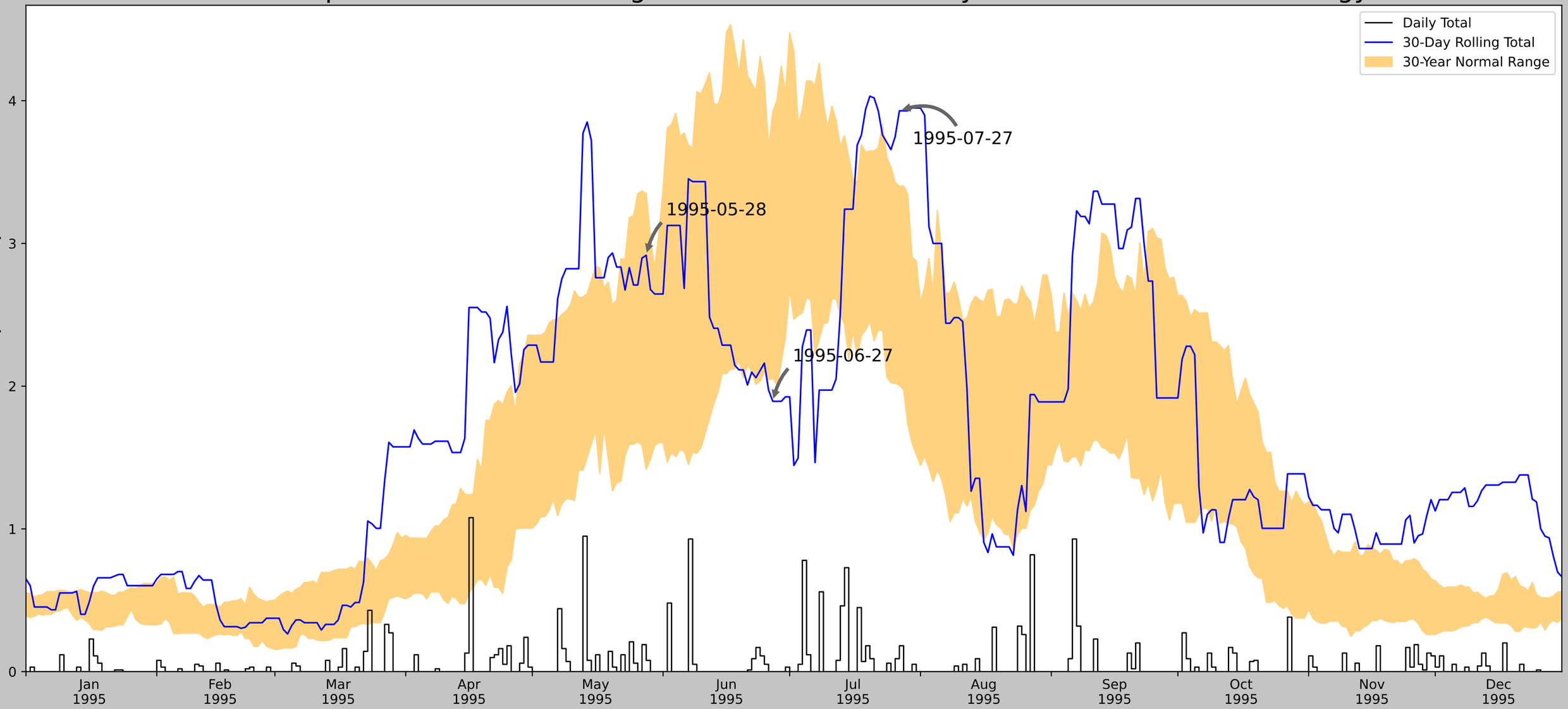
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10510	89
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	30	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	812	1
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	1	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.251559, -102.285315
Observation Date	1995-07-27
Elevation (ft)	2268.534
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1995-07-27	2.00748	3.398819	3.929134	Wet	3	3	9
1995-06-27	2.055512	3.922441	1.893701	Dry	1	2	2
1995-05-28	1.417323	3.350394	2.917323	Normal	2	1	2
Result							Normal Conditions - 13

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	9.301	11.322	4.291	10479	90
LOSTWOOD 12 N	48.55, -102.4	2250.984	13.367	28.872	6.401	62	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	811	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	1	0

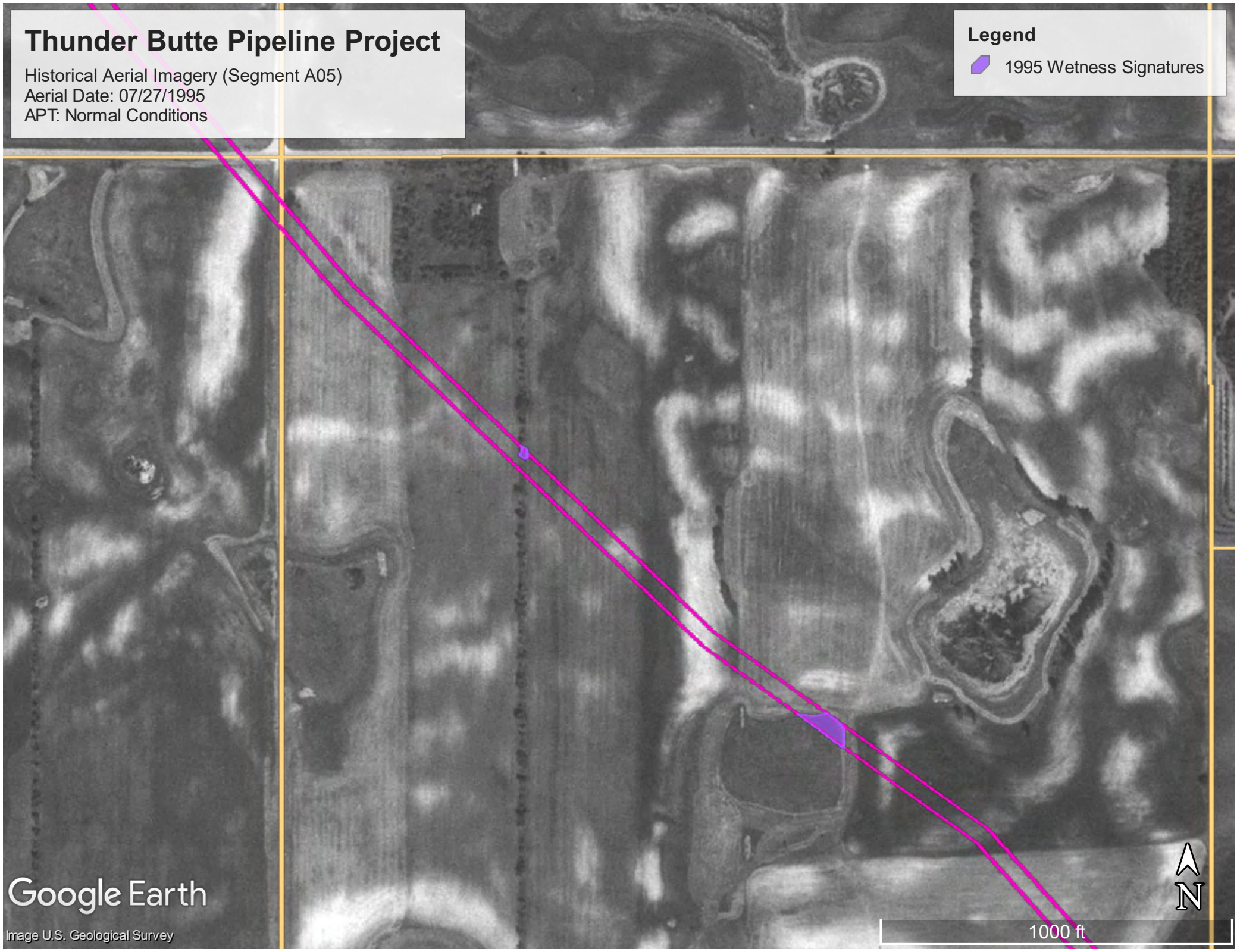
Farmed Wetland Determination - Aerial Slide Review

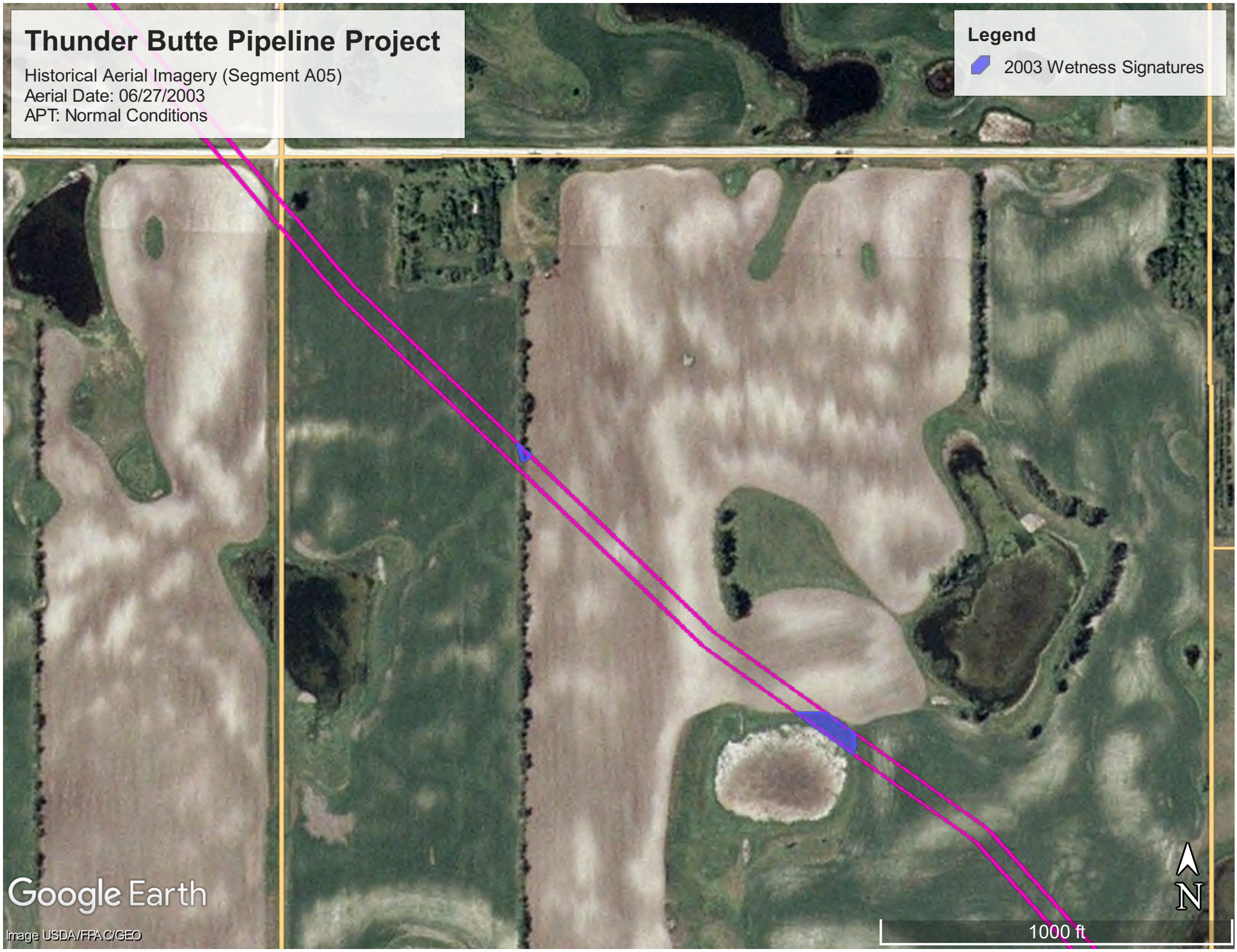
Project Name: Thunder Butte Pipeline Project: Segment A05
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation	
			PFW01	PFW02
6/5/2024	Google Earth Pro, 2024	Normal Conditions	2024-PFW01	2024-PFW02
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009-PFW01	2009-PFW03
7/4/2006	Google Earth Pro, 2024	Normal Conditions	2006-PFW01	2006-PFW02
6/27/2003	Google Earth Pro, 2024	Normal Conditions	2003-PFW01	2003-PFW02
7/27/1995	Google Earth Pro, 2024	Normal Conditions	1995-PFW01	1995-PFW02
Summary Table			**PFW01**	**PFW02**
Number of Normal Years			5	5
Number of Normal Years with Wet Signatures			5	5
Percent of Normal Years with Wet Signatures			100%	100%
Hydric Soils present?			C132B[1]	C3A[2]
Farmed wetland present?			Wetland Present: **WA05FW01**	Wetland Present: **WA05FW02**

[1] - Soil map unit is classified as predominantly non-hydric.

[2] - Soil map unit is classified as hydric.


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A05)
Aerial Date: 07/27/1995
APT: Normal Conditions
Legend
1995 Wetness Signatures
Google Earth
Image U.S. Geological Survey
N
1000 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A05)
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2003 Wetness Signatures
Google Earth
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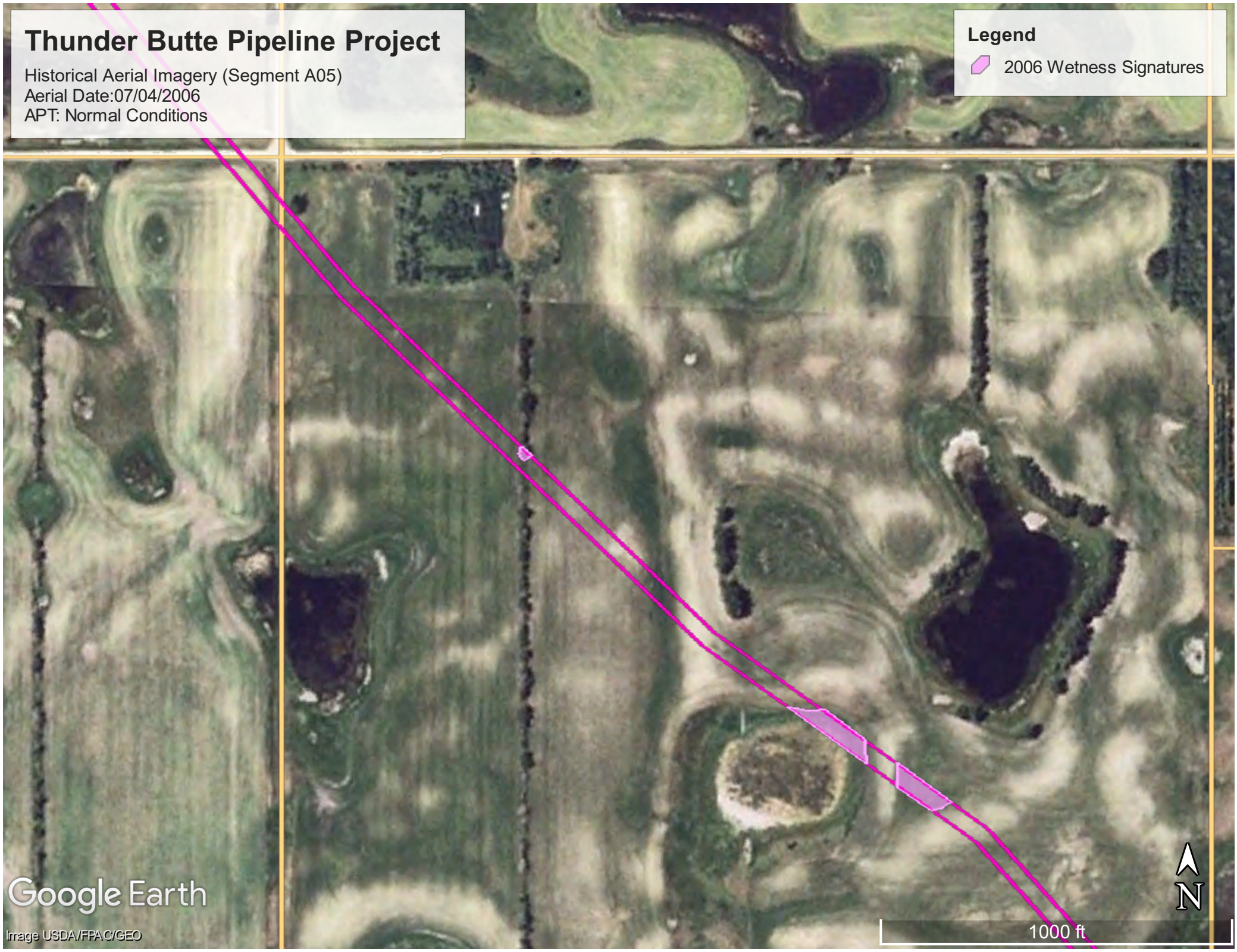
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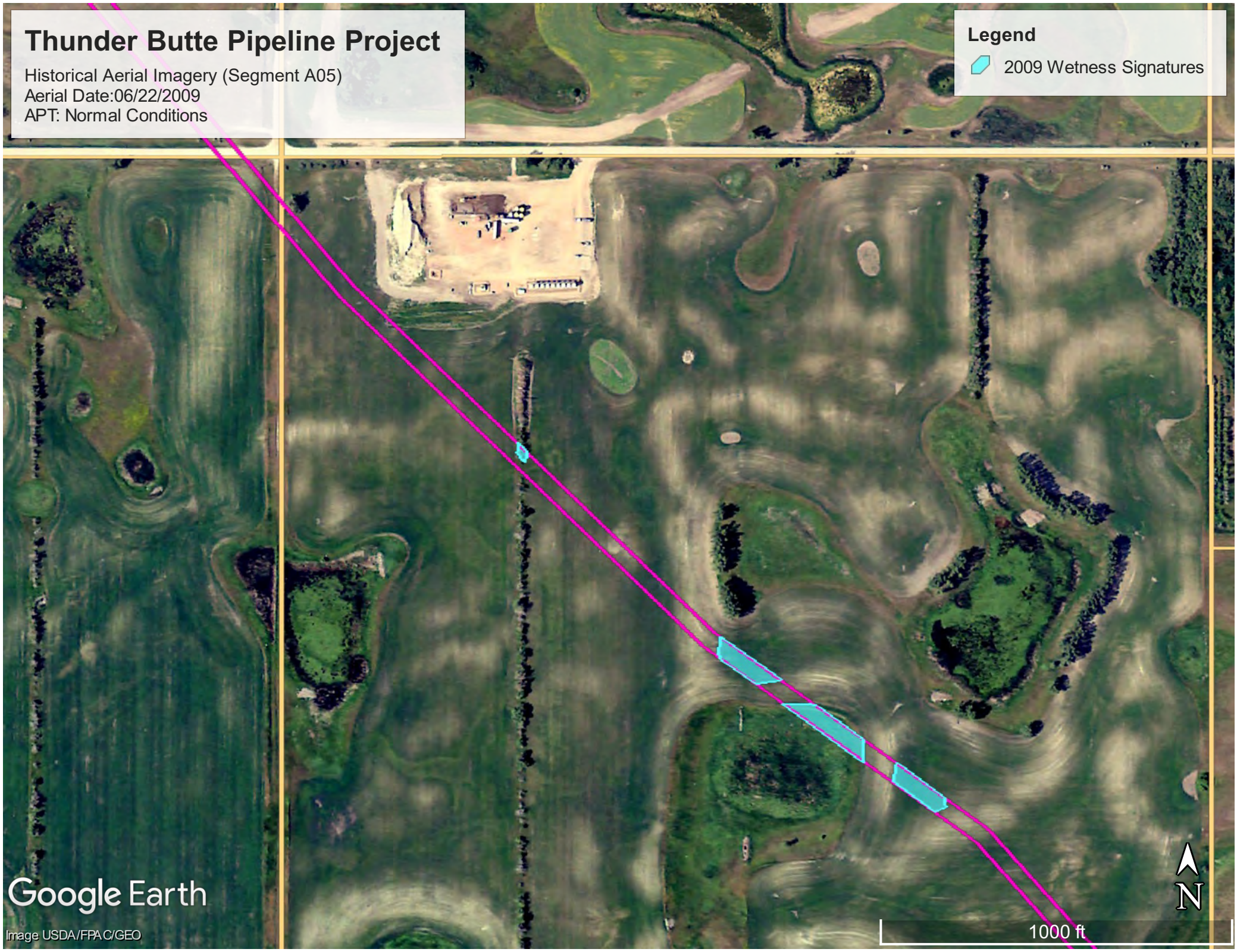
Legend
2006 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
1000 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A05)
Aerial Date:06/22/2009
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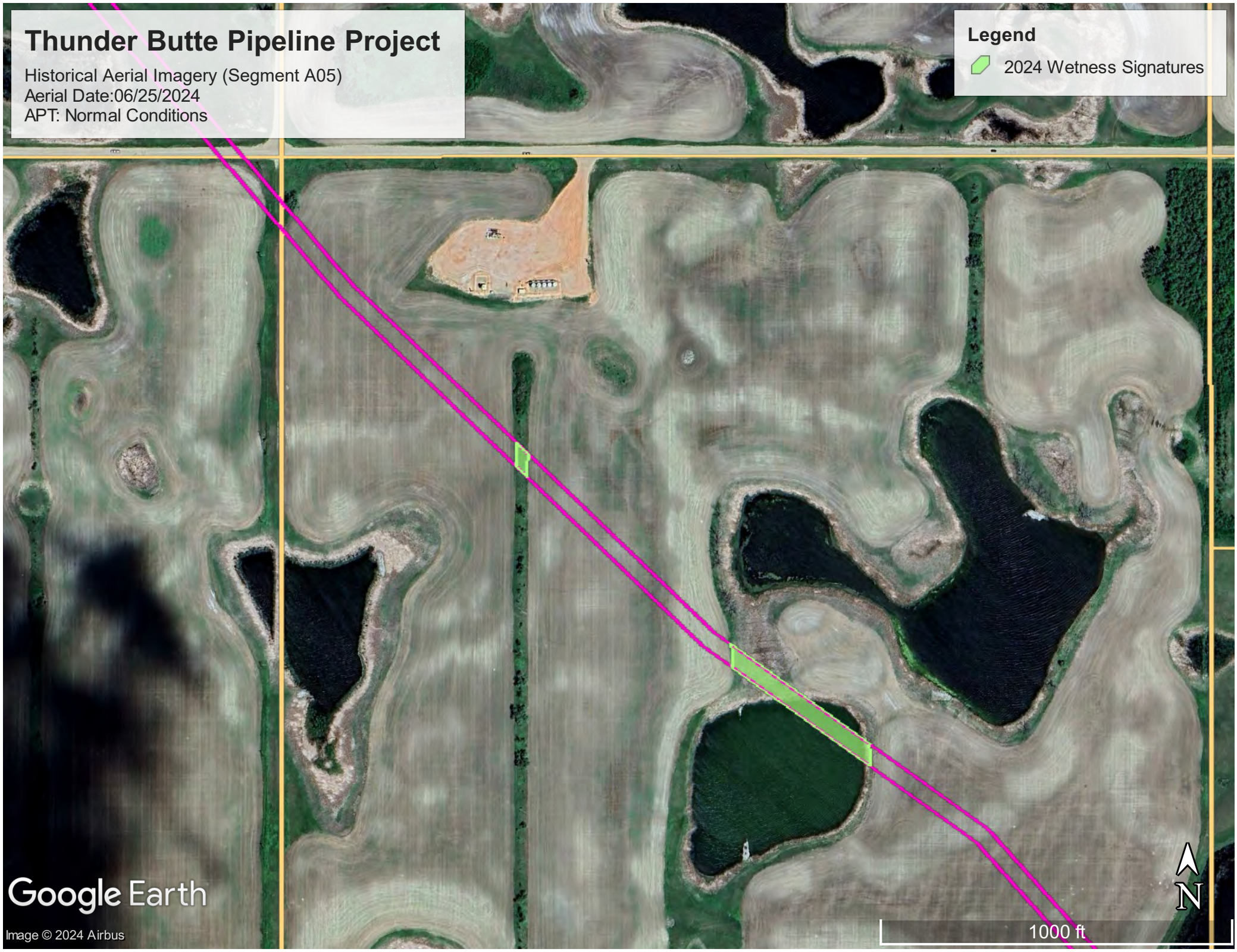
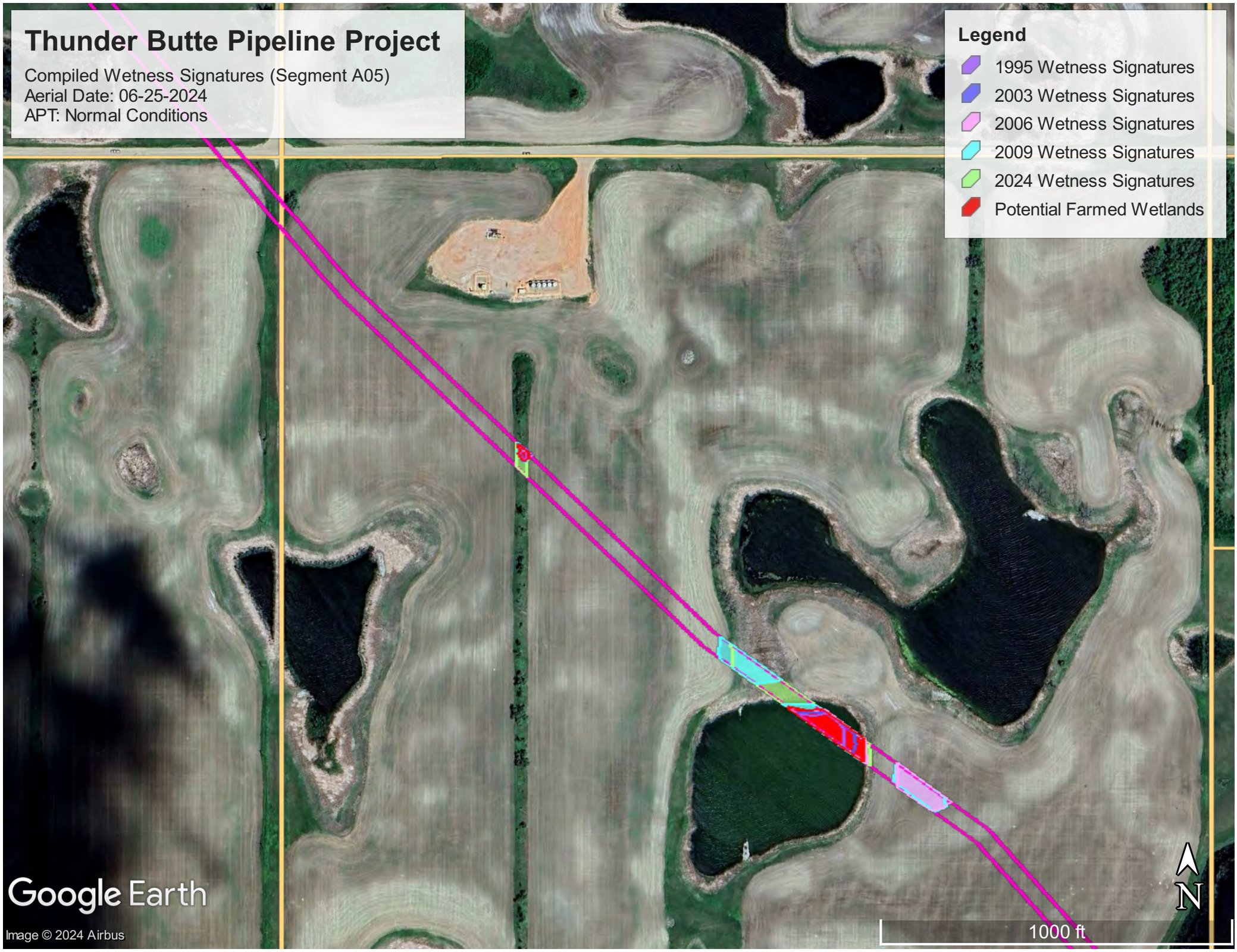
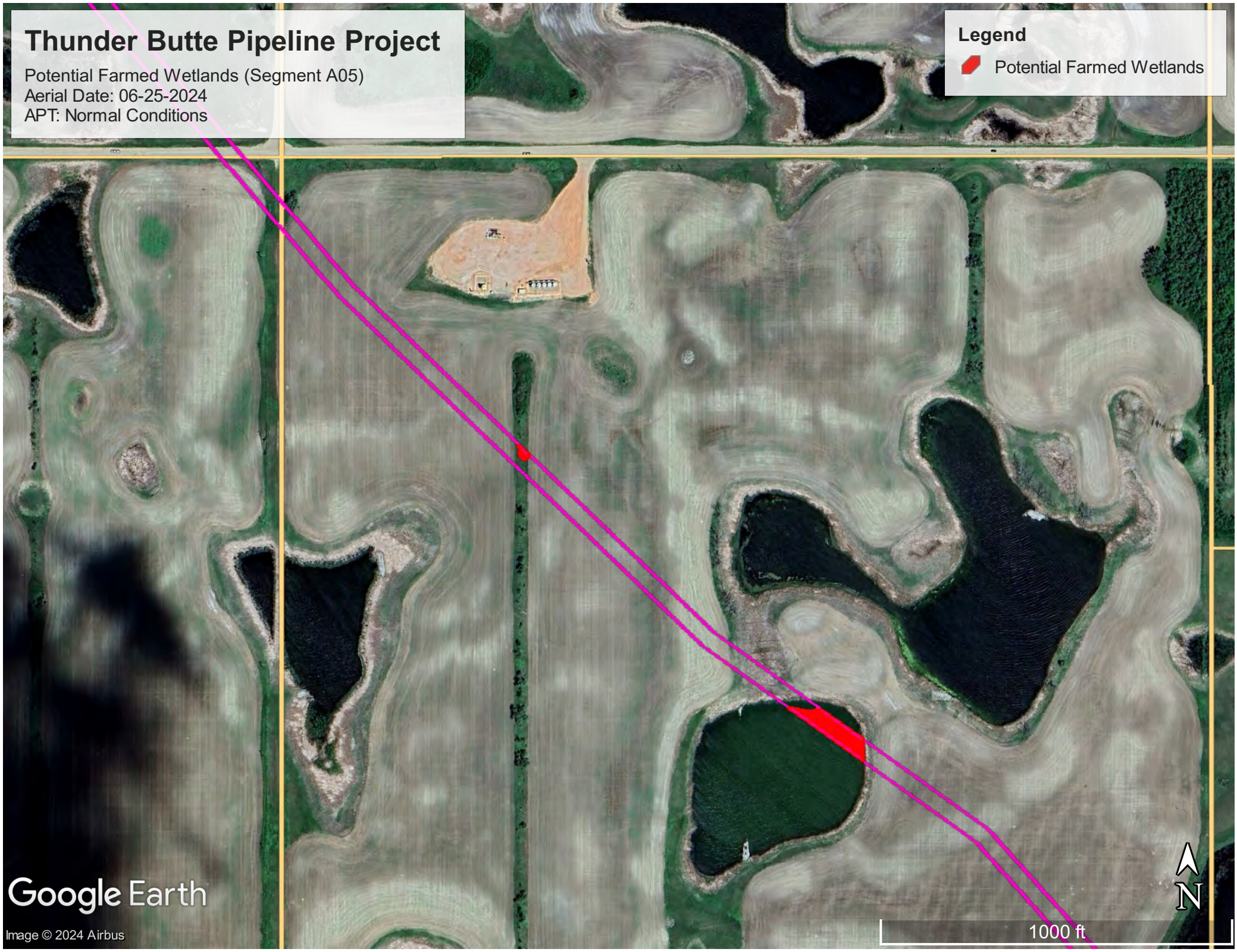
Legend
2009 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
1000 ft

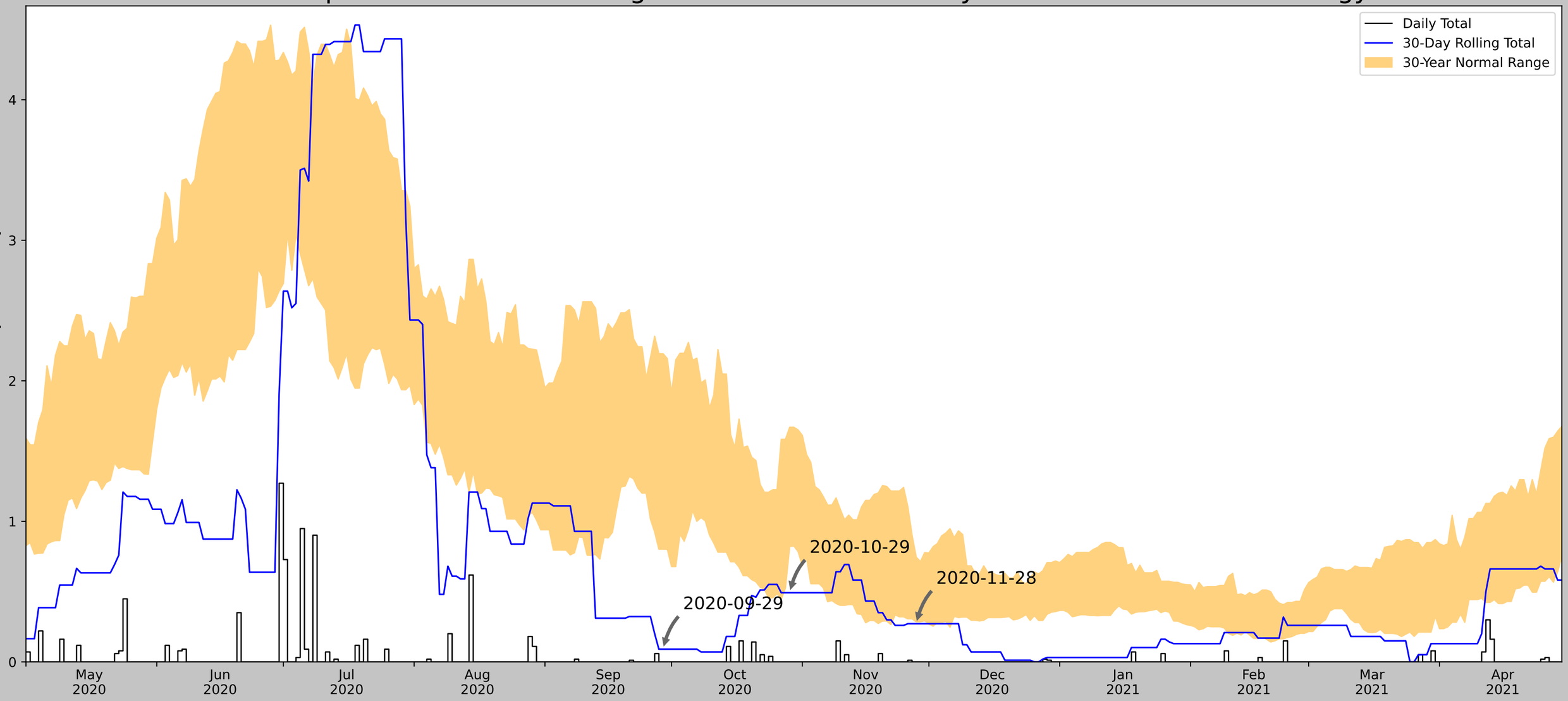

Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A05)
Aerial Date:06/25/2024
APT: Normal Conditions
Legend
2024 Wetness Signatures
Google Earth
Image © 2024 Airbus
N
1000 ft


Thunder Butte Pipeline Project
Compiled Wetness Signatures (Segment A05)
Aerial Date: 06-25-2024
APT: Normal Conditions
Legend
1995 Wetness Signatures
2003 Wetness Signatures
2006 Wetness Signatures
2009 Wetness Signatures
2024 Wetness Signatures
Potential Farmed Wetlands
Google Earth
Image © 2024 Airbus
N
1000 ft


Thunder Butte Pipeline Project
Potential Farmed Wetlands (Segment A05)
Aerial Date: 06-25-2024
APT: Normal Conditions
Legend
Potential Farmed Wetlands
Google Earth
Image © 2024 Airbus
N
1000 ft

Historic Antecedent Precipitation Summary: Segment A08

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precip Condition
11/28/2020	-1.64	Mild drought	Wet Season	6	Drier than Normal
10/12/2020	-1.42	Mild drought	Dry Season	8	Drier than Normal
5/7/2016	-1.17	Mild drought	Dry Season	16	Wetter than Normal
8/19/2013	6.6	Extreme wetness	Dry Season	15	Wetter than Normal
12/31/2009	2.49	Moderate wetness	Wet Season	13	Normal Conditions
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	10	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	18	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	11	Normal Conditions
7/27/1995	4.59	Extreme wetness	Dry Season	12	Normal Conditions



Coordinates	48.197257, -102.206332
Observation Date	2020-11-28
Elevation (ft)	2187.535
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-11-28	0.285433	0.744488	0.271654	Dry	1	3	3
2020-10-29	0.82126	1.669291	0.492126	Dry	1	2	2
2020-09-29	0.802362	2.192913	0.090551	Dry	1	1	1
Result							Drier than Normal - 6

US Army Corps of Engineers

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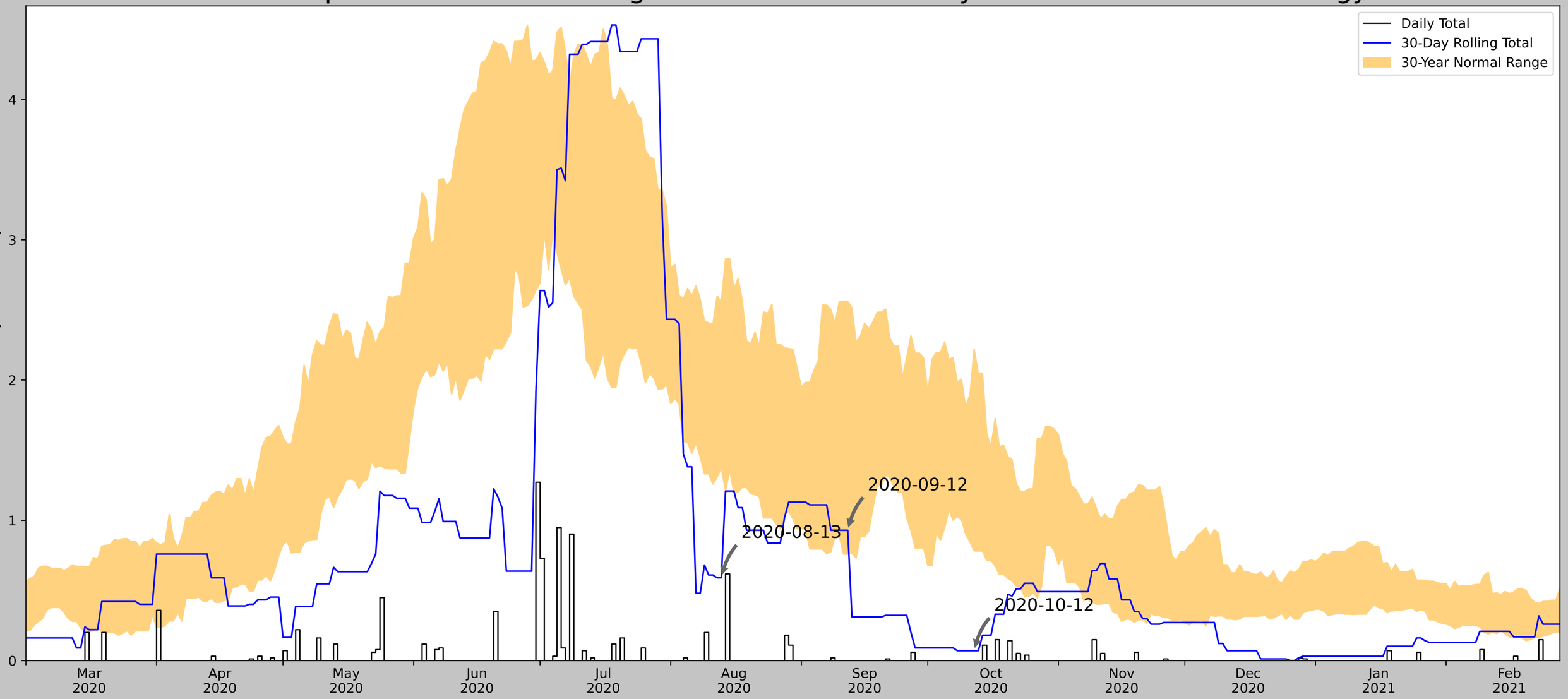
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	38.991	282.609	28.565	11014	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	59	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2020-10-12
Elevation (ft)	2187.535
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-10-12	0.781102	2.221654	0.070866	Dry	1	3	3
2020-09-12	0.759055	2.562205	0.929134	Normal	2	2	4
2020-08-13	1.373622	2.556693	0.590551	Dry	1	1	1
Result							Drier than Normal - 8

US Army Corps of Engineers

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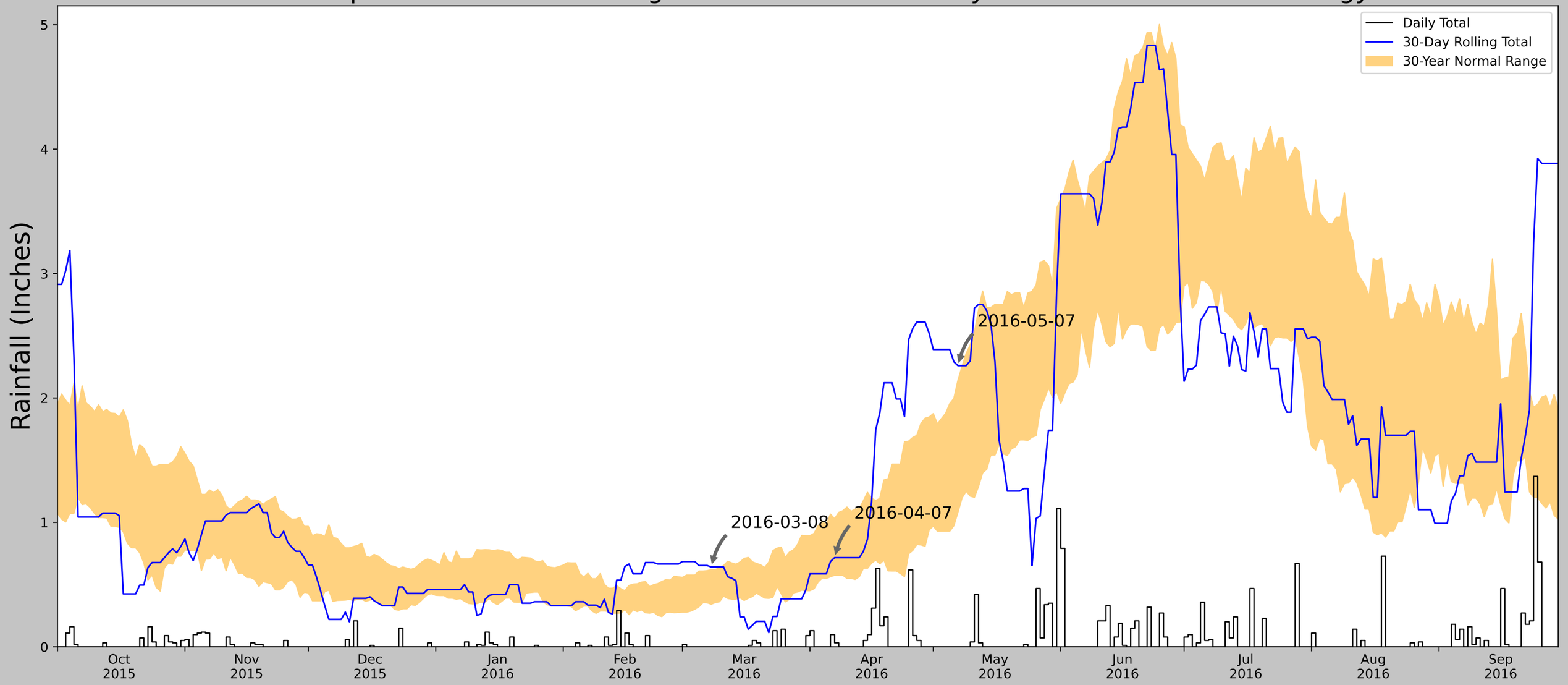
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	38.991	282.609	28.565	11014	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	59	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2016-05-07
Elevation (ft)	2187.535
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-05-07	1.082283	2.14252	2.259843	Wet	3	3	9
2016-04-07	0.575197	1.02874	0.716535	Normal	2	2	4
2016-03-08	0.34252	0.620079	0.641732	Wet	3	1	3
Result							Wetter than Normal - 16

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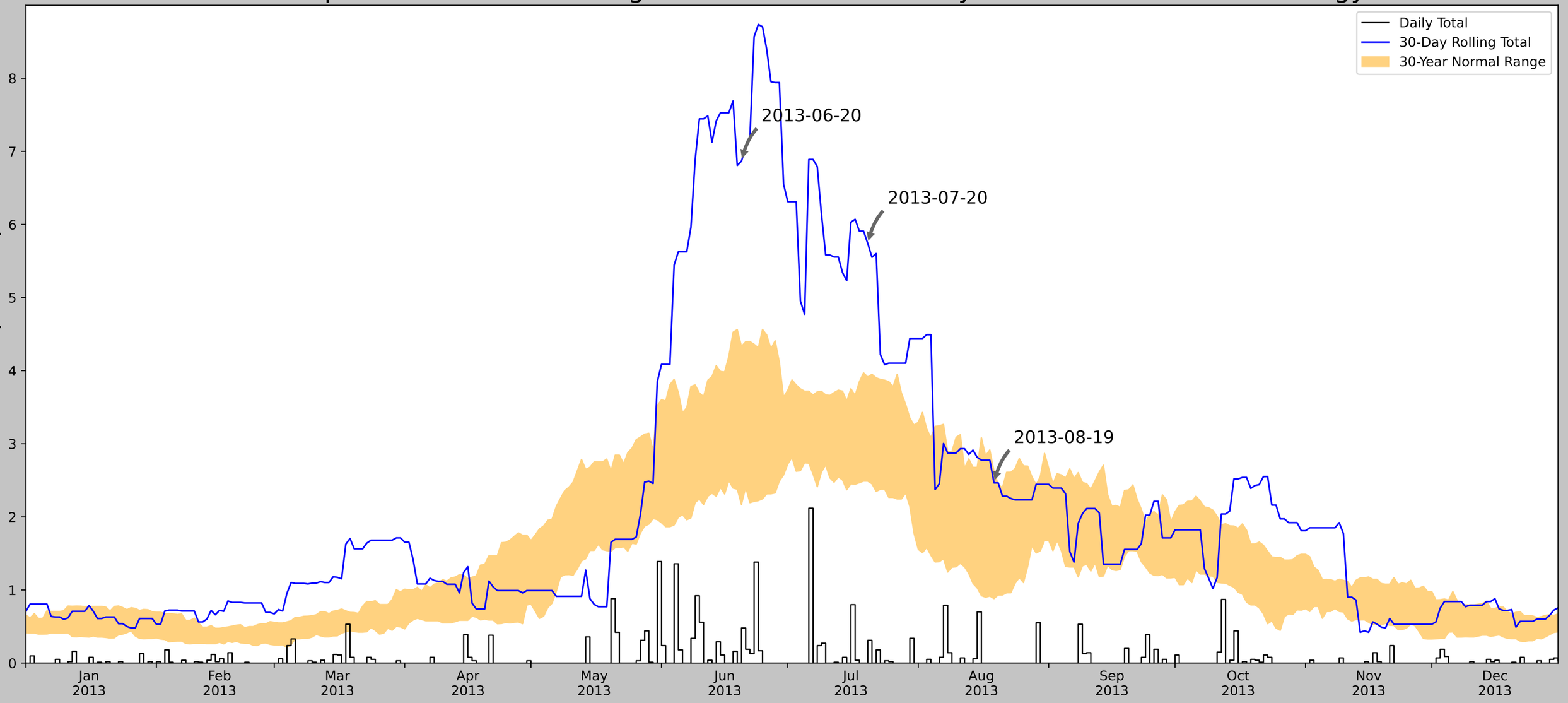
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	14.51	92.321	7.869	11064	90
STANLEY 1.0 SE	48.308, -102.3702	2236.877	3.867	42.979	1.906	2	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	52	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	37	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2013-08-19
Elevation (ft)	2187.535
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-08-19	0.882283	2.621654	2.464567	Normal	2	3	6
2013-07-20	2.488583	3.914173	5.740158	Wet	3	2	6
2013-06-20	2.168898	4.332677	6.866142	Wet	3	1	3
Result							Wetter than Normal - 15

US Army Corps of Engineers

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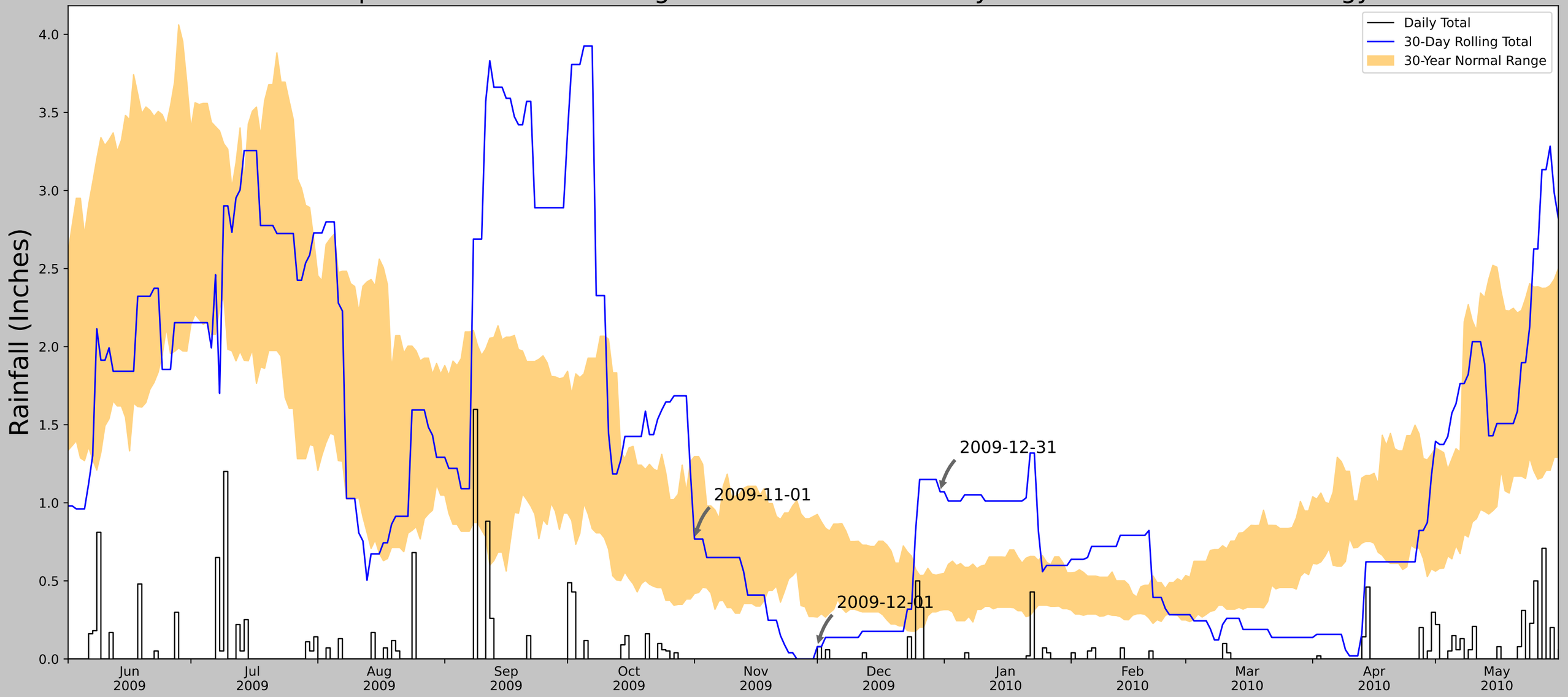
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	14.51	92.321	7.869	11068	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	53	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	35	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2009-12-31
Elevation (ft)	2187.535
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-12-31	0.312205	0.543307	1.070866	Wet	3	3	9
2009-12-01	0.26811	0.925591	0.07874	Dry	1	2	2
2009-11-01	0.419291	1.296457	0.767717	Normal	2	1	2
Result							Normal Conditions - 13

US Army Corps of Engineers

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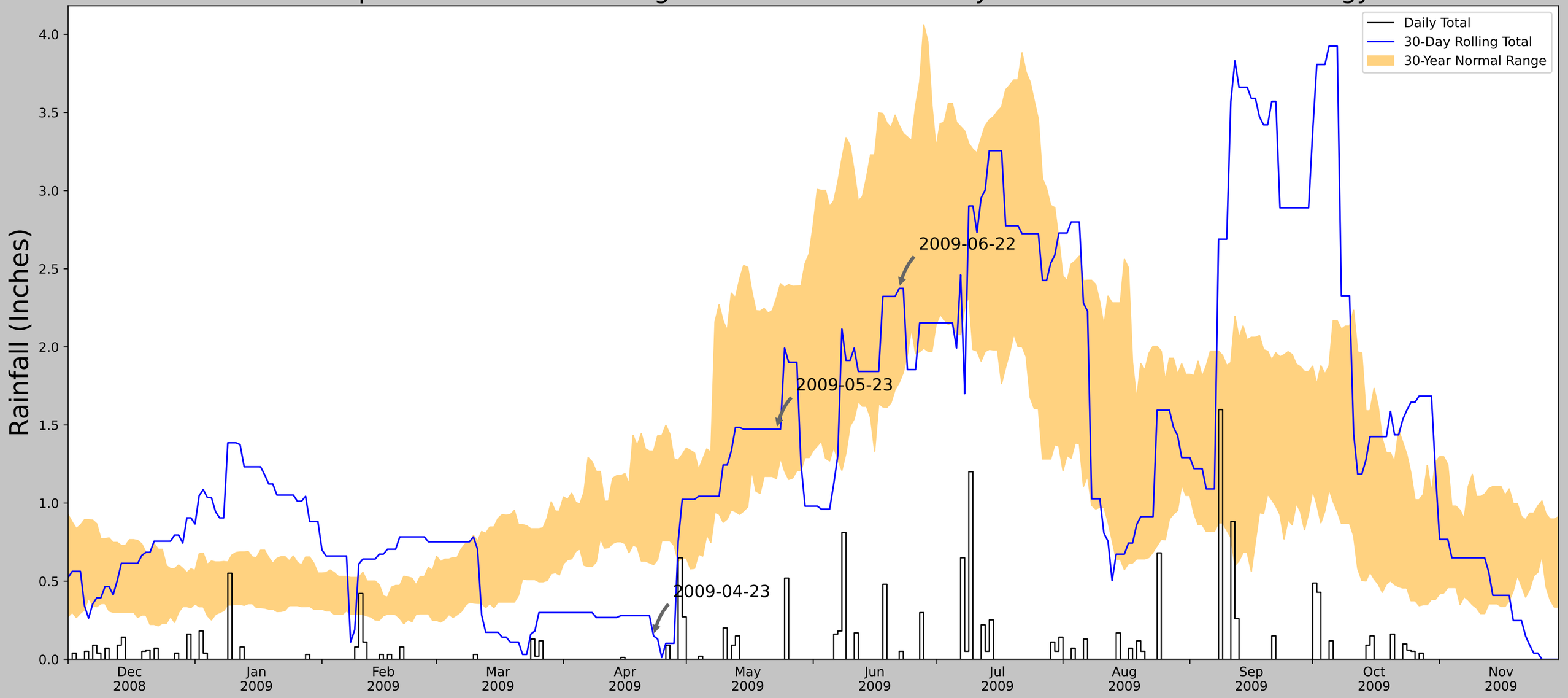
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0



Coordinates	48.197257, -102.206332
Observation Date	2009-06-22
Elevation (ft)	2187.535
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	1.77126	3.417323	2.374016	Normal	2	3	6
2009-05-23	1.155512	2.309843	1.472441	Normal	2	2	4
2009-04-23	0.606299	1.332677	0.149606	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

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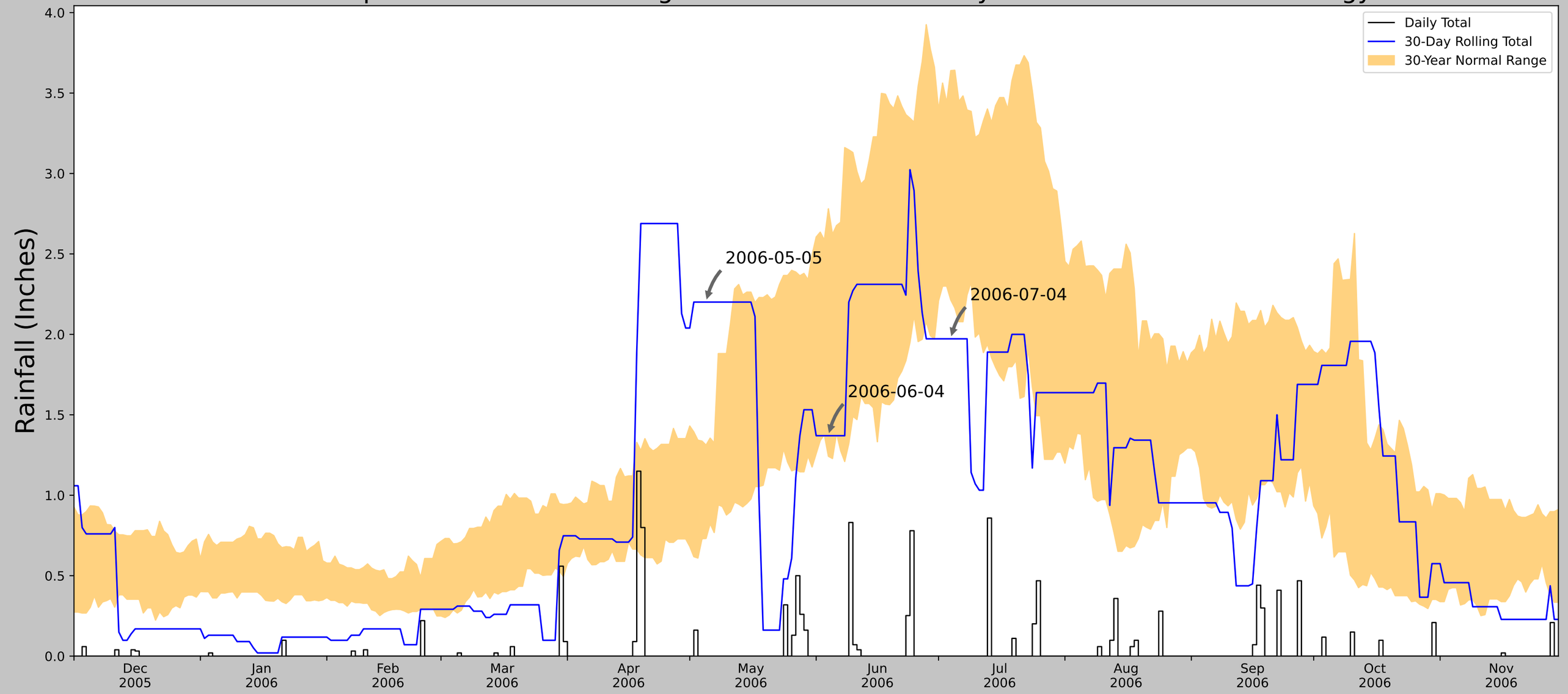
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2006-07-04
Elevation (ft)	2187.535
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.214173	3.63937	1.972441	Dry	1	3	3
2006-06-04	1.242126	2.780709	1.370079	Normal	2	2	4
2006-05-05	0.731496	1.311417	2.200787	Wet	3	1	3
Result							Normal Conditions - 10

US Army Corps of Engineers

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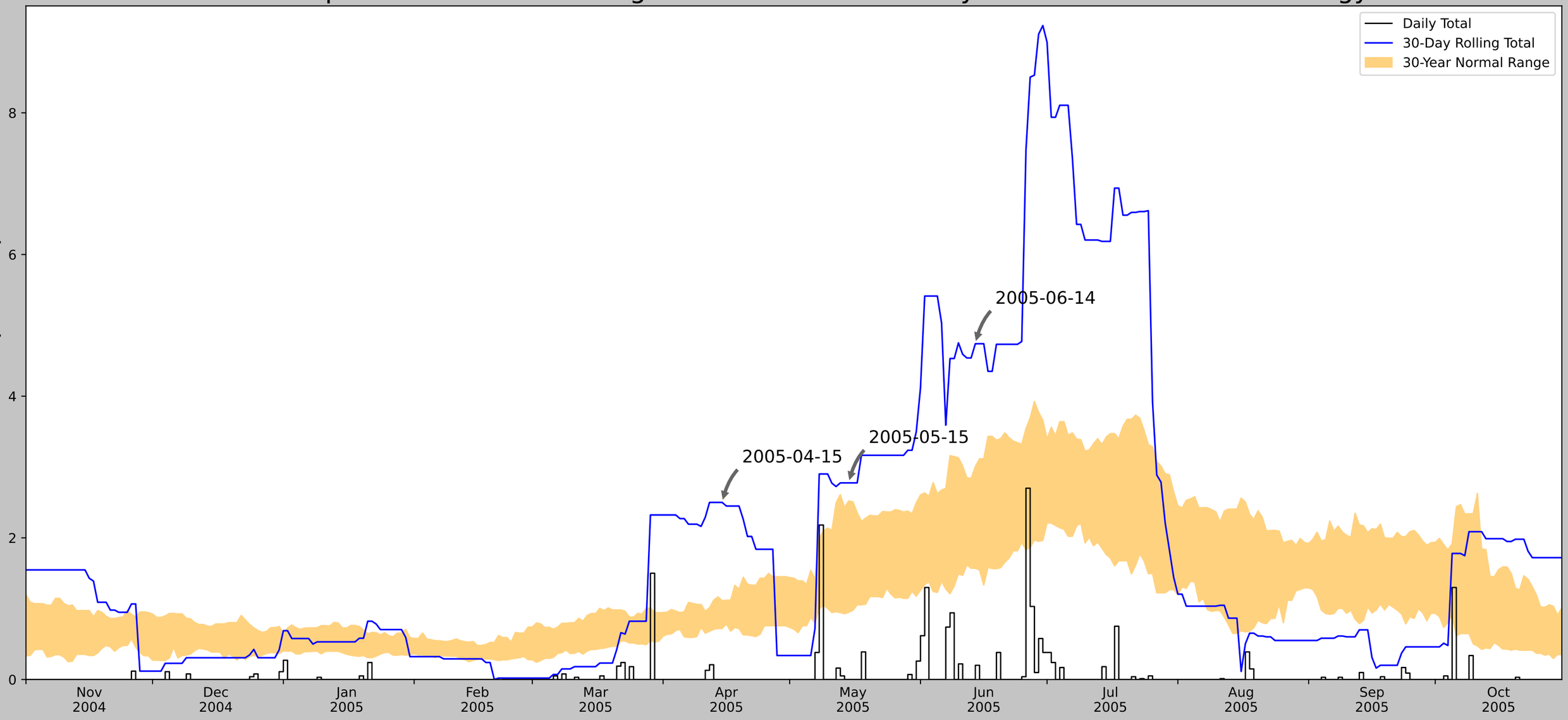
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	2005-06-14
Elevation (ft)	2187.535
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	1.570472	3.006693	4.740158	Wet	3	3	9
2005-05-15	0.949213	2.520866	2.775591	Wet	3	2	6
2005-04-15	0.719685	1.114173	2.5	Wet	3	1	3
Result							Wetter than Normal - 18

US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11307	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	44	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.197257, -102.206332
Observation Date	2003-06-27
Elevation (ft)	2187.535
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	1.933858	3.695276	1.897638	Dry	1	3	3
2003-05-28	1.075197	2.364173	3.15748	Wet	3	2	6
2003-04-28	0.738189	1.451575	0.929134	Normal	2	1	2
Result							Normal Conditions - 11

US Army Corps of Engineers

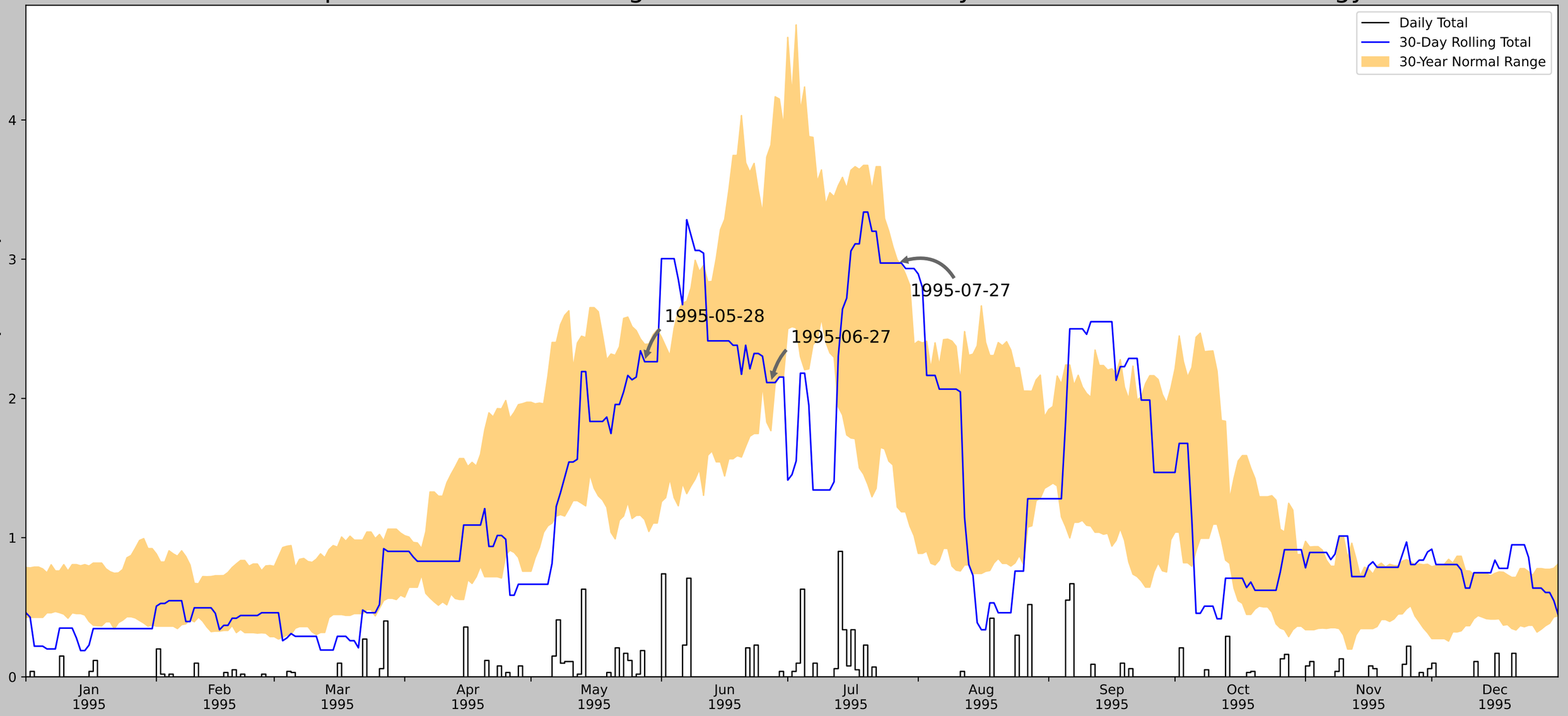
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11310	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	43	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.197257, -102.206332
Observation Date	1995-07-27
Elevation (ft)	2187.535
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1995-07-27	1.219685	2.995276	2.972441	Normal	2	3	6
1995-06-27	1.767717	3.820473	2.114173	Normal	2	2	4
1995-05-28	1.130315	2.388583	2.26378	Normal	2	1	2
Result							Normal Conditions - 12

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.32	17.587	7.631	11309	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	44	0

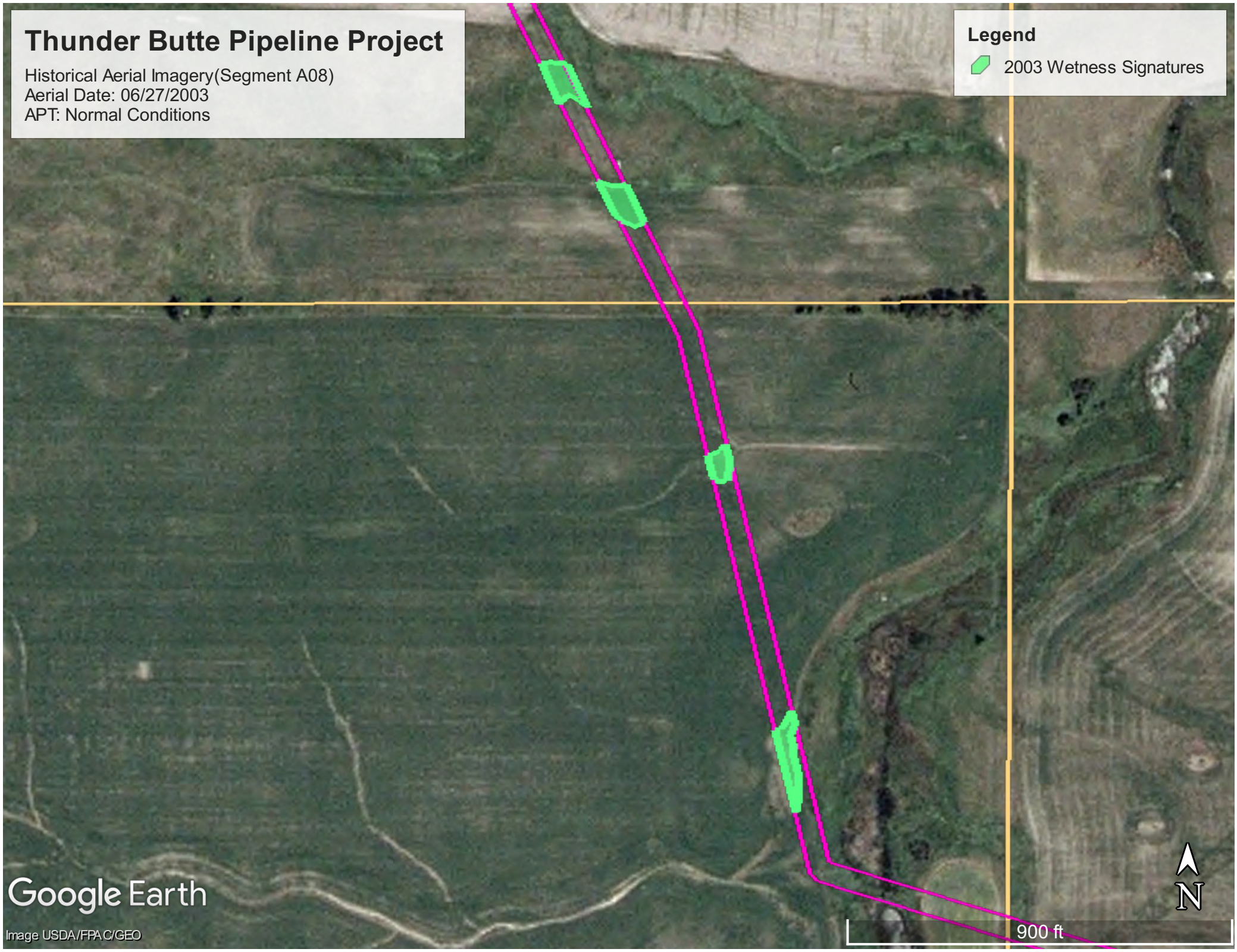
Farmed Wetland Determination - Aerial Slide Review

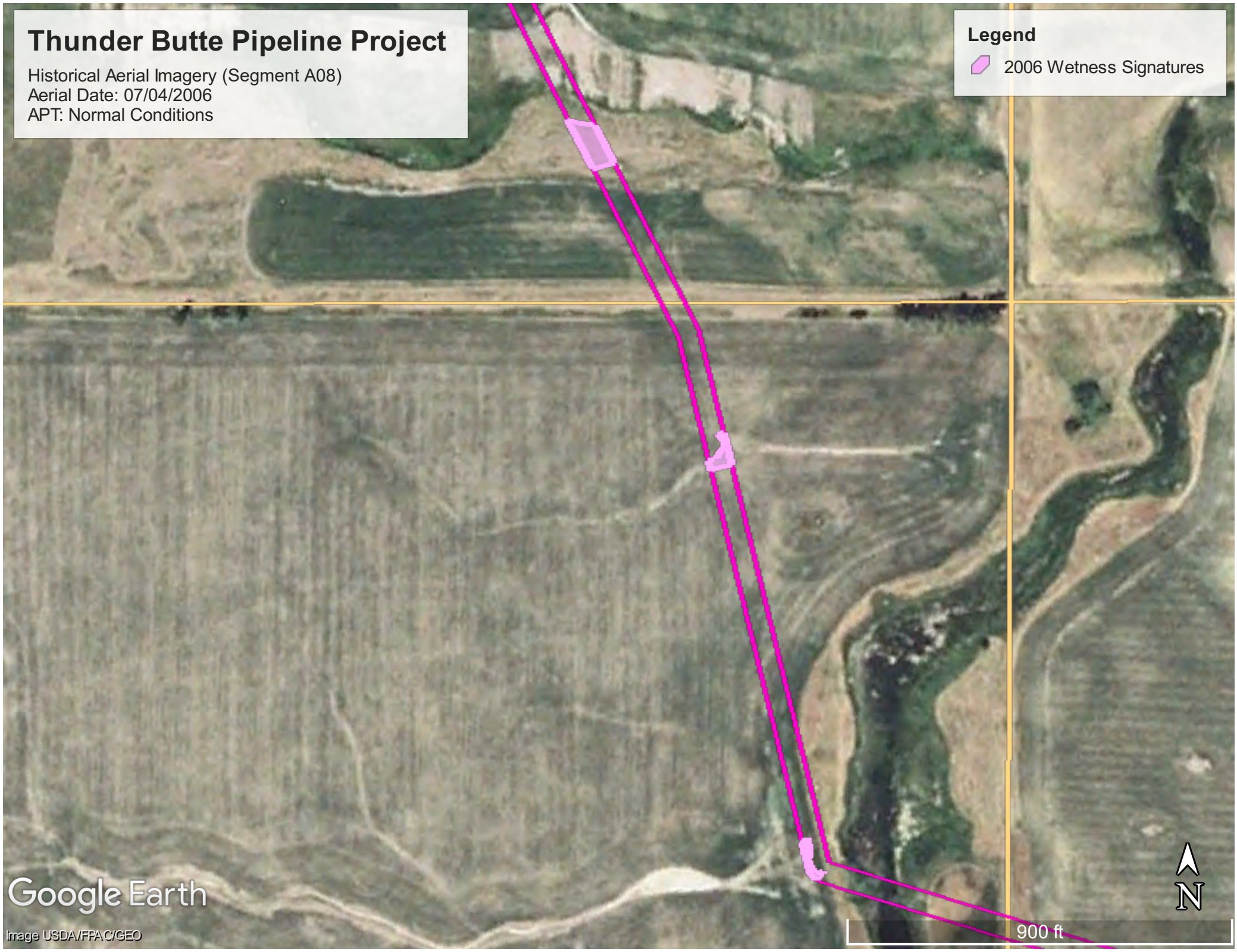
Project Name: Thunder Butte Pipeline Project: Segment A08
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

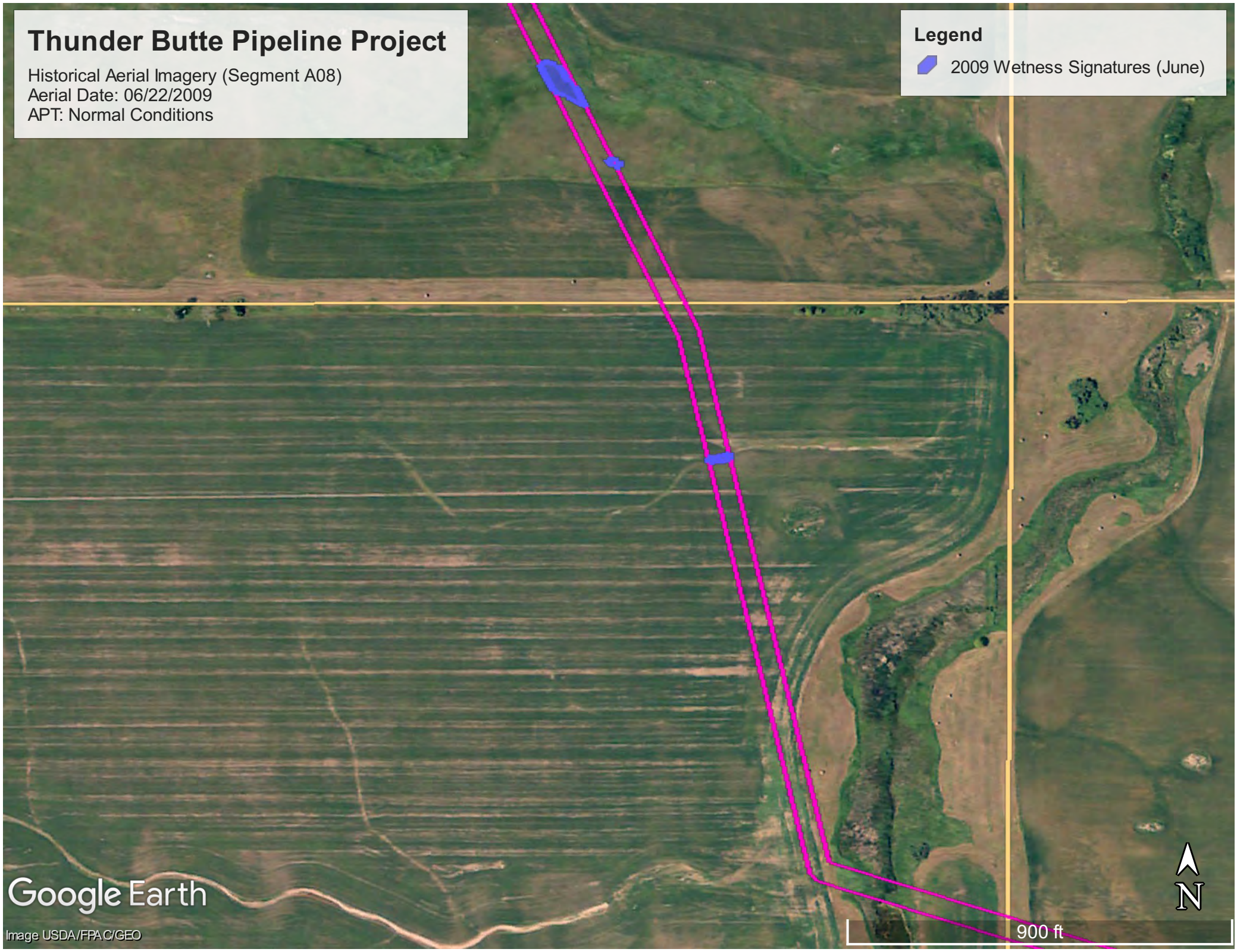
Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation	
			PFW01	PFW02
12/31/2009	Google Earth Pro, 2024	Normal Conditions	2009D-PFW01	2009D-PFW02
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009J-PFW01	2009J-PFW03
7/4/2006	Google Earth Pro, 2024	Normal Conditions	2006-PFW01	2006-PFW02
6/27/2003	Google Earth Pro, 2024	Normal Conditions	2003-PFW01	2003-PFW03
7/27/1995	Google Earth Pro, 2024	Normal Conditions	1995-PFW01	-
Summary Table			**PFW01**	**PFW02**
Number of Normal Years			5	5
Number of Normal Years with Wet Signatures			5	4
Percent of Normal Years with Wet Signatures			100%	80%
Hydric Soils present?			C132B[1]	C132C[1]
Farmed wetland present?			Wetland Present: **WA08FW01**	Wetland Present: **WA08FW02**

1 - Soil map unit is classified as predominantly non-hydric.


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A08)
Aerial Date: 07-27-1995
APT: Normal Conditions
Legend
1995 Wetness Signatures
Google Earth
Image U.S. Geological Survey
N
900 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery(Segment A08)
Aerial Date: 06/27/2003
APT: Normal Conditions
Legend
2003 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
900 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A08)
Aerial Date: 07/04/2006
APT: Normal Conditions
Legend
2006 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
900 ft

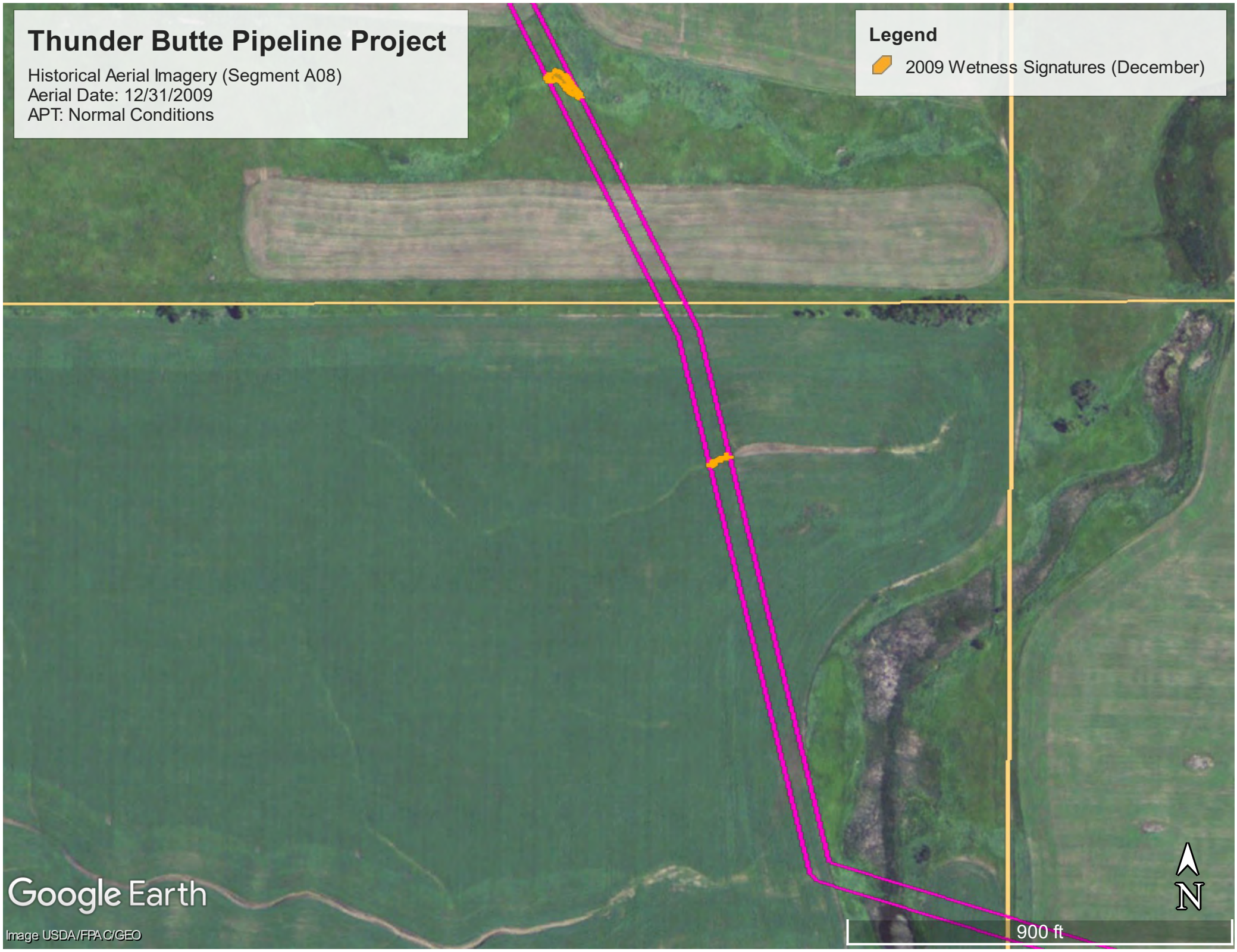

Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A08)
Aerial Date: 06/22/2009
APT: Normal Conditions
Legend
2009 Wetness Signatures (June)
Google Earth
Image USDA/FPAC/GEO
N
900 ft

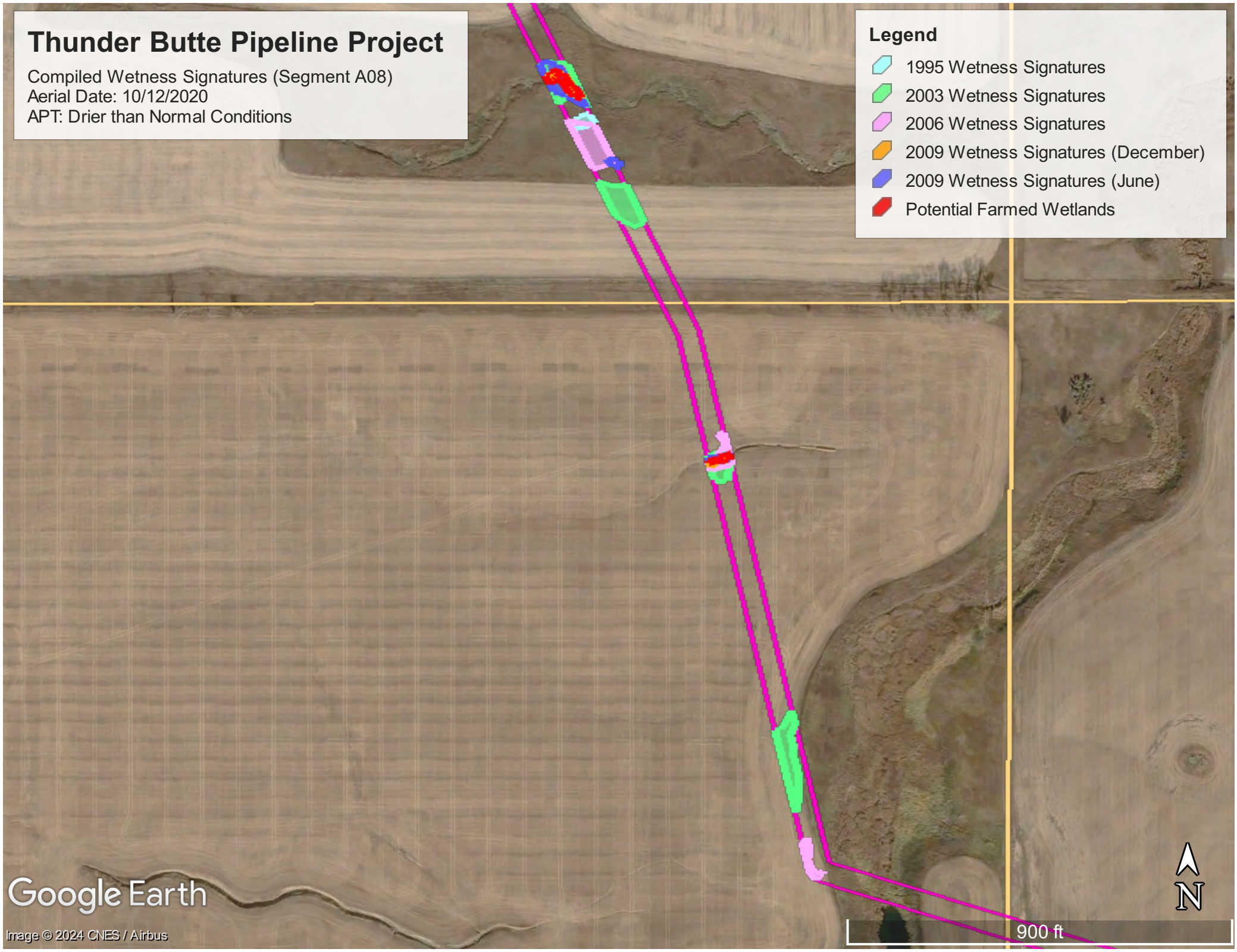
Thunder Butte Pipeline Project

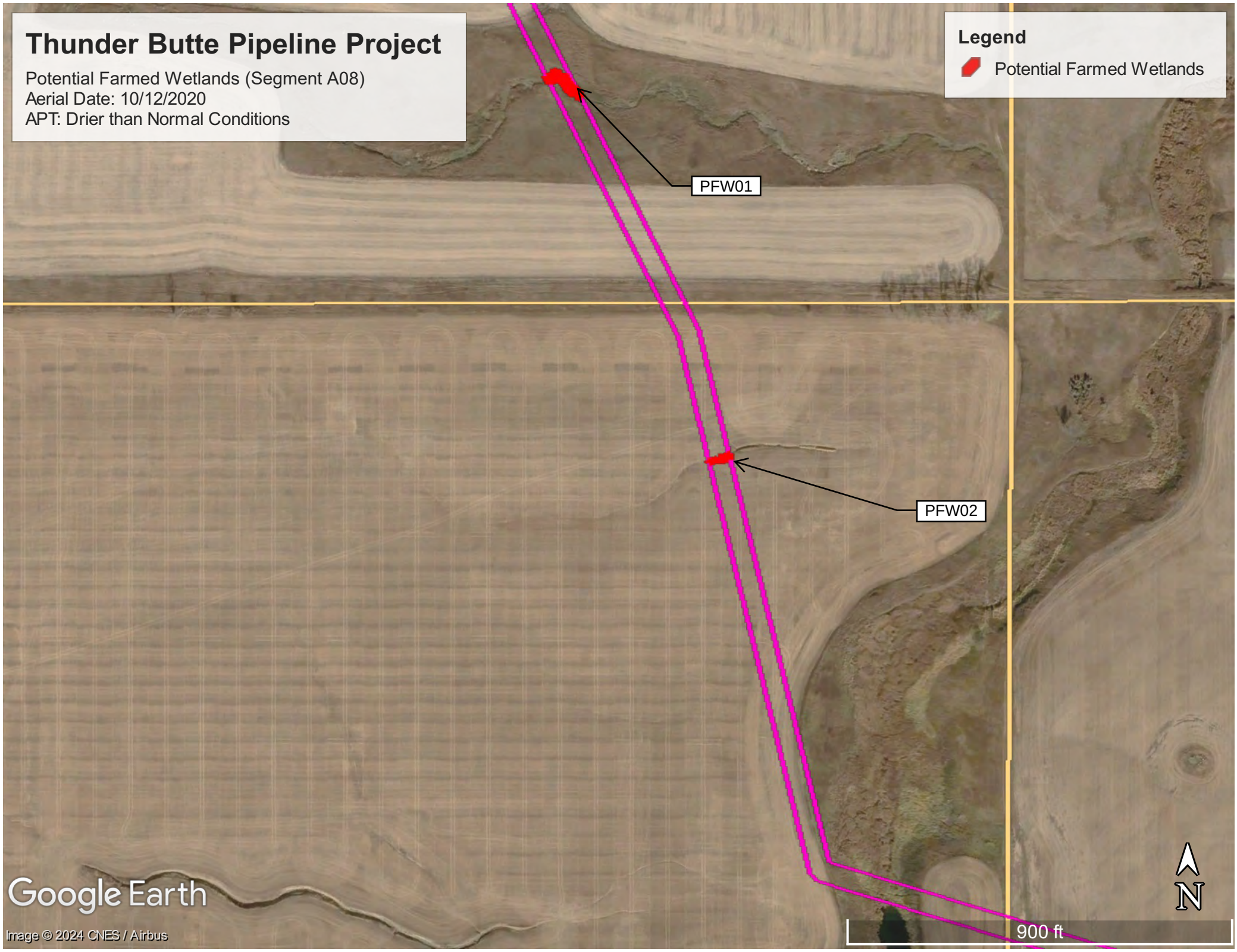
Historical Aerial Imagery (Segment A08)
Aerial Date: 12/31/2009
APT: Normal Conditions

Legend

2009 Wetness Signatures (December)




Thunder Butte Pipeline Project
Compiled Wetness Signatures (Segment A08)
Aerial Date: 10/12/2020
APT: Drier than Normal Conditions
Legend
1995 Wetness Signatures
2003 Wetness Signatures
2006 Wetness Signatures
2009 Wetness Signatures (December)
2009 Wetness Signatures (June)
Potential Farmed Wetlands
Google Earth
Image © 2024 CNES / Airbus
N
900 ft

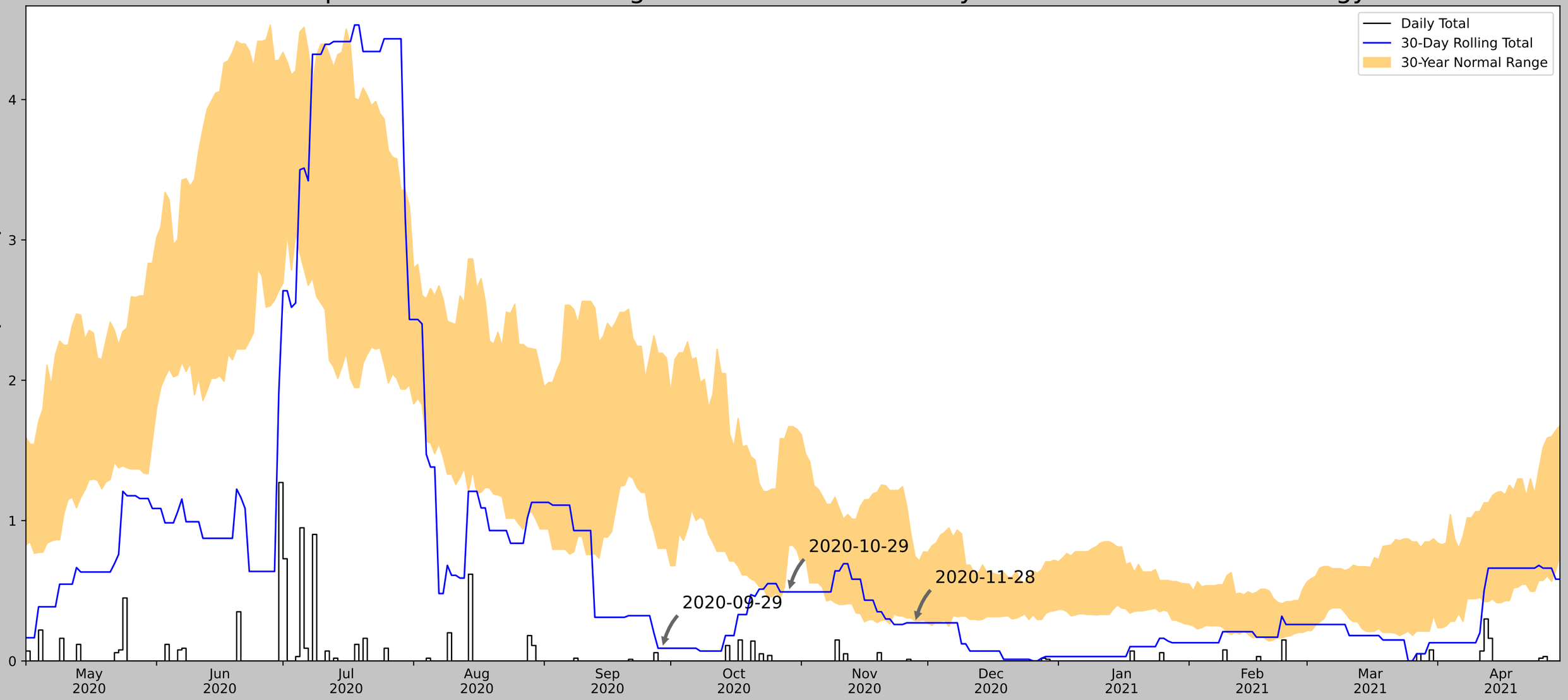

Thunder Butte Pipeline Project
Potential Farmed Wetlands (Segment A08)
Aerial Date: 10/12/2020
APT: Drier than Normal Conditions
Legend
Potential Farmed Wetlands
PFW01
PFW02
Google Earth
Image © 2024 CNES / Airbus
N
900 ft

Historic Antecedent Precipitation Summary: Segment A10

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
11/28/2020	-1.64	Mild drought	Wet Season	6	Drier than Normal
10/12/2020	-1.42	Mild drought	Dry Season	8	Drier than Normal
5/7/2016	-1.17	Mild drought	Dry Season	16	Wetter than Normal
8/19/2013	6.6	Extreme wetness	Dry Season	15	Wetter than Normal
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	10	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	18	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	11	Normal Conditions
7/27/1995	4.59	Extreme wetness	Dry Season	12	Normal Conditions

Notes:

* Aerial imagery reviewed the five of the most recent aerials exhibiting normal conditions.



Coordinates	48.182702, -102.180935
Observation Date	2020-11-28
Elevation (ft)	2193.974
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-11-28	0.285433	0.744488	0.271654	Dry	1	3	3
2020-10-29	0.82126	1.669291	0.492126	Dry	1	2	2
2020-09-29	0.802362	2.192913	0.090551	Dry	1	1	1
Result							Drier than Normal - 6

US Army Corps of Engineers

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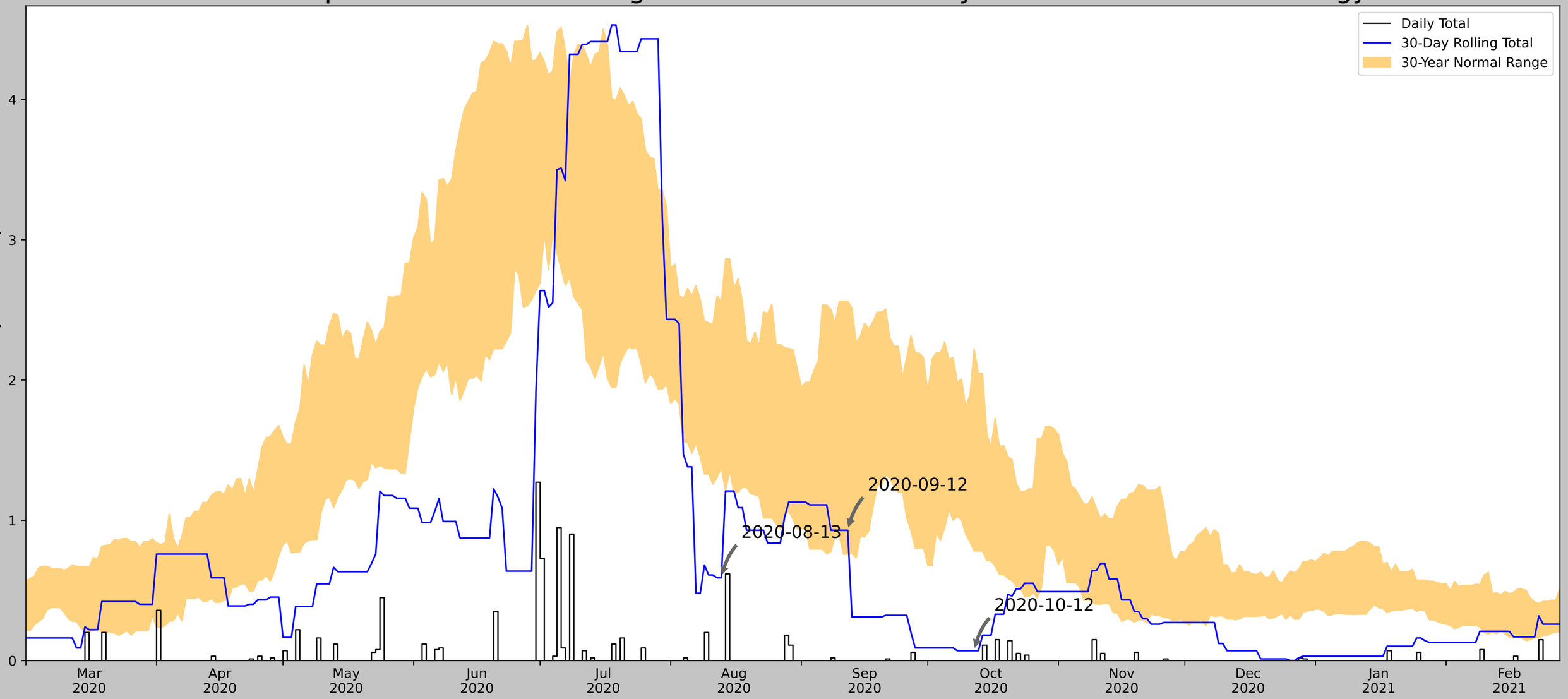
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	39.48	276.17	28.67	11014	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	59	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2020-10-12
Elevation (ft)	2193.974
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-10-12	0.781102	2.221654	0.070866	Dry	1	3	3
2020-09-12	0.759055	2.562205	0.929134	Normal	2	2	4
2020-08-13	1.373622	2.556693	0.590551	Dry	1	1	1
Result							Drier than Normal - 8

US Army Corps of Engineers

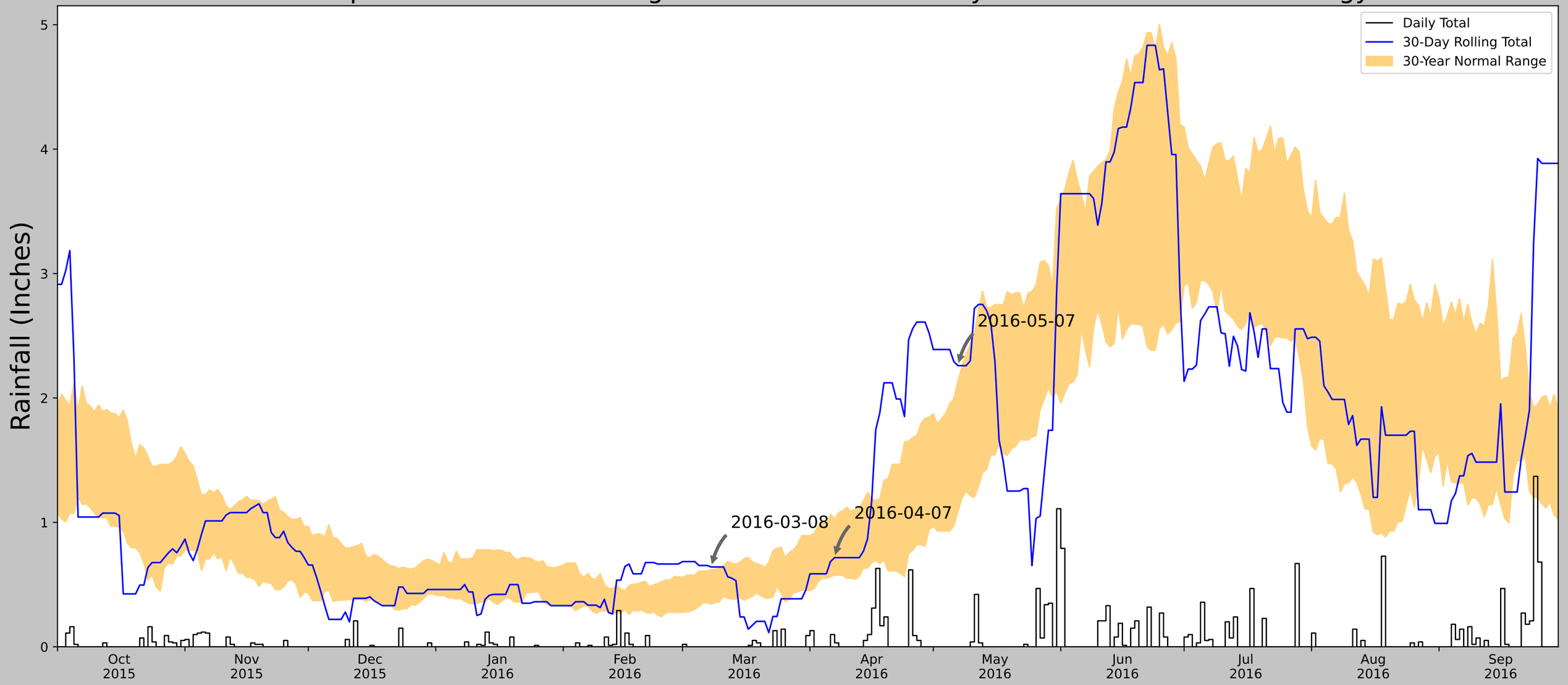
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
KEENE 3S	47.8967, -102.9208	2470.144	39.48	276.17	28.67	11014	90
TIOGA 1E	48.3989, -102.9181	2245.079	34.699	225.065	23.424	59	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	39.515	190.288	25.301	84	0
PLAZA	48.0267, -101.9625	2094.16	45.238	375.984	37.366	4	0
TAGUS	48.3475, -101.9325	2169.948	55.208	300.196	41.417	117	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	65.434	660.105	72.639	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2016-05-07
Elevation (ft)	2193.974
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-05-07	1.082283	2.14252	2.259843	Wet	3	3	9
2016-04-07	0.575197	1.02874	0.716535	Normal	2	2	4
2016-03-08	0.34252	0.620079	0.641732	Wet	3	1	3
Result							Wetter than Normal - 16

US Army Corps of Engineers

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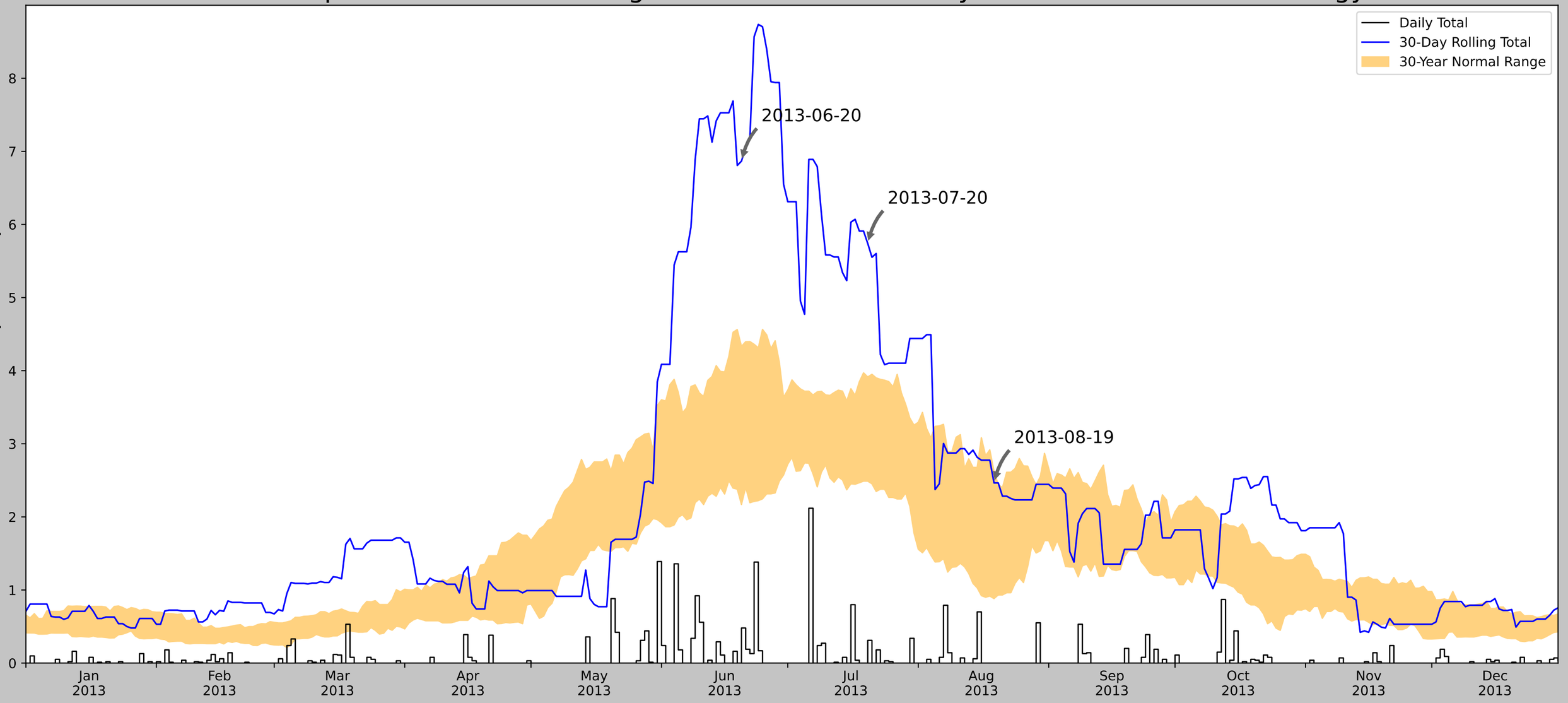
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	16.036	85.882	8.594	11064	90
STANLEY 1.0 SE	48.308, -102.3702	2236.877	3.867	42.979	1.906	2	0
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	52	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	37	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2013-08-19
Elevation (ft)	2193.974
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-08-19	0.882283	2.621654	2.464567	Normal	2	3	6
2013-07-20	2.488583	3.914173	5.740158	Wet	3	2	6
2013-06-20	2.168898	4.332677	6.866142	Wet	3	1	3
Result							Wetter than Normal - 15

US Army Corps of Engineers

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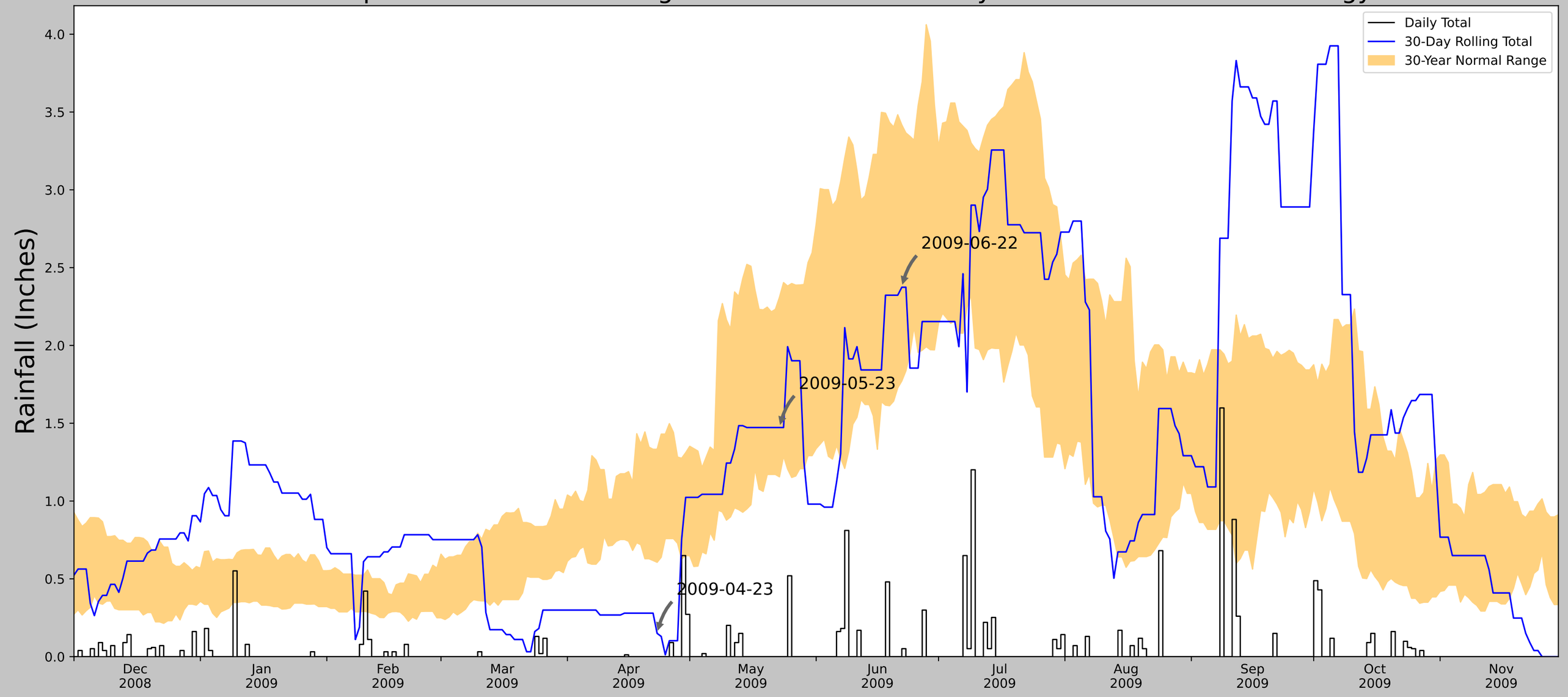
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	16.036	85.882	8.594	11068	90
POWERS LAKE 1N	48.5722, -102.6467	2205.053	18.374	74.803	9.643	53	0
TIOGA 1E	48.3989, -102.9181	2245.079	23.422	34.777	11.354	35	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	122	0
KENMARE 1 WSW	48.6692, -102.0975	1810.039	25.943	469.817	23.863	75	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2009-06-22
Elevation (ft)	2193.974
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	1.77126	3.417323	2.374016	Normal	2	3	6
2009-05-23	1.155512	2.309843	1.472441	Normal	2	2	4
2009-04-23	0.606299	1.332677	0.149606	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

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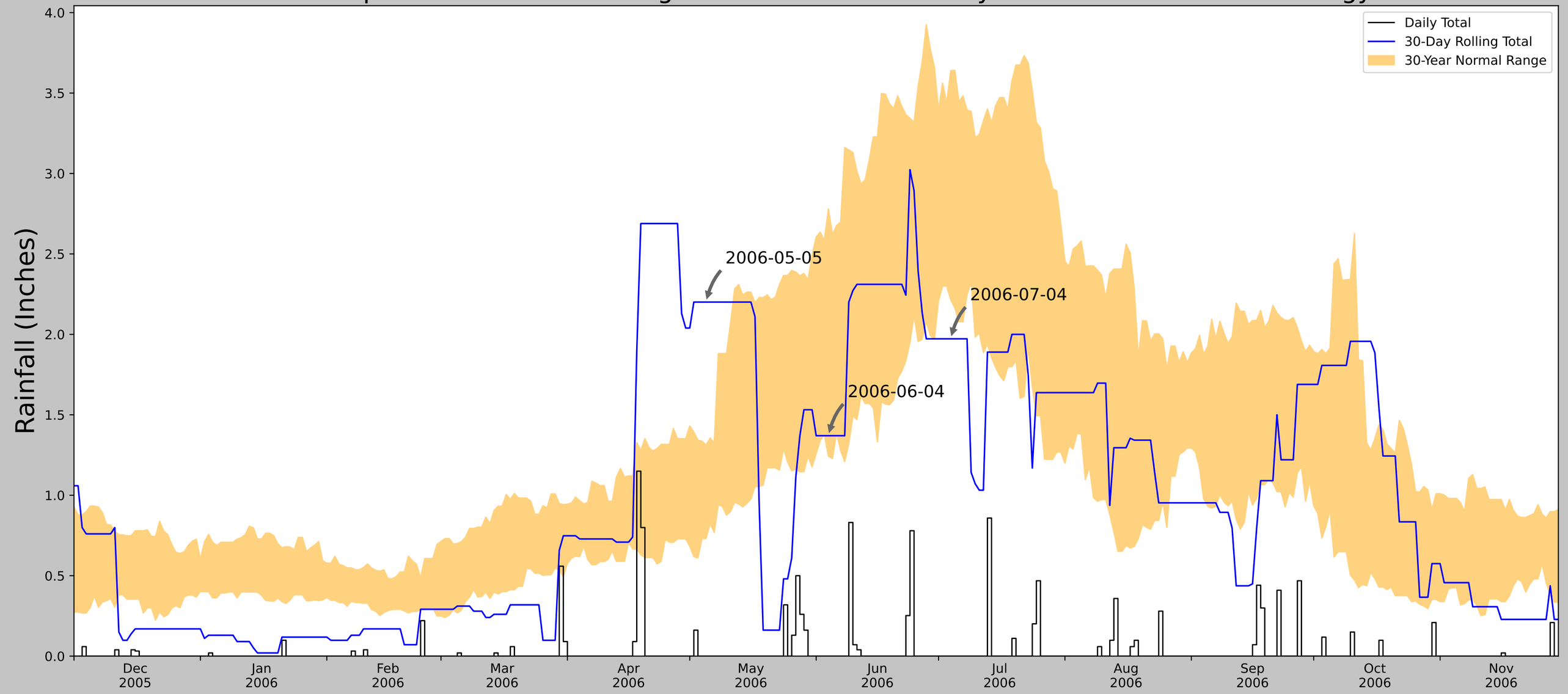
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.131	24.026	7.647	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2006-07-04
Elevation (ft)	2193.974
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.214173	3.63937	1.972441	Dry	1	3	3
2006-06-04	1.242126	2.780709	1.370079	Normal	2	2	4
2006-05-05	0.731496	1.311417	2.200787	Wet	3	1	3
Result							Normal Conditions - 10

US Army Corps of Engineers

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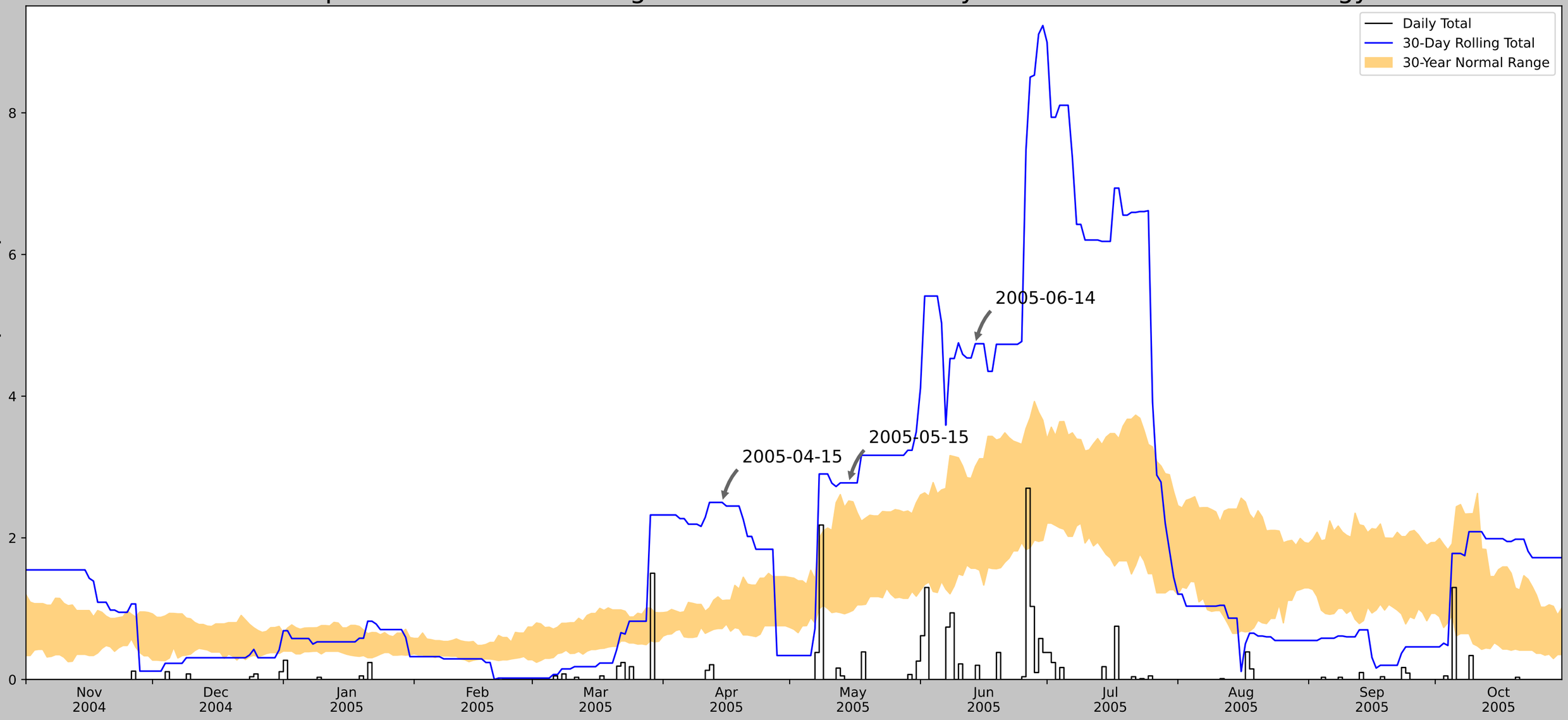
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.131	24.026	7.647	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	2005-06-14
Elevation (ft)	2193.974
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	1.570472	3.006693	4.740158	Wet	3	3	9
2005-05-15	0.949213	2.520866	2.775591	Wet	3	2	6
2005-04-15	0.719685	1.114173	2.5	Wet	3	1	3
Result							Wetter than Normal - 18

US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.131	24.026	7.647	11307	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	44	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.182702, -102.180935
Observation Date	2003-06-27
Elevation (ft)	2193.974
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	1.933858	3.695276	1.897638	Dry	1	3	3
2003-05-28	1.075197	2.364173	3.15748	Wet	3	2	6
2003-04-28	0.738189	1.451575	0.929134	Normal	2	1	2
Result							Normal Conditions - 11

US Army Corps of Engineers

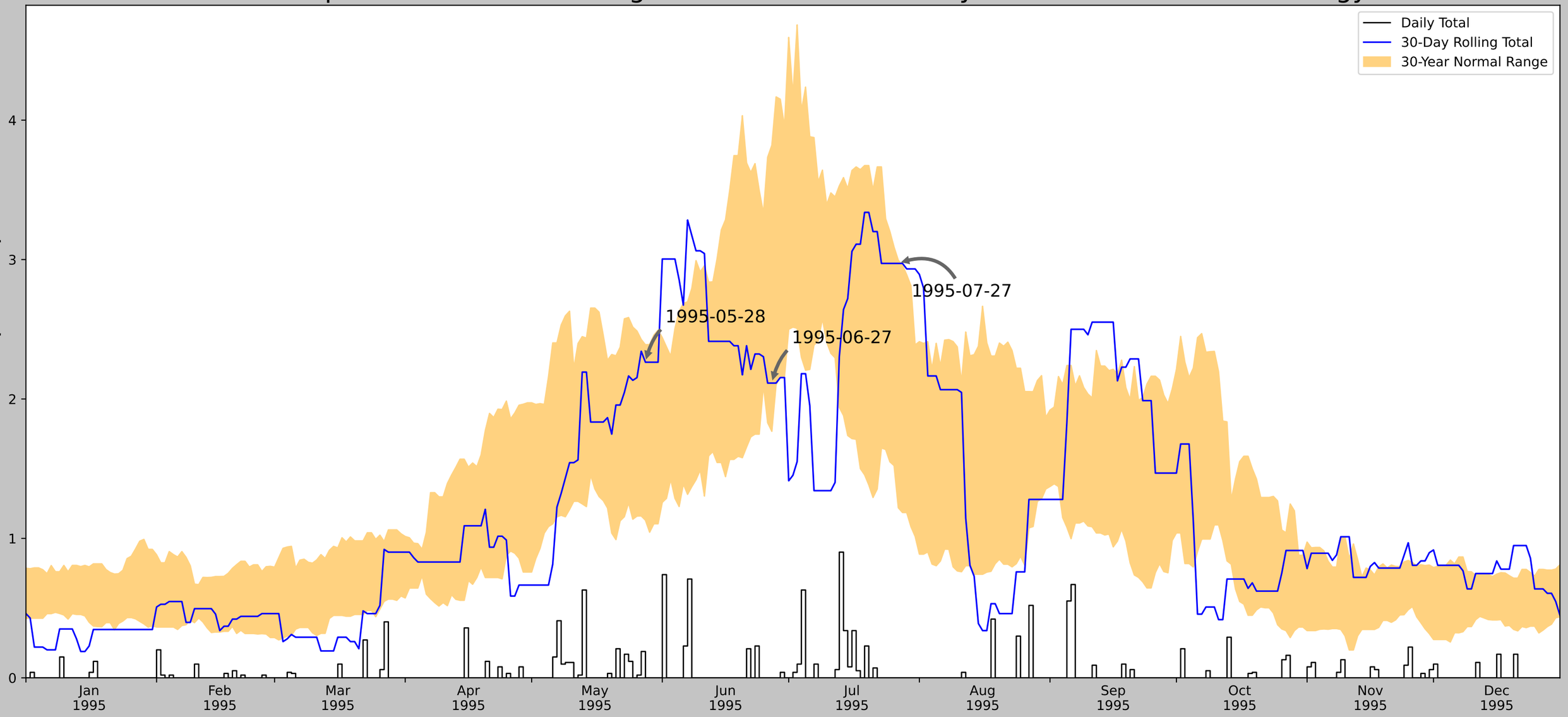
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.131	24.026	7.647	11310	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	43	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.182702, -102.180935
Observation Date	1995-07-27
Elevation (ft)	2193.974
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1995-07-27	1.219685	2.995276	2.972441	Normal	2	3	6
1995-06-27	1.767717	3.820473	2.114173	Normal	2	2	4
1995-05-28	1.130315	2.388583	2.26378	Normal	2	1	2
Result							Normal Conditions - 12

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

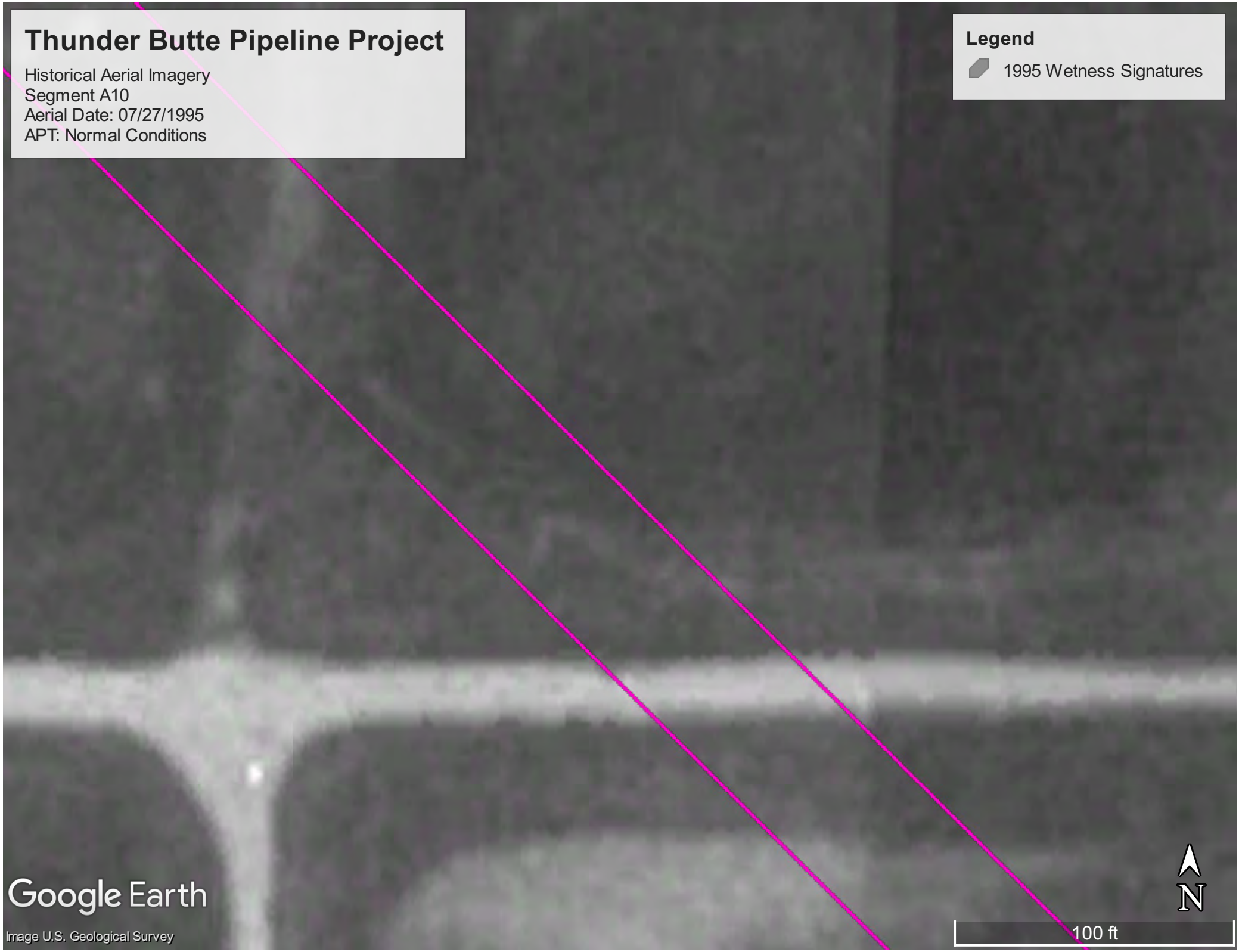
Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	16.131	24.026	7.647	11309	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	44	0

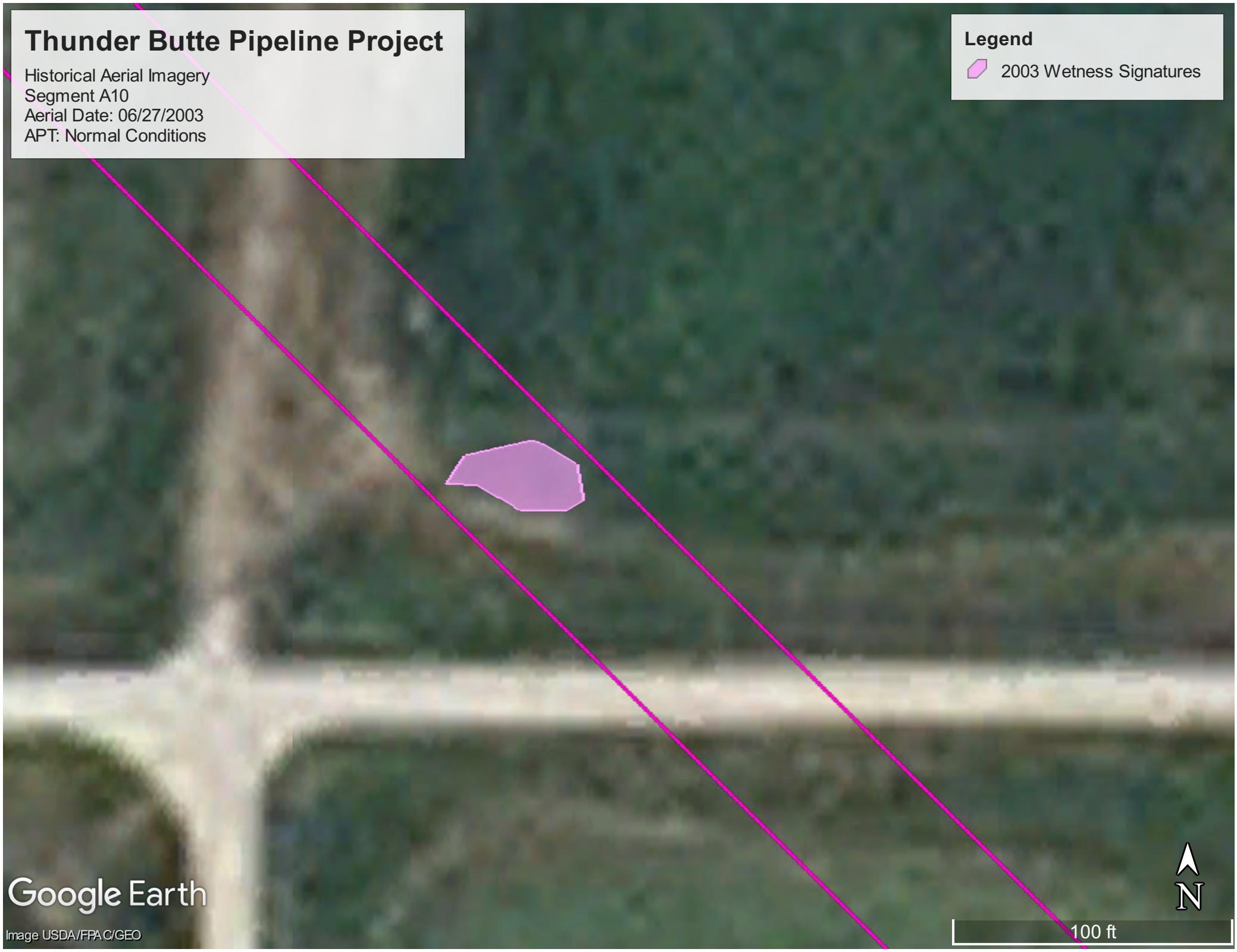
Farmed Wetland Determination - Aerial Slide Review

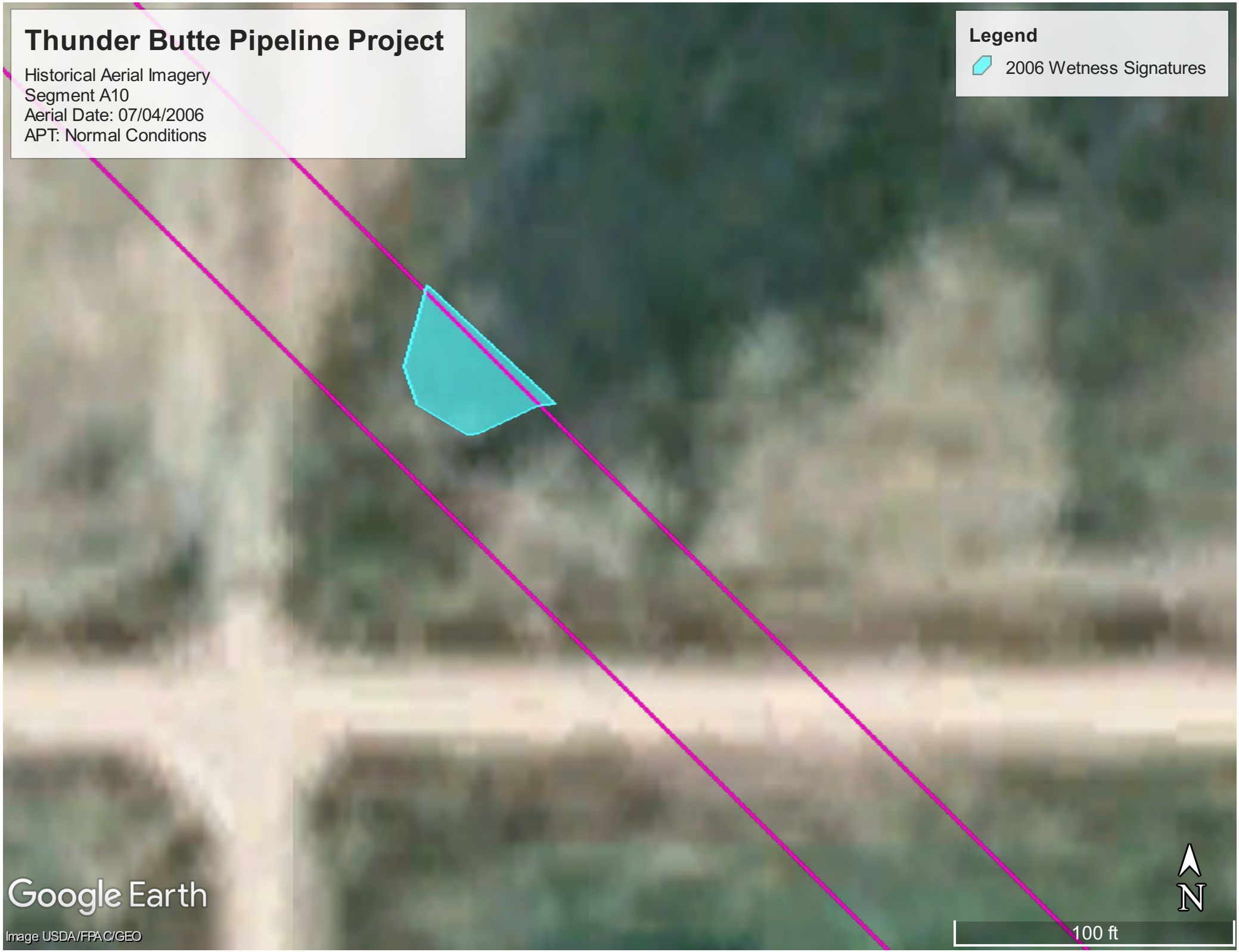
Project Name: Thunder Butte Pipeline Project: Segment A10
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation
			PFW01
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009-PFW01
7/4/2006	Google Earth Pro, 2024	Normal Conditions	-
6/27/2003	Google Earth Pro, 2024	Normal Conditions	2006-PFW01
7/27/1995	Google Earth Pro, 2024	Normal Conditions	-
Summary Table			PFW01
Number of Normal Years			4
Number of Normal Years with Wet Signatures			2
Percent of Normal Years with Wet Signatures			50%
Hydric Soils present?			C132B[1]
Farmed wetland present?			Potential Farmed Wetland Present: **WA109FW01**

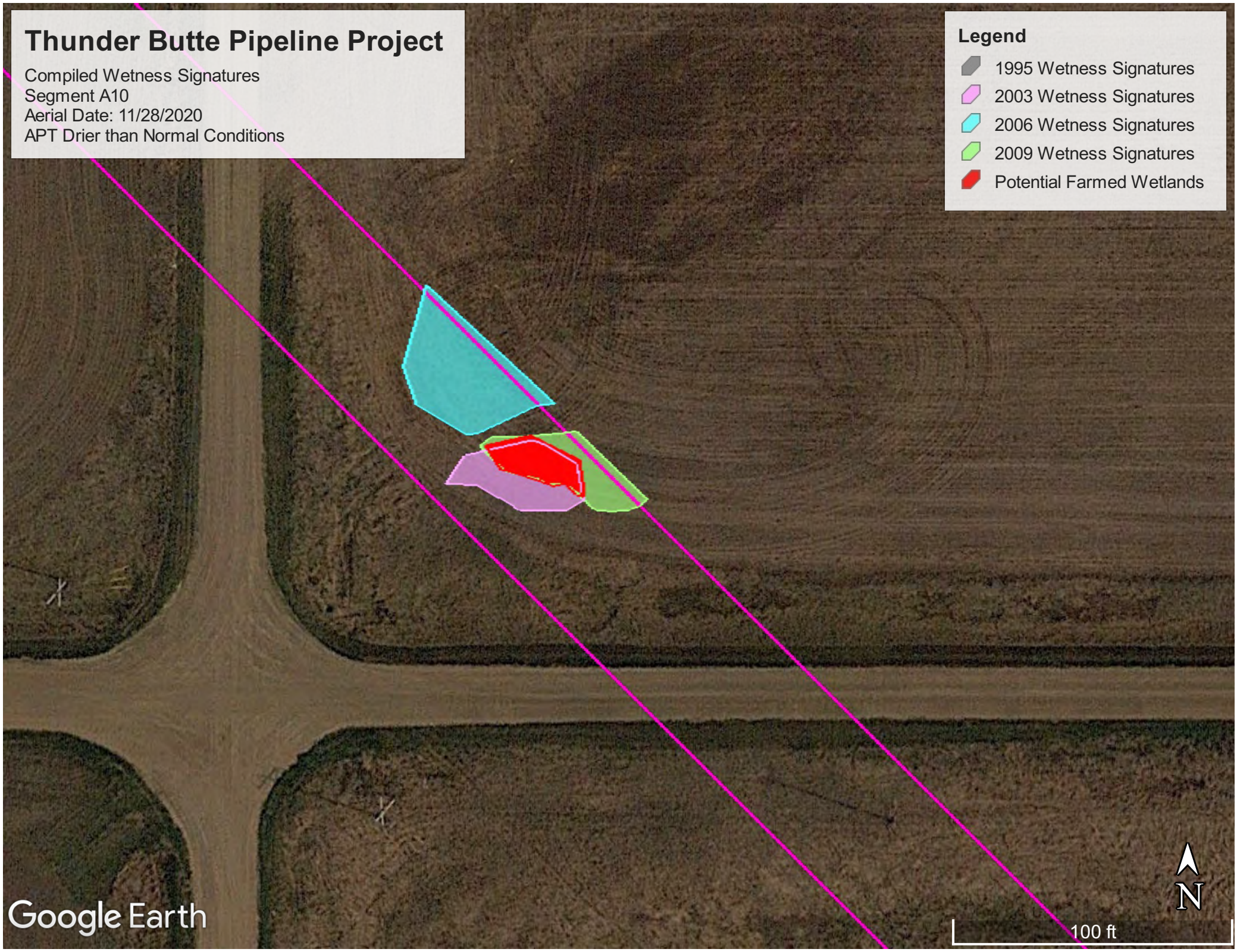
[1] - Soil map unit is classified as predominantly non-hydric.

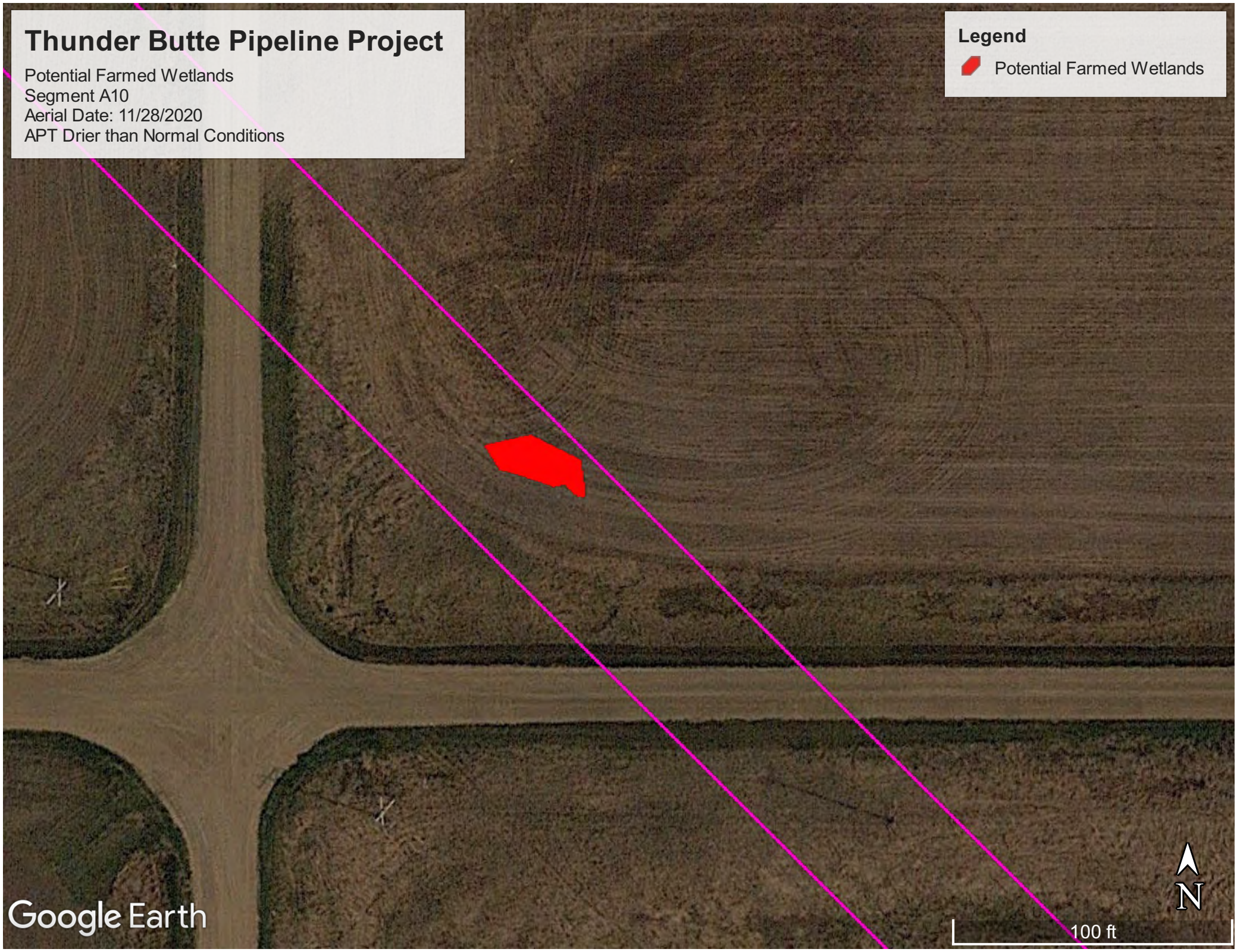

Thunder Butte Pipeline Project
Historical Aerial Imagery
Segment A10
Aerial Date: 07/27/1995
APT: Normal Conditions
Legend
1995 Wetness Signatures
Google Earth
Image U.S. Geological Survey
N
100 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery
Segment A10
Aerial Date: 06/27/2003
APT: Normal Conditions
Legend
2003 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
100 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery
Segment A10
Aerial Date: 07/04/2006
APT: Normal Conditions
Legend
2006 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
100 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery
Segment A10
Aerial Date: 06/22/2009
APT: Normal Conditions
Legend
2009 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
100 ft


Thunder Butte Pipeline Project
Compiled Wetness Signatures
Segment A10
Aerial Date: 11/28/2020
APT Drier than Normal Conditions
Legend
1995 Wetness Signatures
2003 Wetness Signatures
2006 Wetness Signatures
2009 Wetness Signatures
Potential Farmed Wetlands
Google Earth
N
100 ft


Thunder Butte Pipeline Project
Potential Farmed Wetlands
Segment A10
Aerial Date: 11/28/2020
APT Drier than Normal Conditions
Legend
Potential Farmed Wetlands
Google Earth
N
100 ft

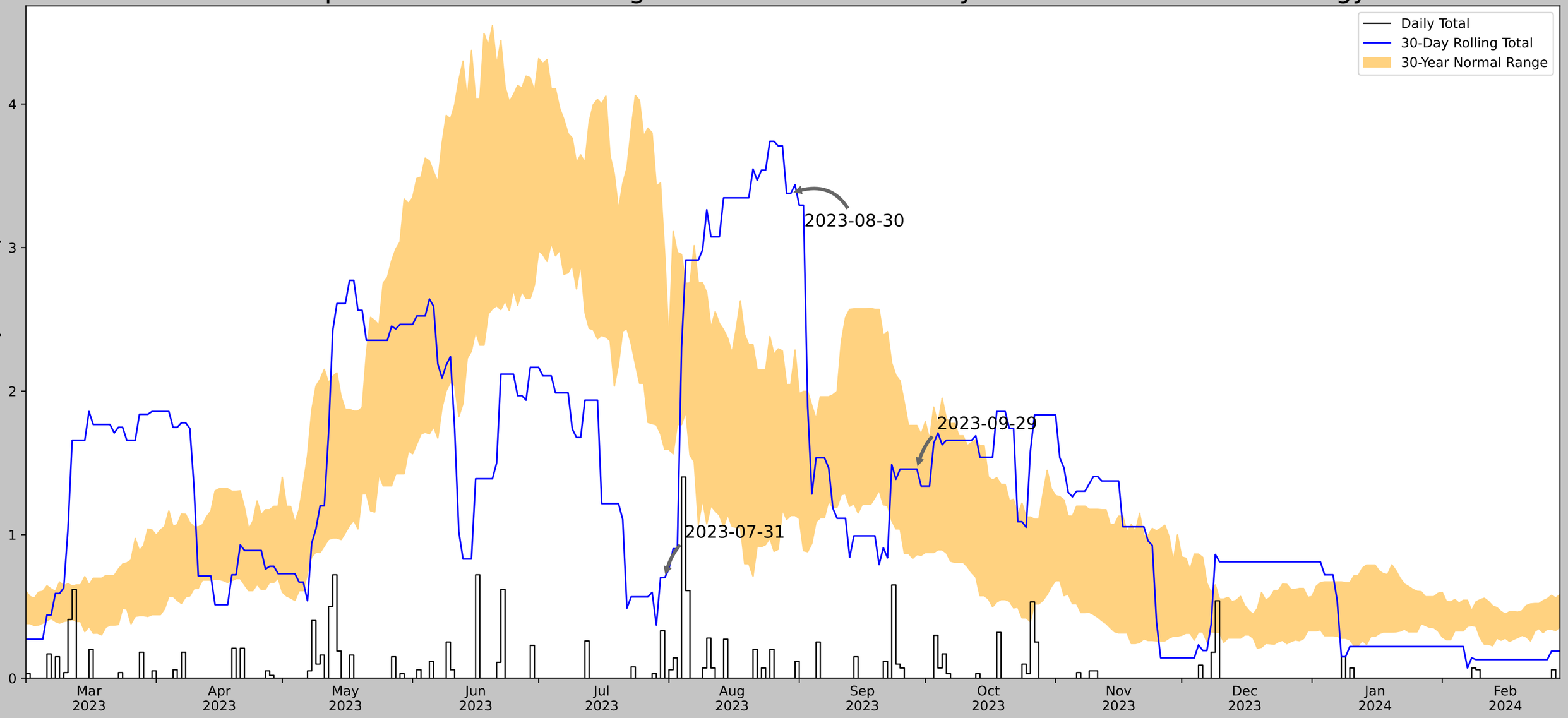
Historic Antecedent Precipitation Summary: Segment A16

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
9/29/2023	-2.53	Moderate drought	Dry Season	13	Normal Conditions
10/18/2019	4.55	Extreme wetness	Dry Season	18	Wetter than Normal
8/1/2016	-2.41	Moderate drought	Dry Season	10	Normal Conditions
9/23/2013	6.78	Extreme wetness	Dry Season	13	Normal Conditions
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	10	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	16	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	11	Normal Conditions
9/1/1995	3.86	Severe wetness	Dry Season	13	Normal Conditions

Notes:

* Aerial imagery reviewed the five of the most recent aerials exhibiting normal conditions.

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2023-09-29
Elevation (ft)	2094.482
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-09-29	0.861417	1.76063	1.456693	Normal	2	3	6
2023-08-30	1.133858	2.046063	3.377953	Wet	3	2	6
2023-07-31	1.593307	2.957874	0.700787	Dry	1	1	1
Result							Normal Conditions - 13

US Army Corps of Engineers

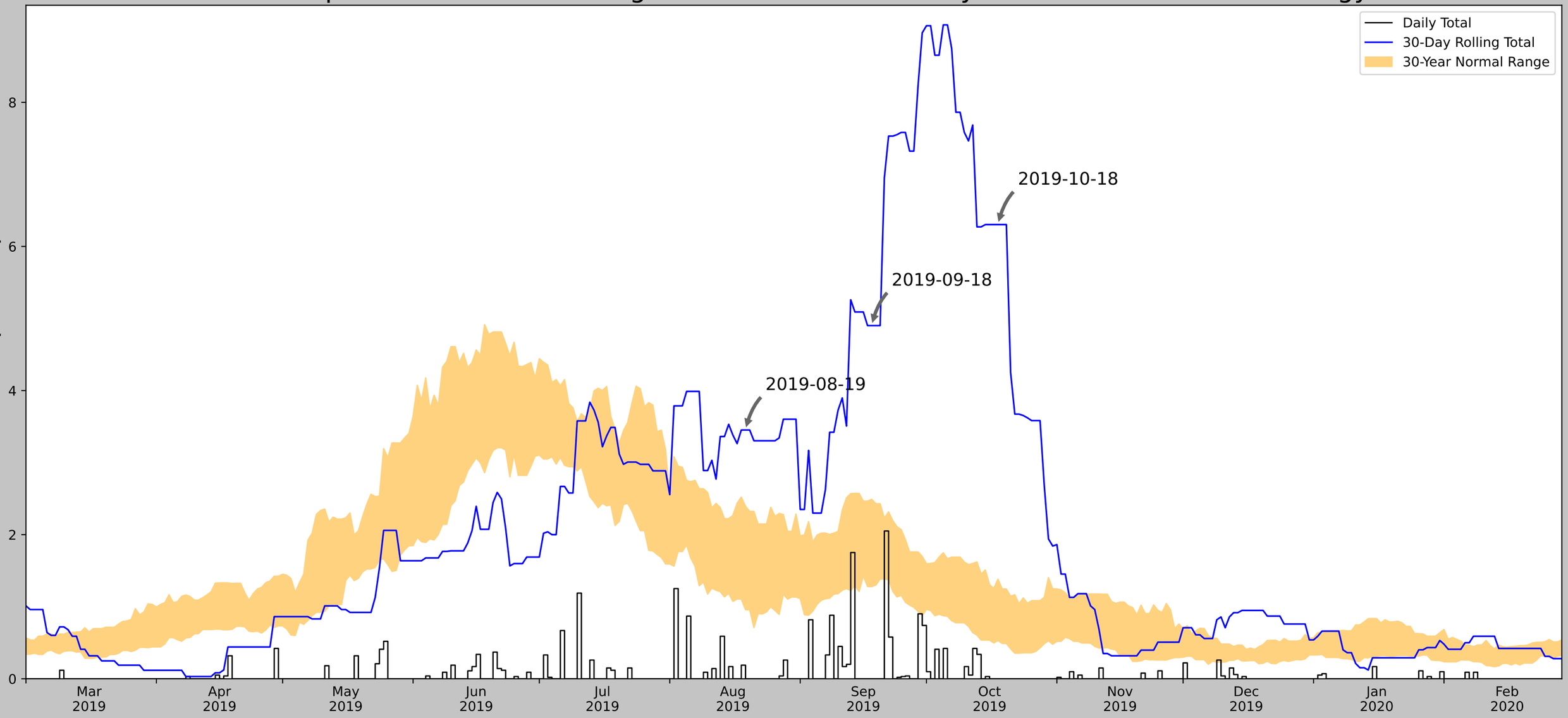
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	36.475	15.426	16.976	11320	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	24	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2019-10-18
Elevation (ft)	2094.482
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2019-10-18	0.531102	1.382677	6.30315	Wet	3	3	9
2019-09-18	1.279134	2.490551	4.901575	Wet	3	2	6
2019-08-19	0.95748	2.394882	3.452756	Wet	3	1	3
Result							Wetter than Normal - 18

US Army Corps of Engineers

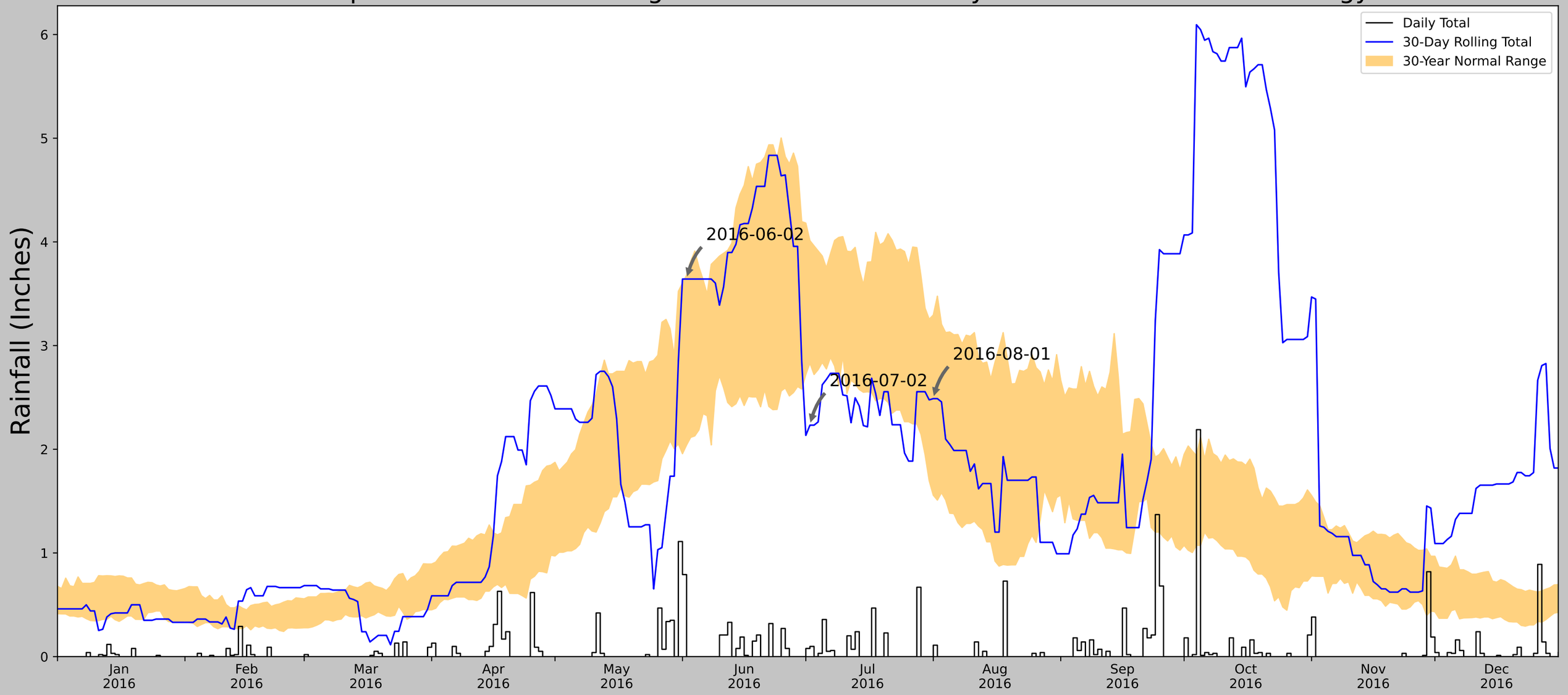
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	36.475	15.426	16.976	11319	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	24	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2016-08-01
Elevation (ft)	2094.482
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-08-01	1.556693	3.294095	2.488189	Normal	2	3	6
2016-07-02	2.831496	4.011811	2.232284	Dry	1	2	2
2016-06-02	2.041339	3.677953	3.641732	Normal	2	1	2
Result							Normal Conditions - 10

US Army Corps of Engineers

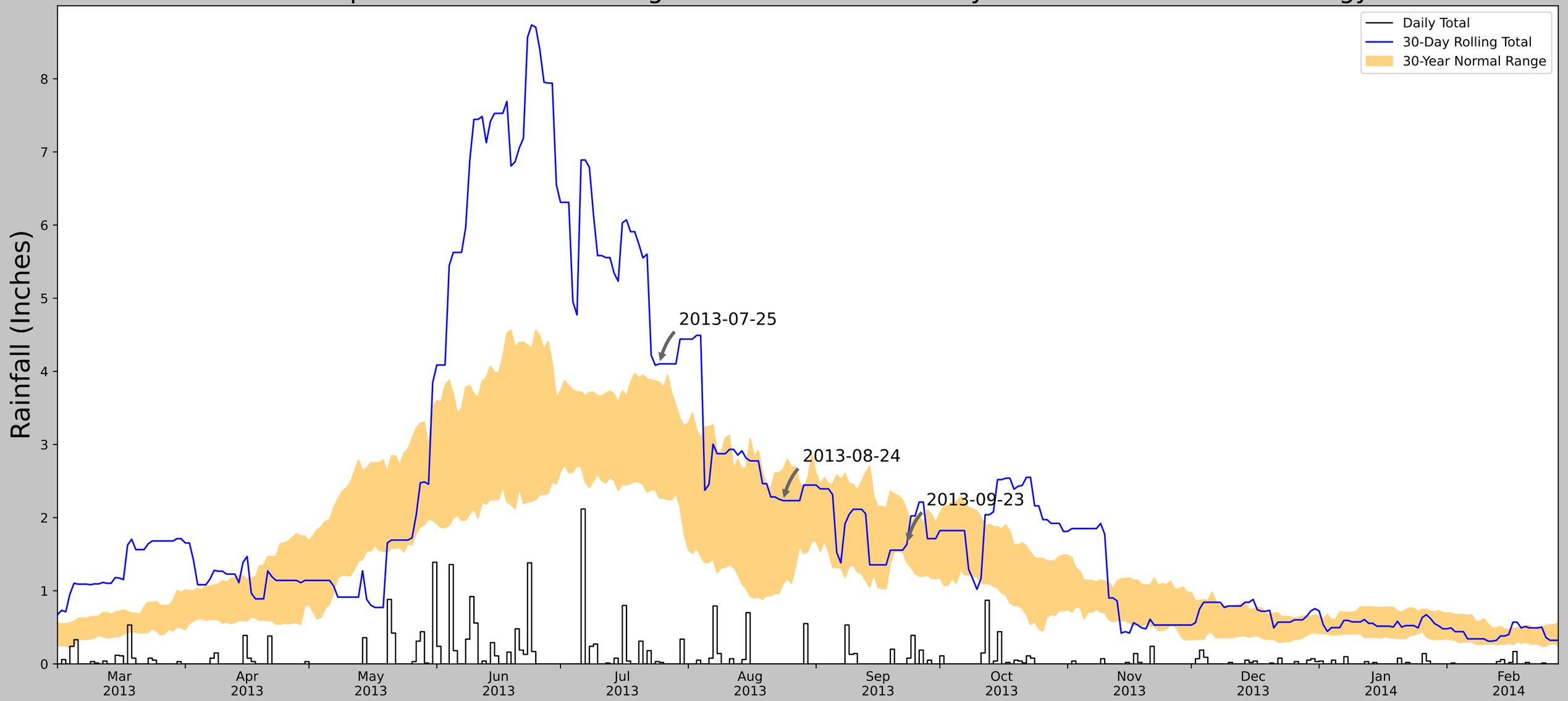
Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

ERDC

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	28.041	185.374	17.816	11064	90
STANLEY 1.0 SE	48.308, -102.3702	2236.877	3.867	42.979	1.906	2	0
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	204	0
MAX	47.8214, -101.2922	2109.908	63.54	169.948	39.391	82	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2013-09-23
Elevation (ft)	2094.482
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-09-23	1.386221	2.105512	1.633858	Normal	2	3	6
2013-08-24	1.090551	2.661024	2.232284	Normal	2	2	4
2013-07-25	2.266142	3.850394	4.102362	Wet	3	1	3
Result							Normal Conditions - 13

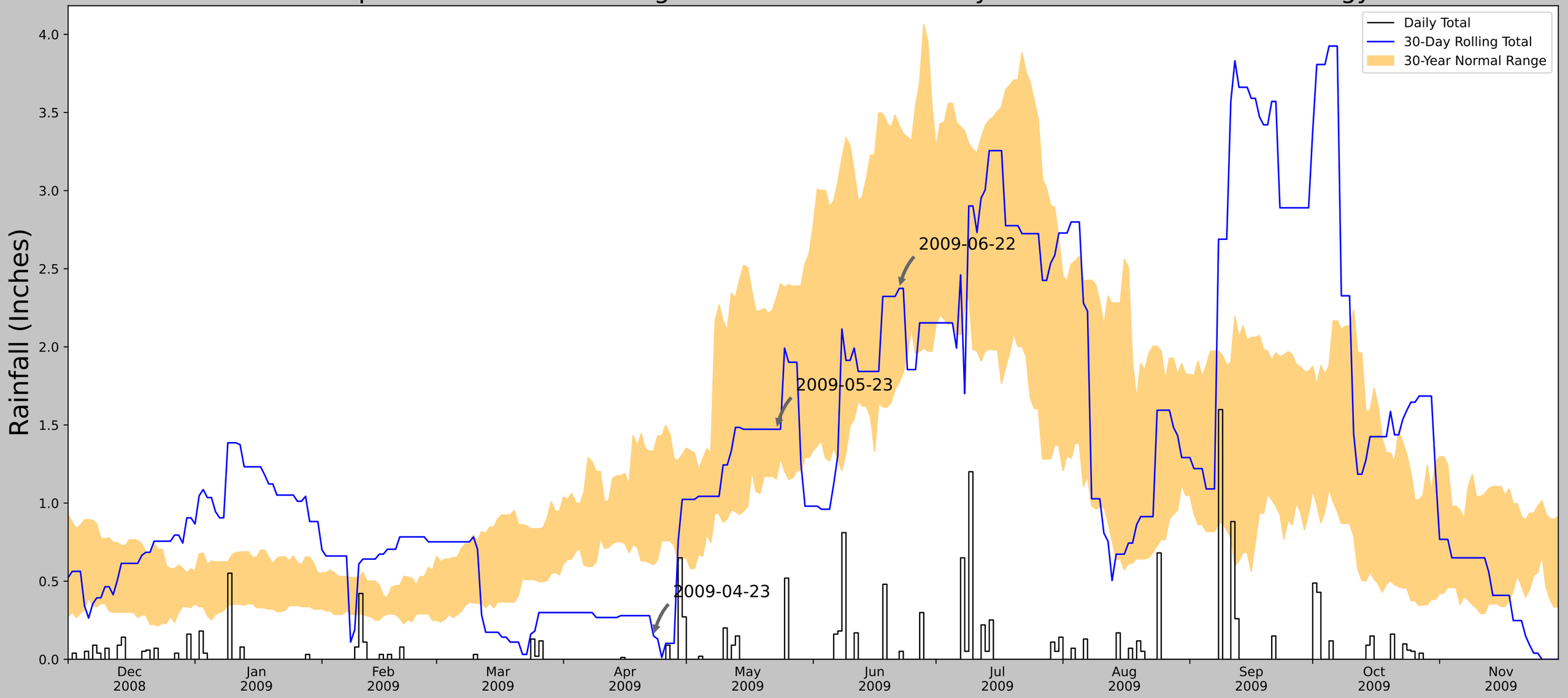
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STANLEY 3 NNW	48.3567, -102.4117	2279.856	28.041	185.374	17.816	11068	90
TAGUS	48.3475, -101.9325	2169.948	22.012	109.908	12.325	205	0
MAX	47.8214, -101.2922	2109.908	63.54	169.948	39.391	80	0



Coordinates	48.061217, -101.994237
Observation Date	2009-06-22
Elevation (ft)	2094.482
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	1.77126	3.417323	2.374016	Normal	2	3	6
2009-05-23	1.155512	2.309843	1.472441	Normal	2	2	4
2009-04-23	0.606299	1.332677	0.149606	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

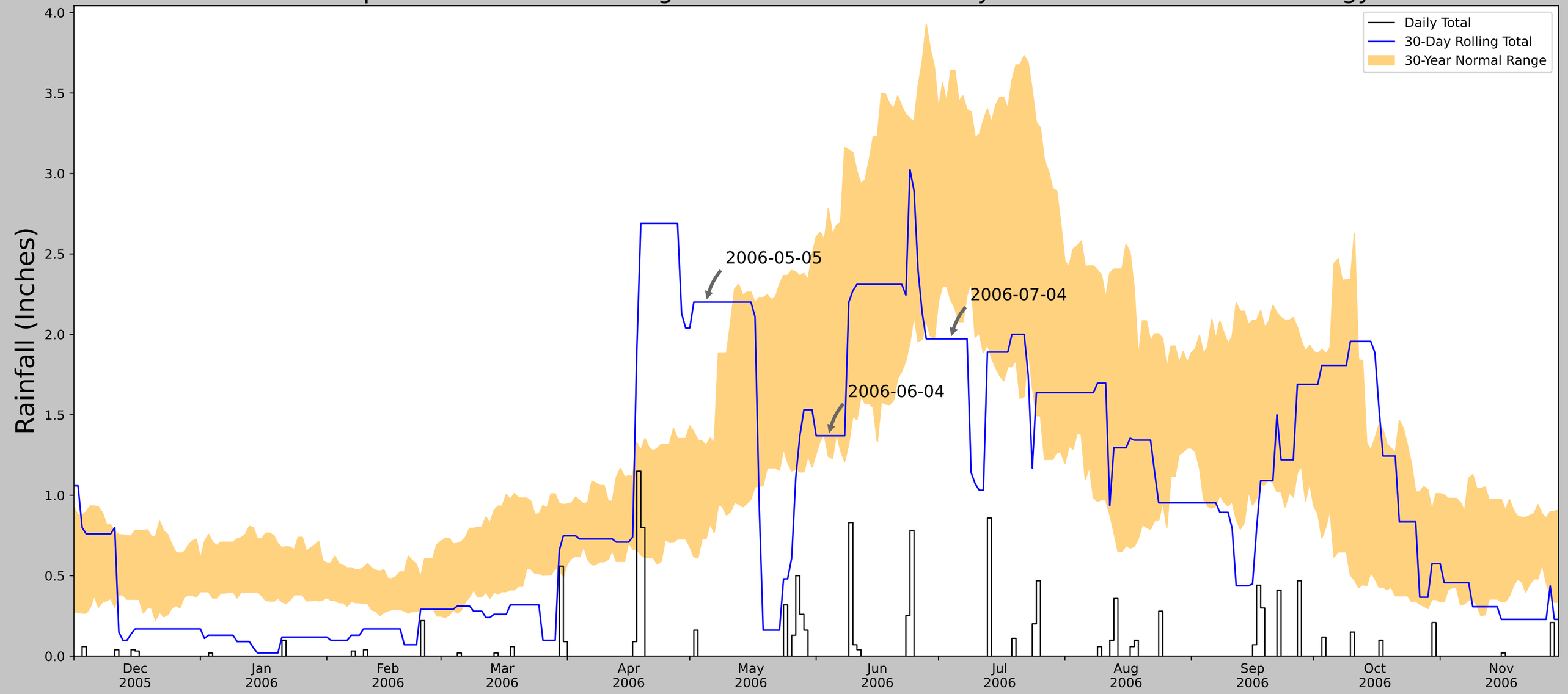
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	19.984	75.466	10.501	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2006-07-04
Elevation (ft)	2094.482
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.214173	3.63937	1.972441	Dry	1	3	3
2006-06-04	1.242126	2.780709	1.370079	Normal	2	2	4
2006-05-05	0.731496	1.311417	2.200787	Wet	3	1	3
Result							Normal Conditions - 10

US Army Corps of Engineers

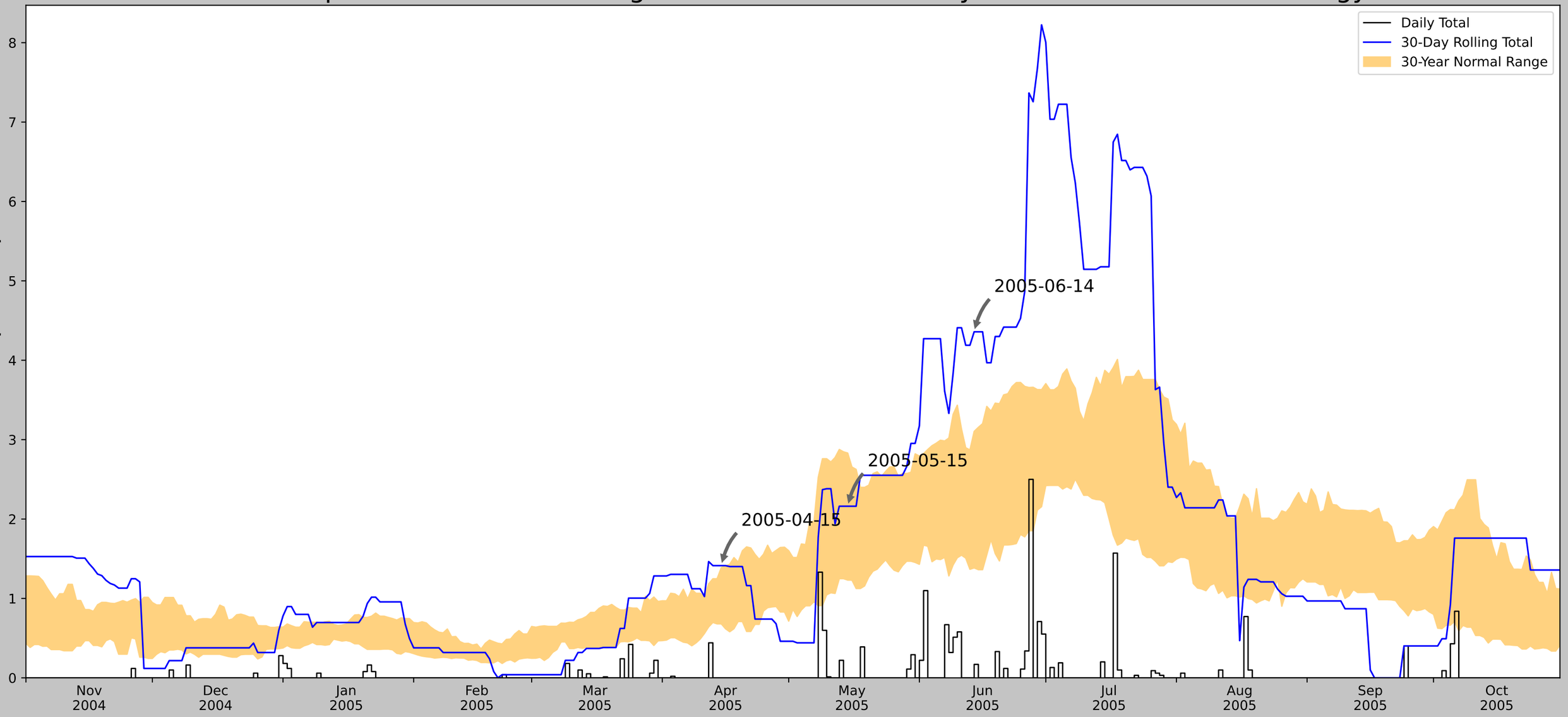
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	19.984	75.466	10.501	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.061217, -101.994237
Observation Date	2005-06-14
Elevation (ft)	2094.482
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	1.384646	3.103937	4.358268	Wet	3	3	9
2005-05-15	1.231102	2.831496	2.161417	Normal	2	2	4
2005-04-15	0.679528	1.388583	1.413386	Wet	3	1	3
Result							Wetter than Normal - 16

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BERTHOLD	48.3139, -101.7328	2080.053	21.209	14.429	9.85	10599	84
TAGUS	48.3475, -101.9325	2169.948	9.462	89.895	5.108	752	6
STANLEY 3 NNW	48.3567, -102.4117	2279.856	31.323	199.803	20.354	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.061217, -101.994237
Observation Date	2003-06-27
Elevation (ft)	2094.482
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	1.933858	3.695276	1.897638	Dry	1	3	3
2003-05-28	1.075197	2.364173	3.15748	Wet	3	2	6
2003-04-28	0.738189	1.451575	0.929134	Normal	2	1	2
Result							Normal Conditions - 11

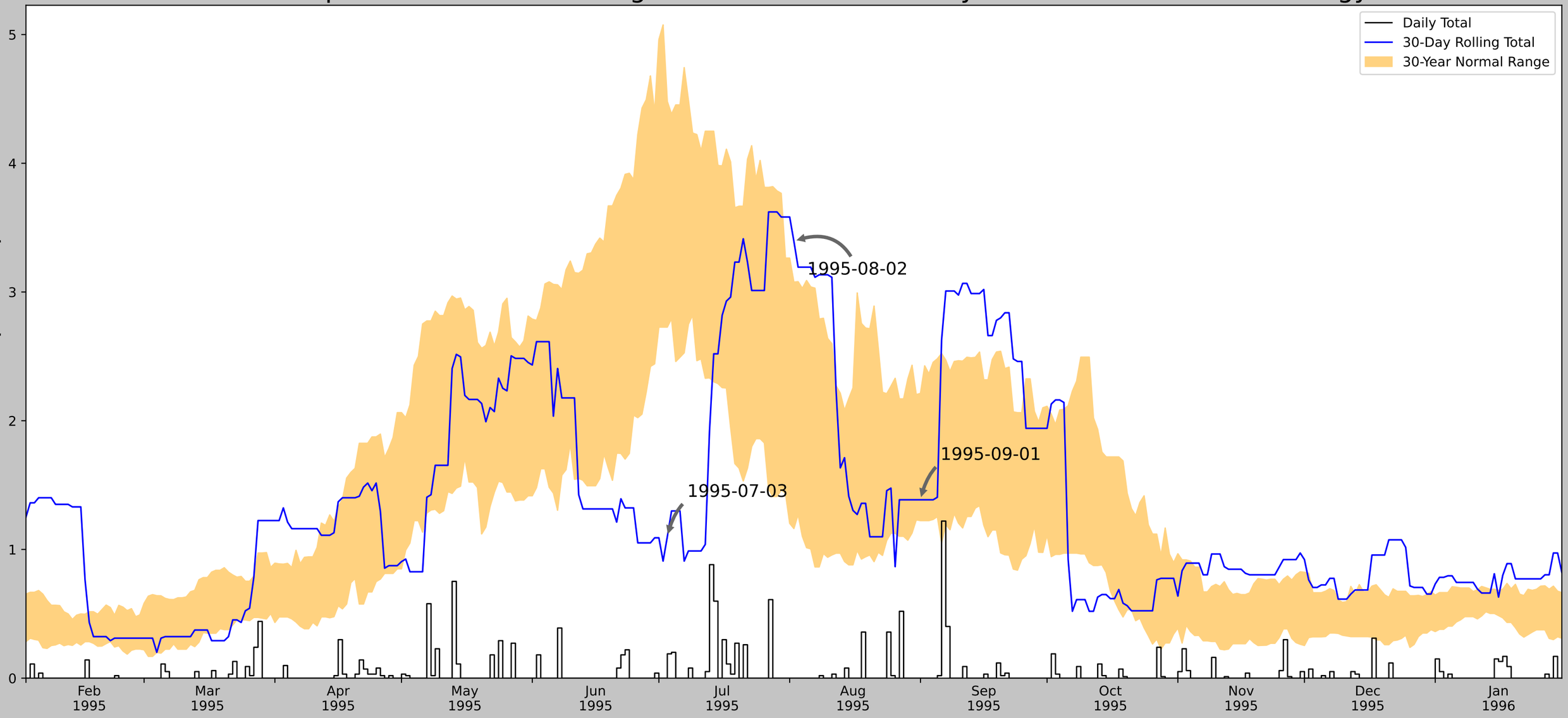
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	19.984	75.466	10.501	11310	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	43	0



Coordinates	48.061217, -101.994237
Observation Date	1995-09-01
Elevation (ft)	2094.482
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1995-09-01	1.224016	2.212598	1.385827	Normal	2	3	6
1995-08-02	1.162205	3.076772	3.393701	Wet	3	2	6
1995-07-03	2.727165	4.481103	1.098425	Dry	1	1	1
Result							Normal Conditions - 13

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BERTHOLD	48.3139, -101.7328	2080.053	21.209	14.429	9.85	10952	90
TAGUS	48.3475, -101.9325	2169.948	9.462	89.895	5.108	401	0

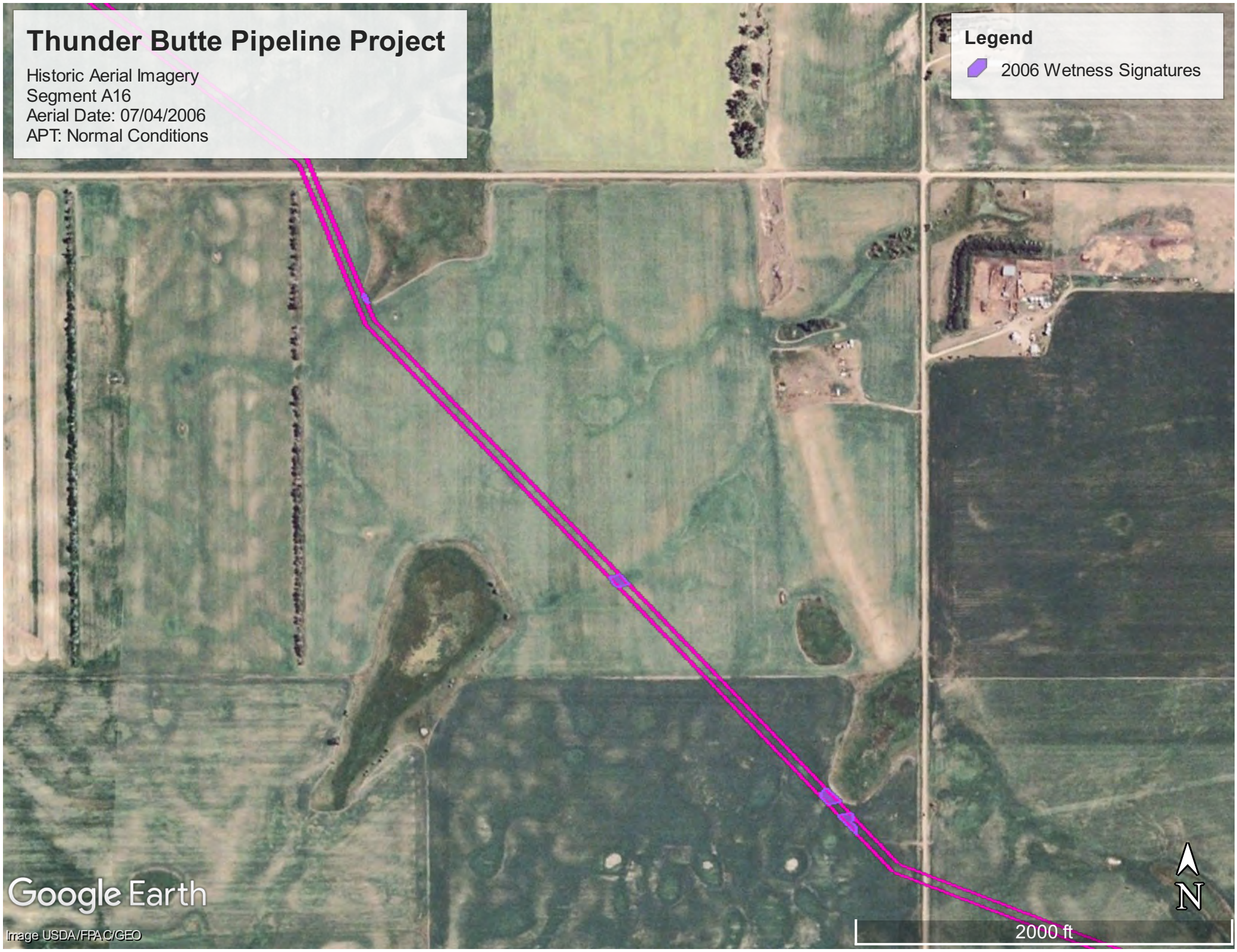
Farmed Wetland Determination - Aerial Slide Review

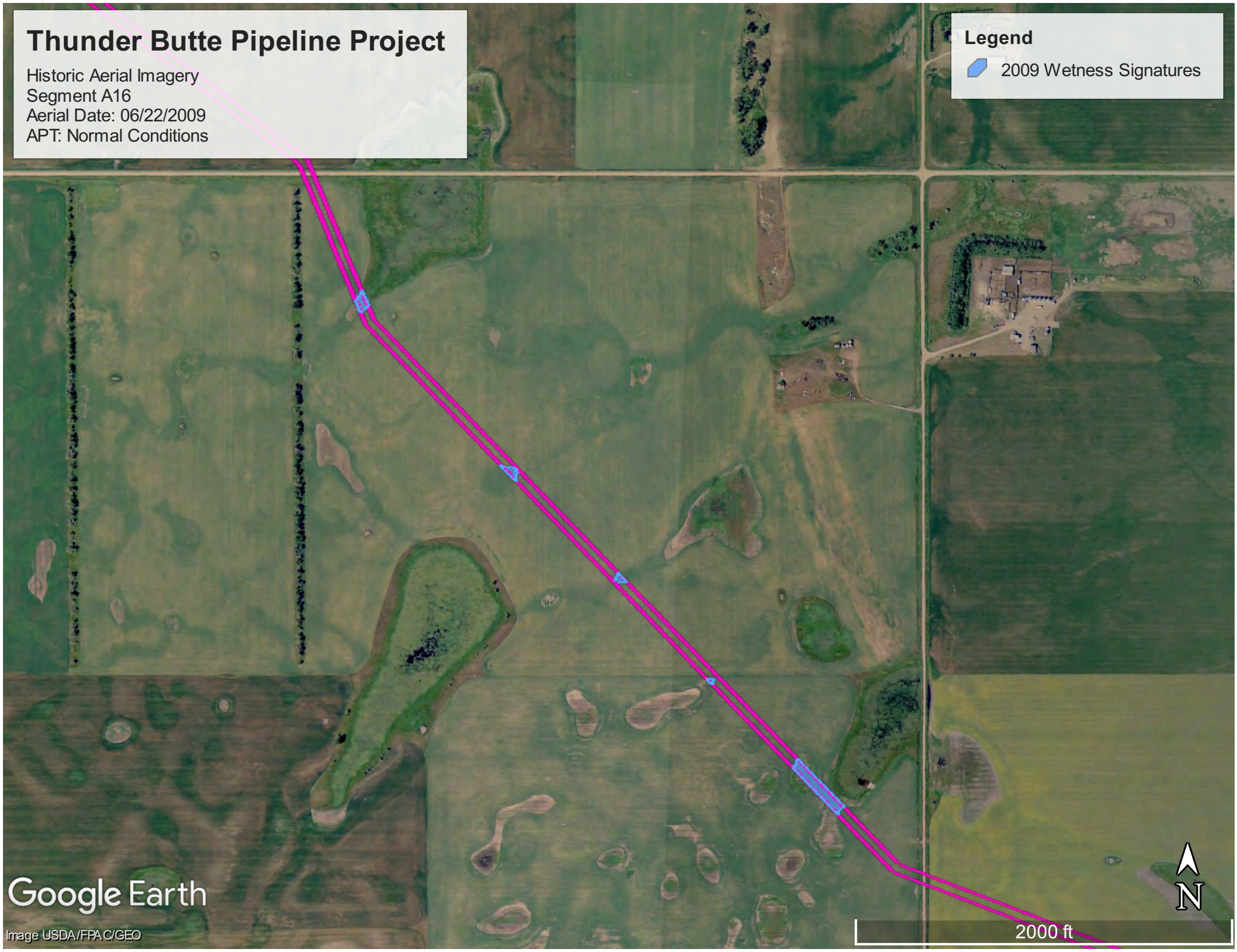
Project Name: Thunder Butte Pipeline Project: Segment A16
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

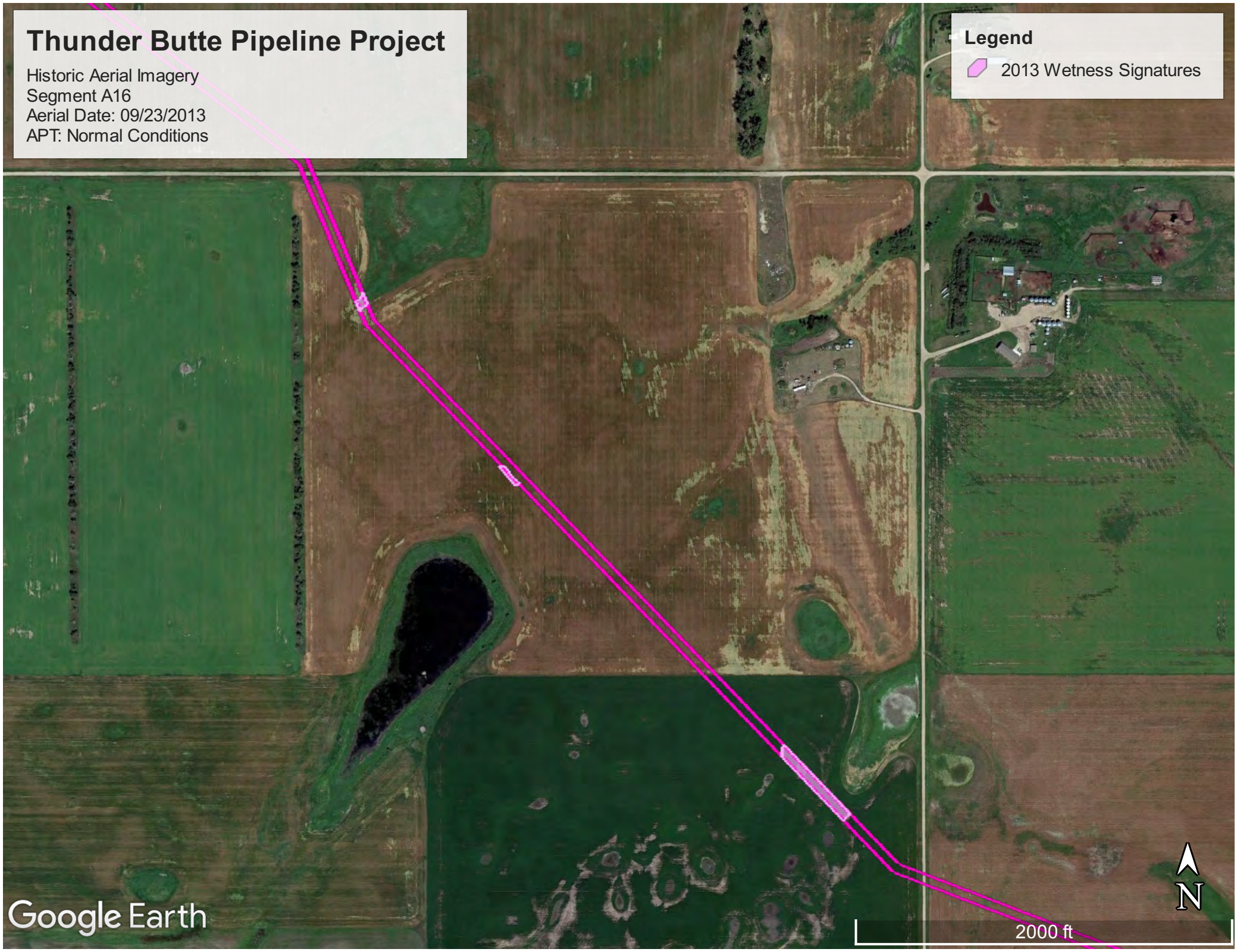
Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation	
			PFW01	PFW02
9/29/2023	Google Earth Pro, 2024	Normal Conditions	2023-PFW01	2023-PFW02
8/1/2016	Google Earth Pro, 2024	Normal Conditions	2016-PFW01	2020-PFW02
9/23/2013	Google Earth Pro, 2024	Normal Conditions	2013-PFW01	2016-PFW02
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009-PFW01	2013-PFW01
7/4/2006	Google Earth Pro, 2024	Normal Conditions	2006-PFW01	2009-PFW02
Summary Table			**PFW01**	**PFW02**
Number of Normal Years			5	5
Number of Normal Years with Wet Signatures			5	5
Percent of Normal Years with Wet Signatures			100%	100%
Hydric Soils present?			C272A[1]	C205A
Farmed wetland present?			Wetland Present: **WA16FW01**	Wetland Present: **WA16FW02**

[1] - Soil map unit is classified as partially hydric.

[2] - Soil map unit is classified as predominantly non-hydric.


Thunder Butte Pipeline Project
Historic Aerial Imagery
Segment A16
Aerial Date: 07/04/2006
APT: Normal Conditions
Legend
2006 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
2000 ft


Thunder Butte Pipeline Project
Historic Aerial Imagery
Segment A16
Aerial Date: 06/22/2009
APT: Normal Conditions
Legend
2009 Wetness Signatures
Google Earth
Image USDA/FPAC/GEO
N
2000 ft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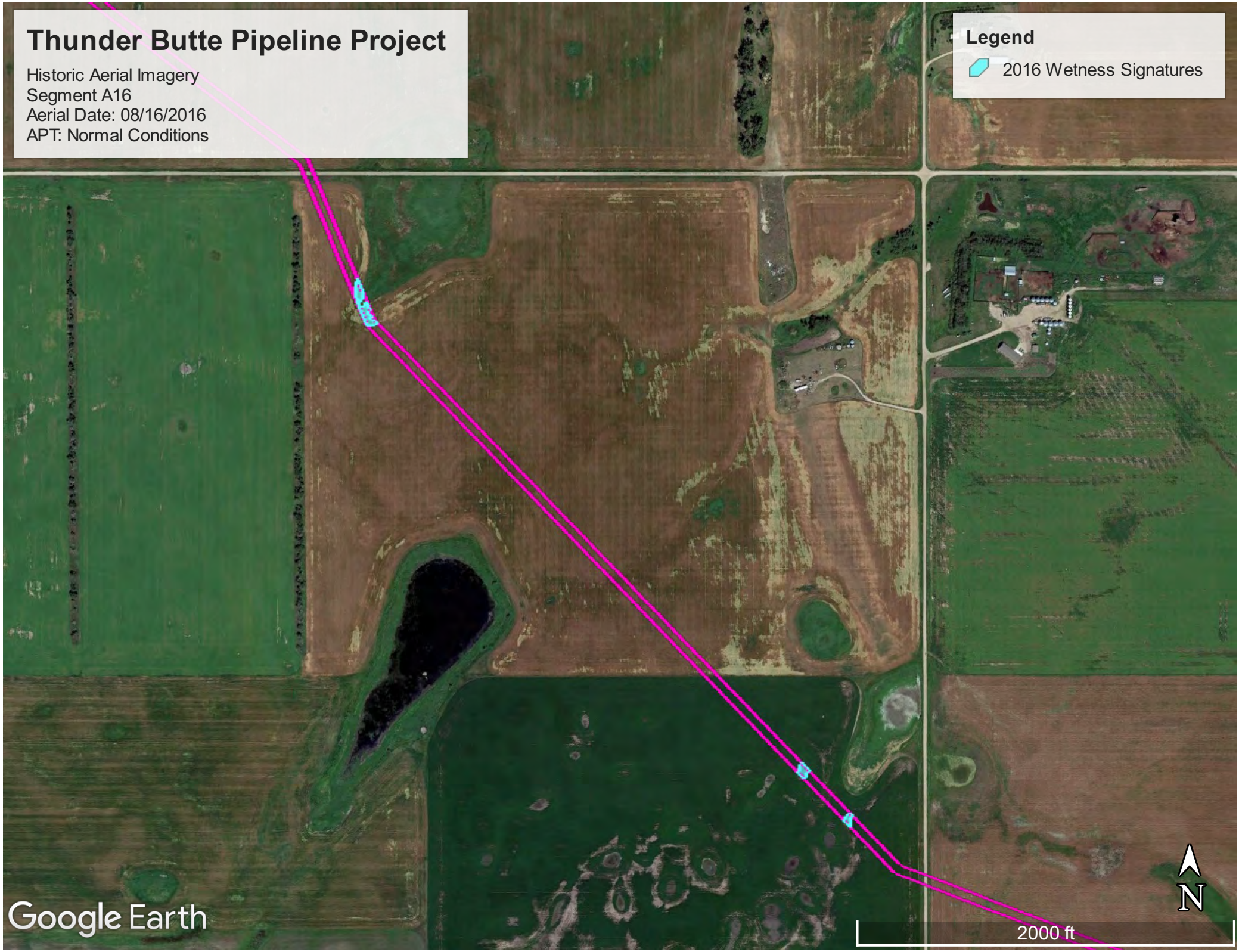
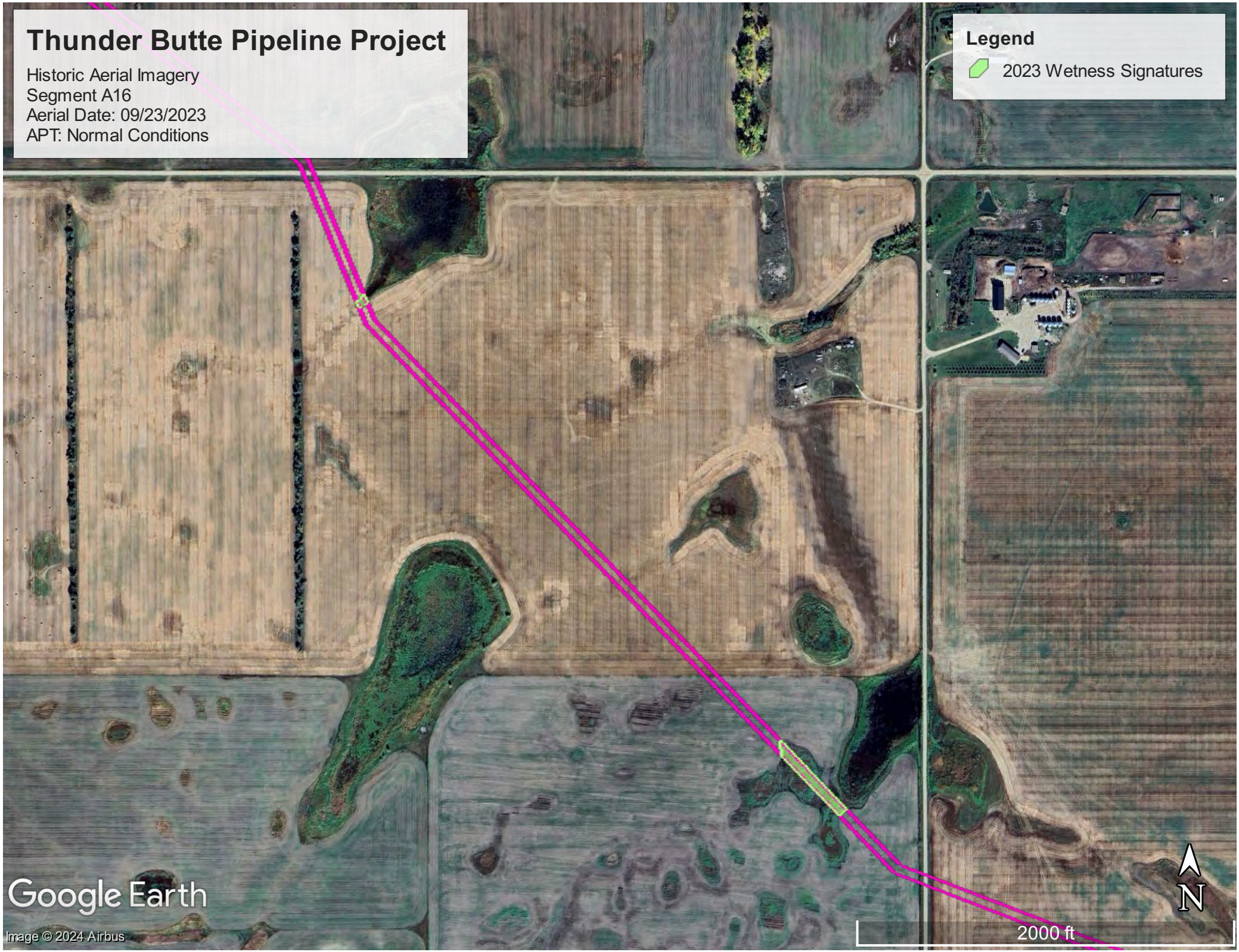
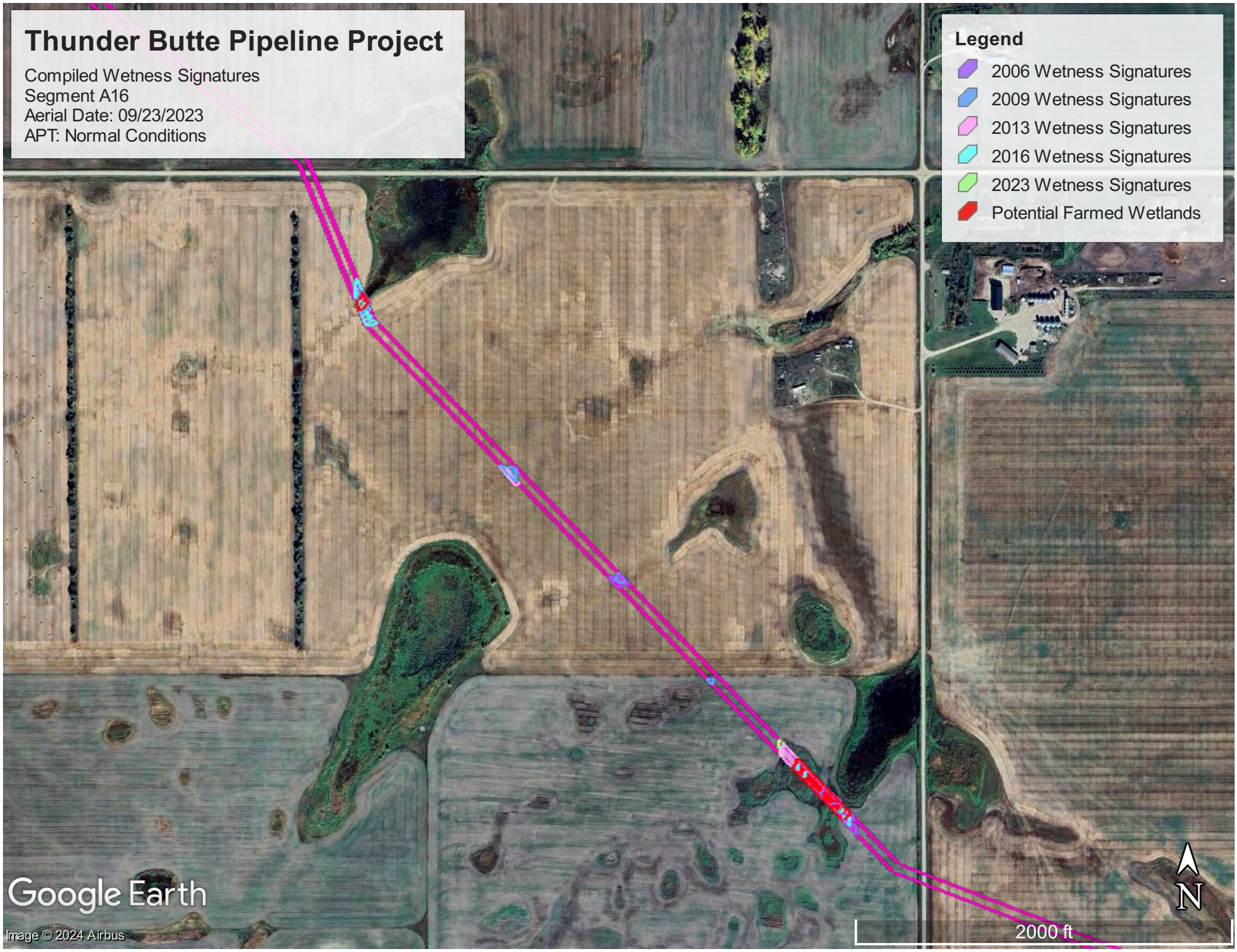
Segment A16
Aerial Date: 09/23/2013
APT: Normal Conditions
Legend
2013 Wetness Signatures
Google Earth
N
2000 ft

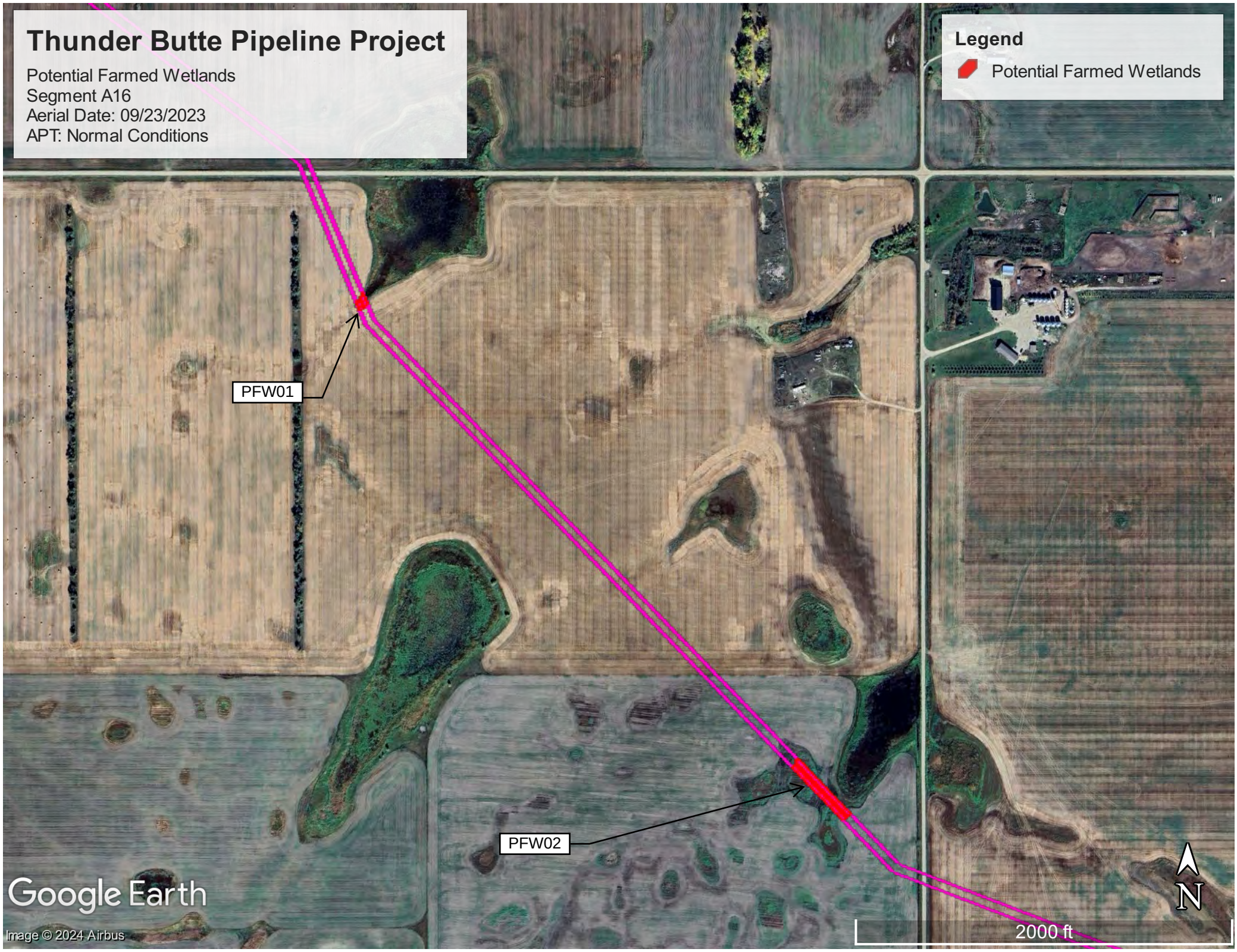

Thunder Butte Pipeline Project
Historic Aerial Imagery
Segment A16
Aerial Date: 08/16/2016
APT: Normal Conditions
Legend
2016 Wetness Signatures
Google Earth
N
2000 ft

Thunder Butte Pipeline Project

Historic Aerial Imagery
Segment A16
Aerial Date: 09/23/2023
APT: Normal Conditions




Thunder Butte Pipeline Project
Compiled Wetness Signatures
Segment A16
Aerial Date: 09/23/2023
APT: Normal Conditions
Legend
2006 Wetness Signatures
2009 Wetness Signatures
2013 Wetness Signatures
2016 Wetness Signatures
2023 Wetness Signatures
Potential Farmed Wetlands
Google Earth
Image © 2024 Airbus
N
2000 ft


Thunder Butte Pipeline Project
Potential Farmed Wetlands
Segment A16
Aerial Date: 09/23/2023
APT: Normal Conditions
Legend
Potential Farmed Wetlands
PFW01
PFW02
Google Earth
Image © 2024 Airbus
N
2000 ft

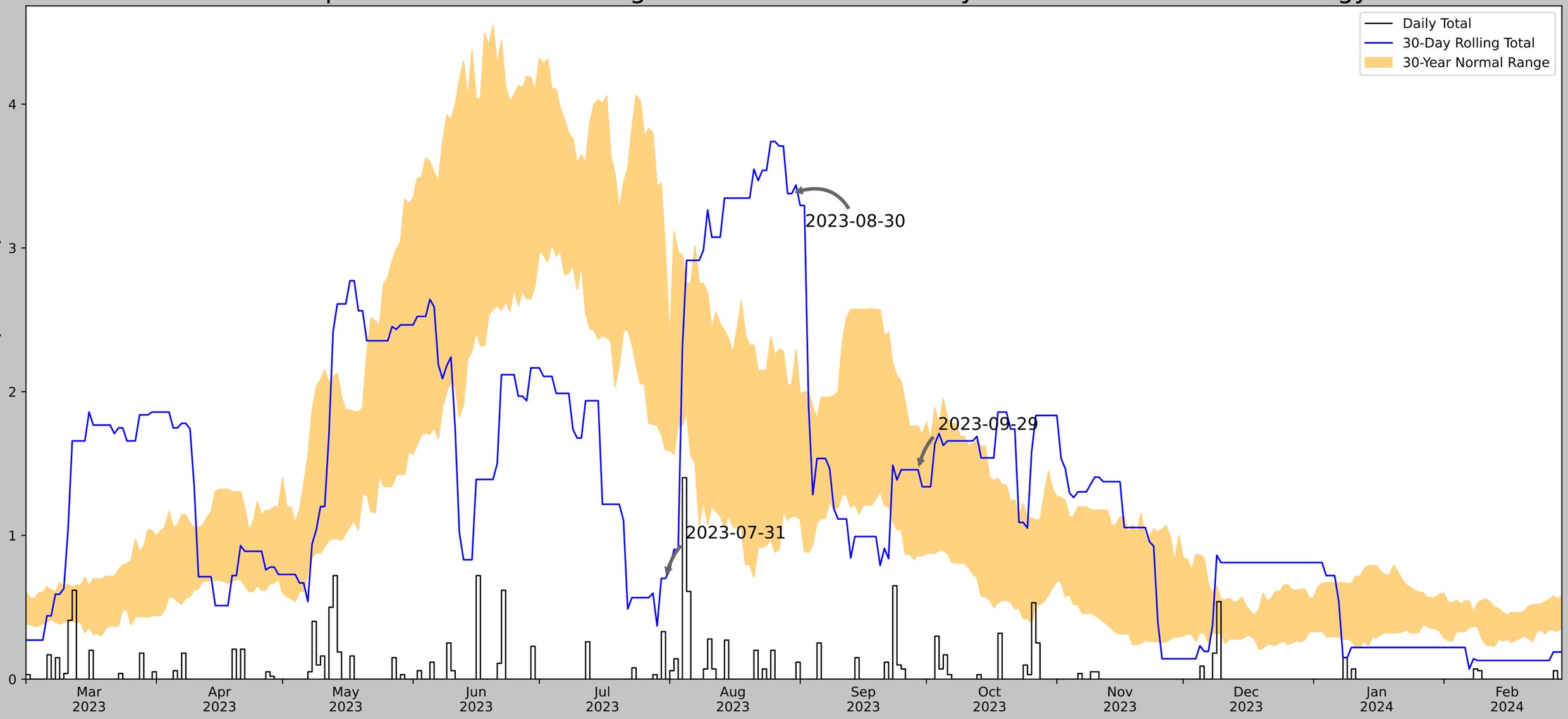
Historic Antecedent Precipitation Summary: Segment A19

Date	PDSI Value	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
9/29/2023	-2.53	Moderate drought	Dry Season	13	Normal Conditions
11/2/2020	-1.64	Mild drought	Wet Season	7	Drier than Normal
8/16/2020	-0.62	Incipient drought	Dry Season	10	Normal Conditions
8/1/2016	-2.41	Moderate drought	Dry Season	14	Normal Conditions
9/23/2013	6.78	Extreme wetness	Dry Season	14	Normal Conditions
12/31/2009	2.49	Moderate wetness	Wet Season	13	Normal Conditions
6/22/2009	1.72	Mild wetness	Dry Season	11	Normal Conditions
7/4/2006	-2.4	Moderate drought	Dry Season	10	Normal Conditions
6/14/2005	2.51	Moderate wetness	Dry Season	16	Wetter than Normal
6/27/2003	-0.55	Incipient drought	Dry Season	11	Normal Conditions
7/27/1995	4.59	Extreme wetness	Dry Season	10	Normal Conditions

Notes:

* Aerial imagery reviewed the five of the most recent aerials exhibiting normal conditions.

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2023-09-29
Elevation (ft)	2092.432
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-09-29	0.861417	1.76063	1.456693	Normal	2	3	6
2023-08-30	1.133858	2.046063	3.377953	Wet	3	2	6
2023-07-31	1.593307	2.957874	0.700787	Dry	1	1	1
Result							Normal Conditions - 13

US Army Corps of Engineers

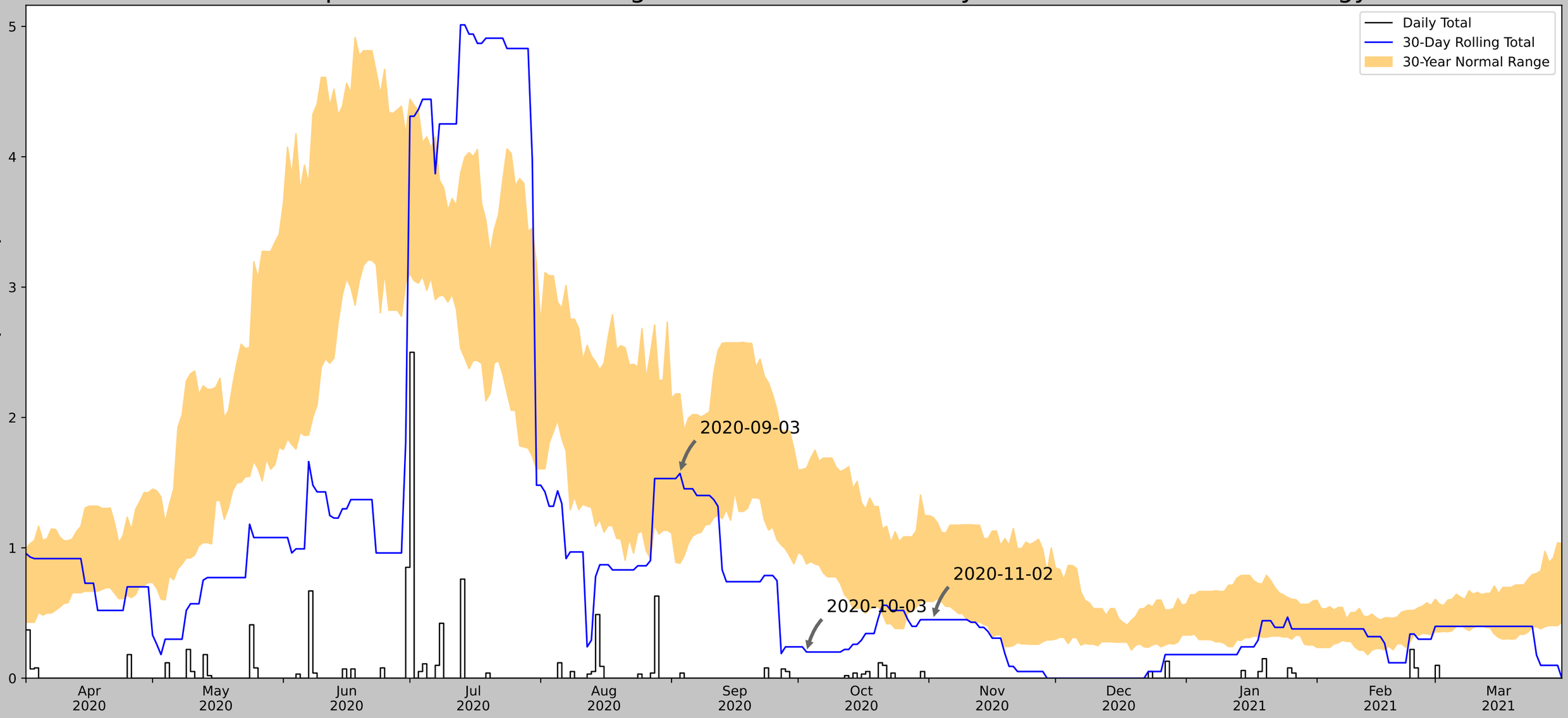
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	33.424	17.476	15.625	11320	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	24	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2020-11-02
Elevation (ft)	2092.432
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-11-02	0.588583	1.234646	0.448819	Dry	1	3	3
2020-10-03	0.875591	1.611811	0.200787	Dry	1	2	2
2020-09-03	0.881102	2.181496	1.570866	Normal	2	1	2
Result							Drier than Normal - 7

US Army Corps of Engineers

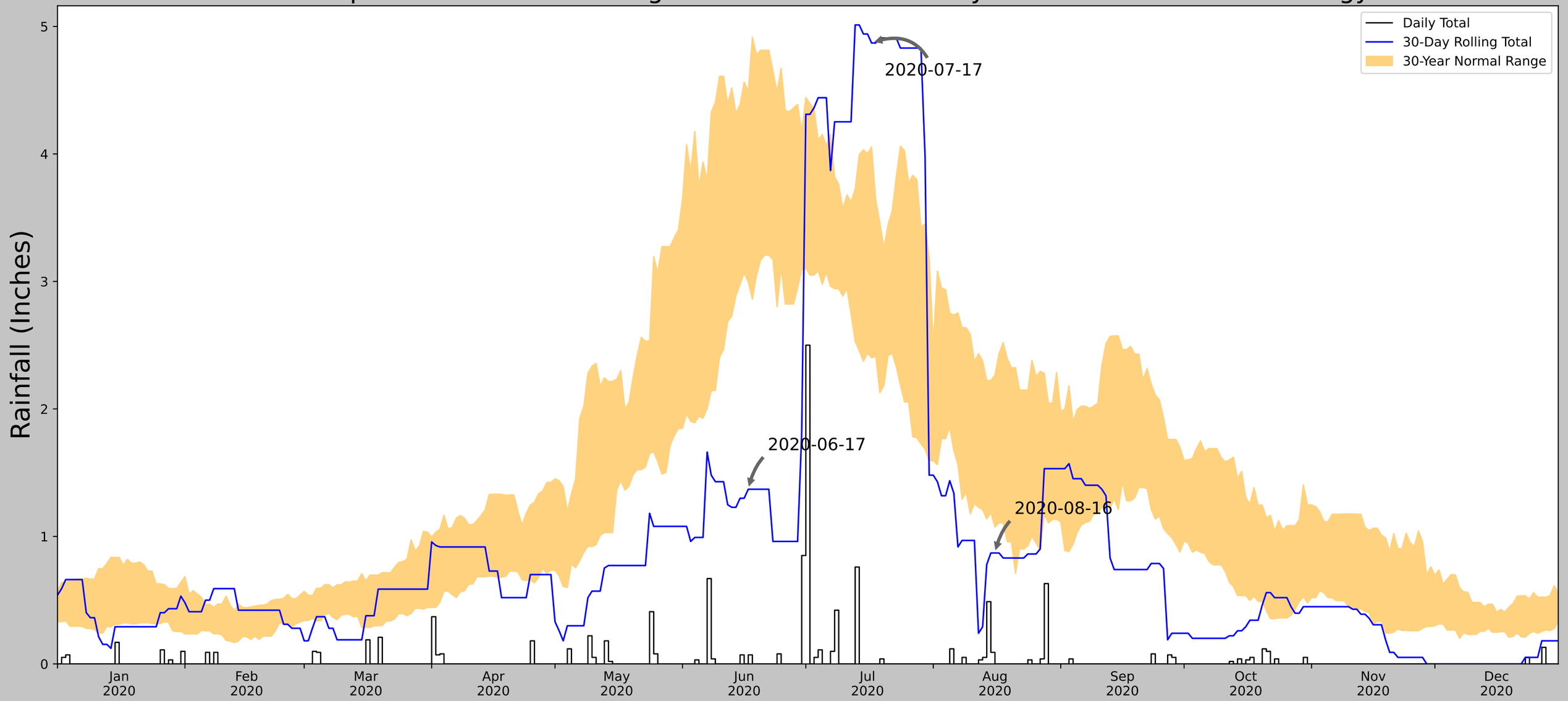
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	33.424	17.476	15.625	11320	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	24	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2020-08-16
Elevation (ft)	2092.432
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-08-16	1.074016	2.266929	0.870079	Dry	1	3	3
2020-07-17	2.400394	4.056693	4.870079	Wet	3	2	6
2020-06-17	2.996063	4.492126	1.370079	Dry	1	1	1
Result							Normal Conditions - 10

US Army Corps of Engineers

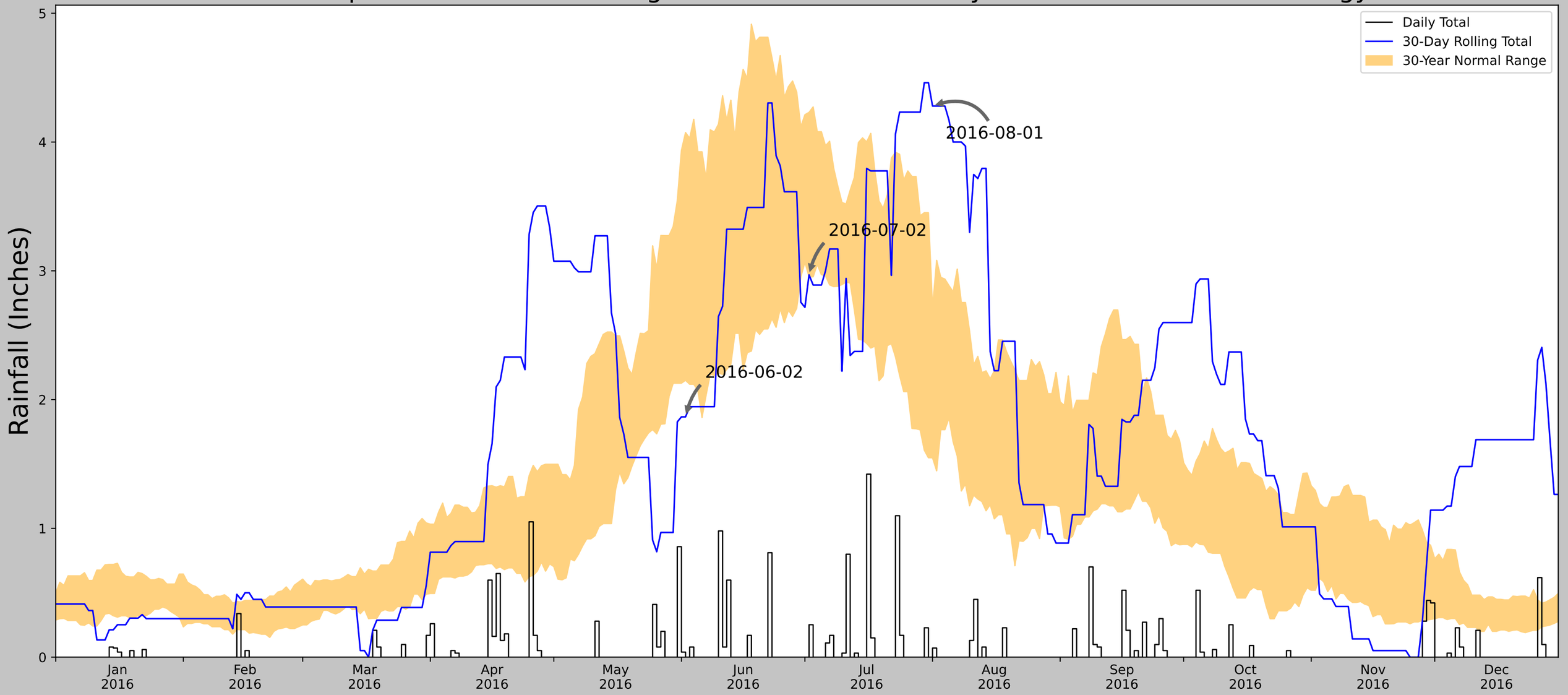
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	33.424	17.476	15.625	11319	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	24	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2016-08-01
Elevation (ft)	2092.432
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-08-01	1.548425	2.712599	4.279528	Wet	3	3	9
2016-07-02	2.953543	4.230315	2.968504	Normal	2	2	4
2016-06-02	2.15	4.073622	1.866142	Dry	1	1	1
Result							Normal Conditions - 14

US Army Corps of Engineers

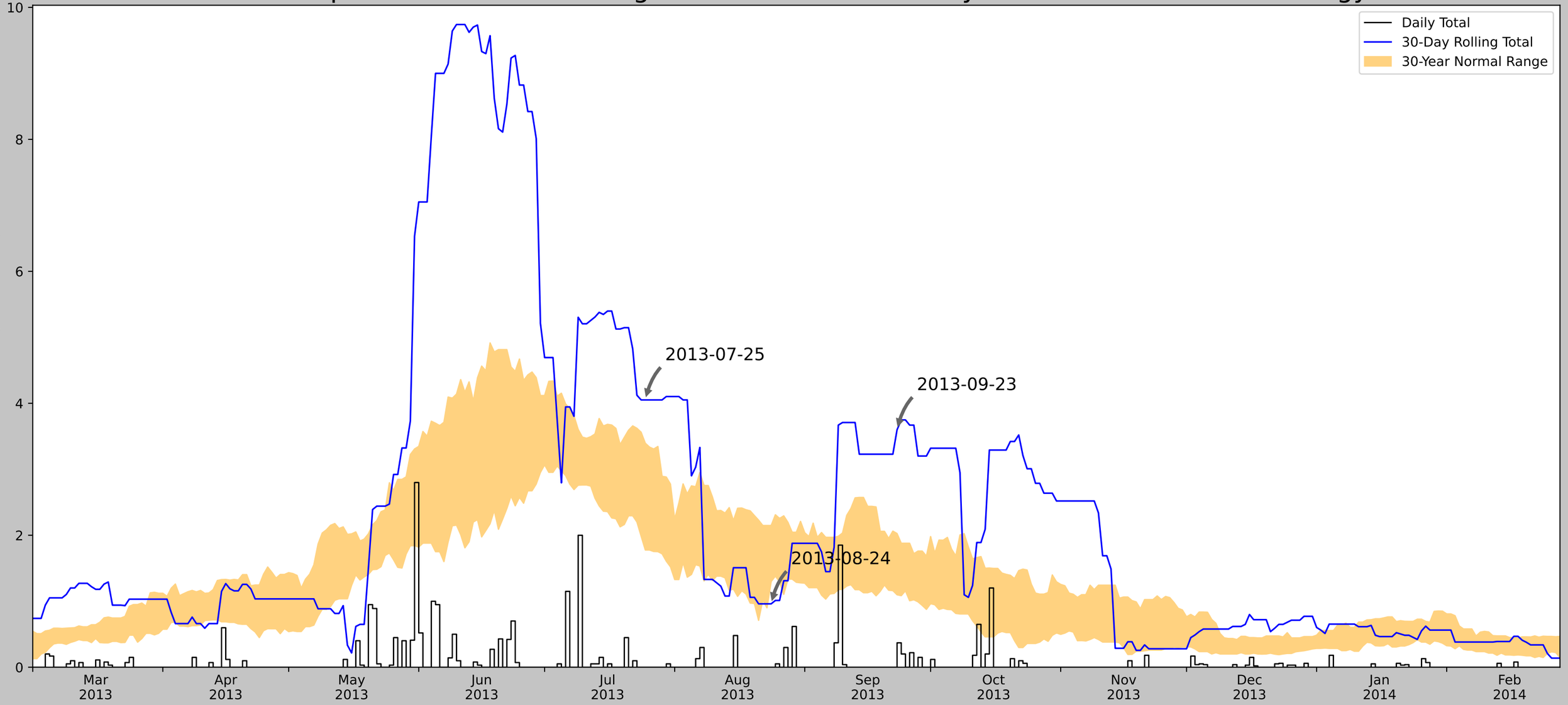
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	33.424	17.476	15.625	11310	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	32	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0
BERTHOLD	48.3139, -101.7328	2080.053	39.646	29.855	19.024	1	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2013-09-23
Elevation (ft)	2092.432
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2013-09-23	1.098032	2.026378	3.598425	Wet	3	3	9
2013-08-24	1.298425	2.148032	0.96063	Dry	1	2	2
2013-07-25	1.776378	3.394882	4.051181	Wet	3	1	3
Result							Normal Conditions - 14

US Army Corps of Engineers

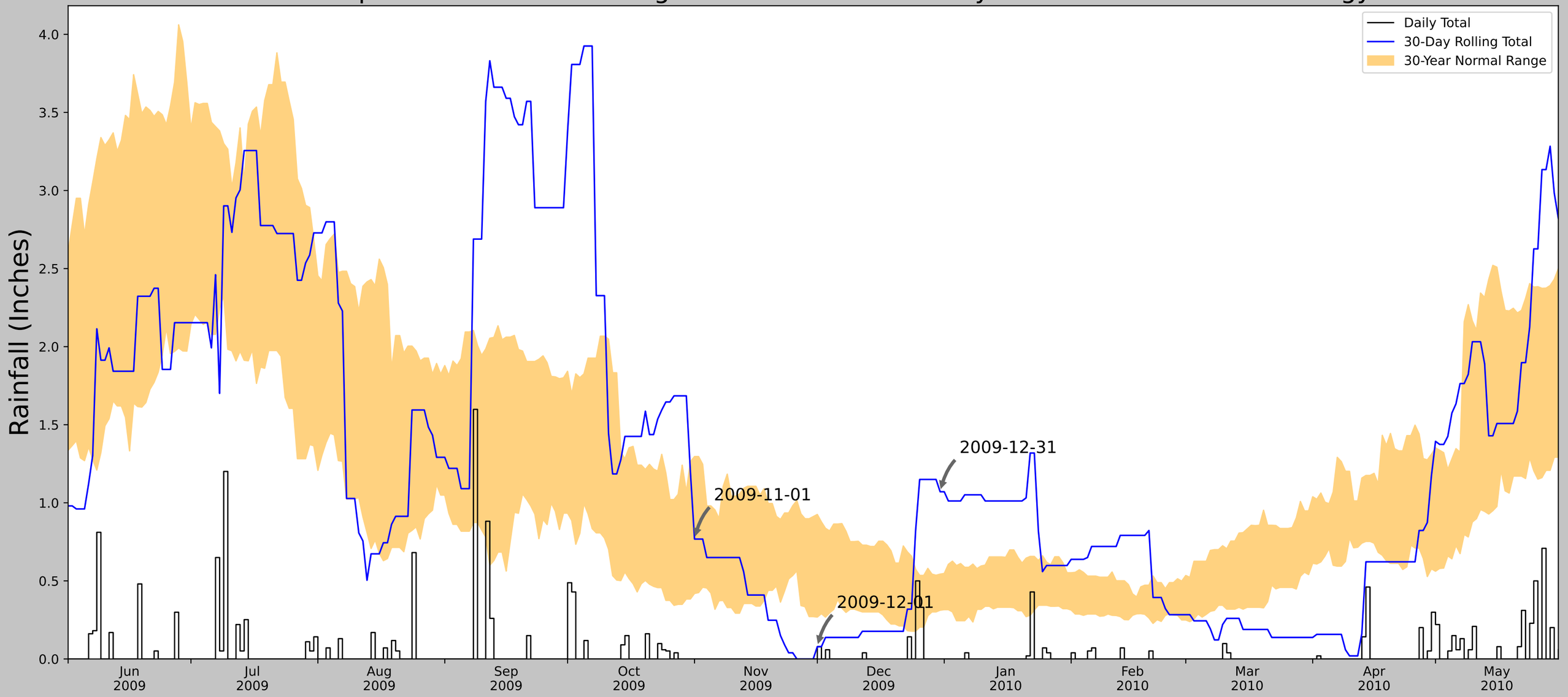
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MAX	47.8214, -101.2922	2109.908	33.424	17.476	15.625	11287	90
GARRISON	47.6539, -101.4197	1932.087	13.001	177.821	8.162	56	0
GARRISON	47.6461, -101.4406	1909.121	13.938	200.787	9.071	9	0
BERTHOLD	48.3139, -101.7328	2080.053	39.646	29.855	19.024	1	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2009-12-31
Elevation (ft)	2092.432
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-12-31	0.312205	0.543307	1.070866	Wet	3	3	9
2009-12-01	0.26811	0.925591	0.07874	Dry	1	2	2
2009-11-01	0.419291	1.296457	0.767717	Normal	2	1	2
Result							Normal Conditions - 13

US Army Corps of Engineers

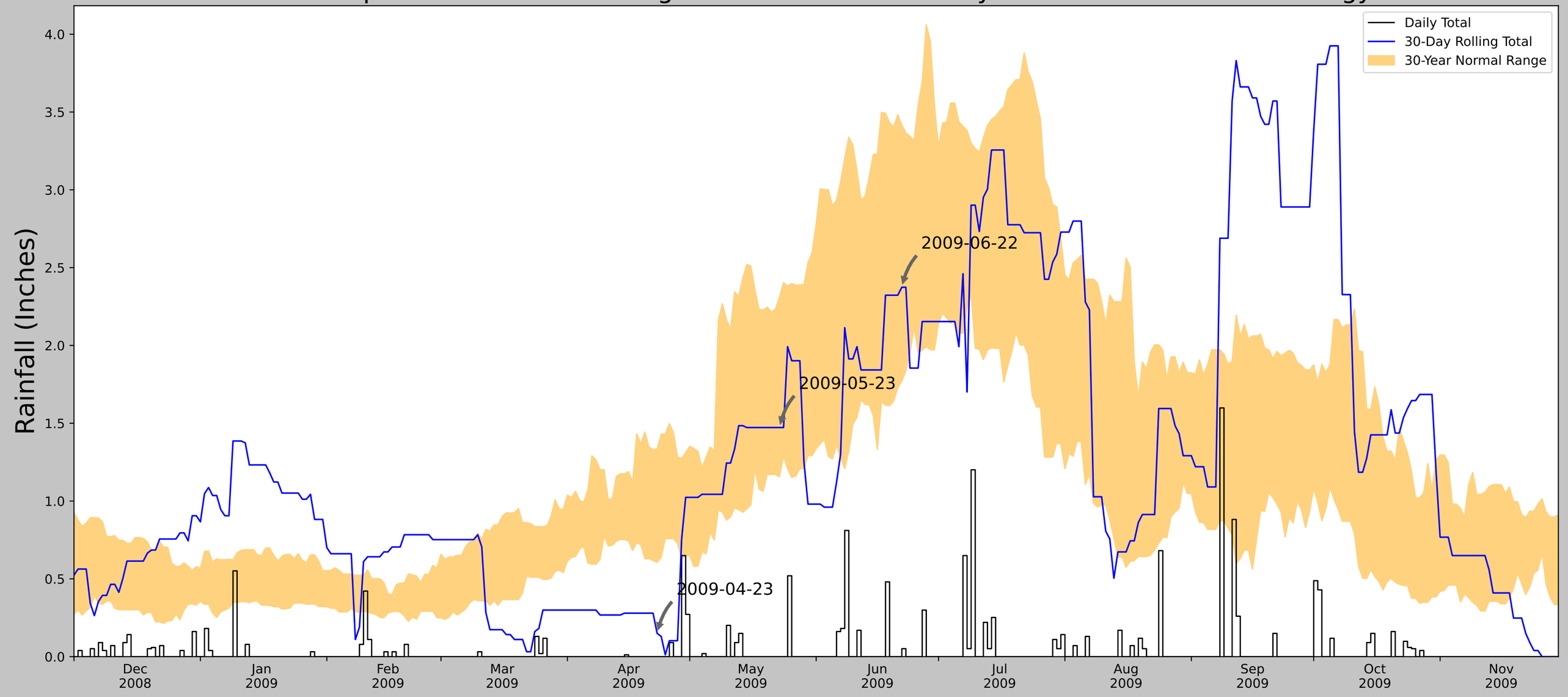
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	21.745	77.516	11.471	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2009-06-22
Elevation (ft)	2092.432
Drought Index (PDSI)	Mild wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2009-06-22	1.77126	3.417323	2.374016	Normal	2	3	6
2009-05-23	1.155512	2.309843	1.472441	Normal	2	2	4
2009-04-23	0.606299	1.332677	0.149606	Dry	1	1	1
Result							Normal Conditions - 11

US Army Corps of Engineers

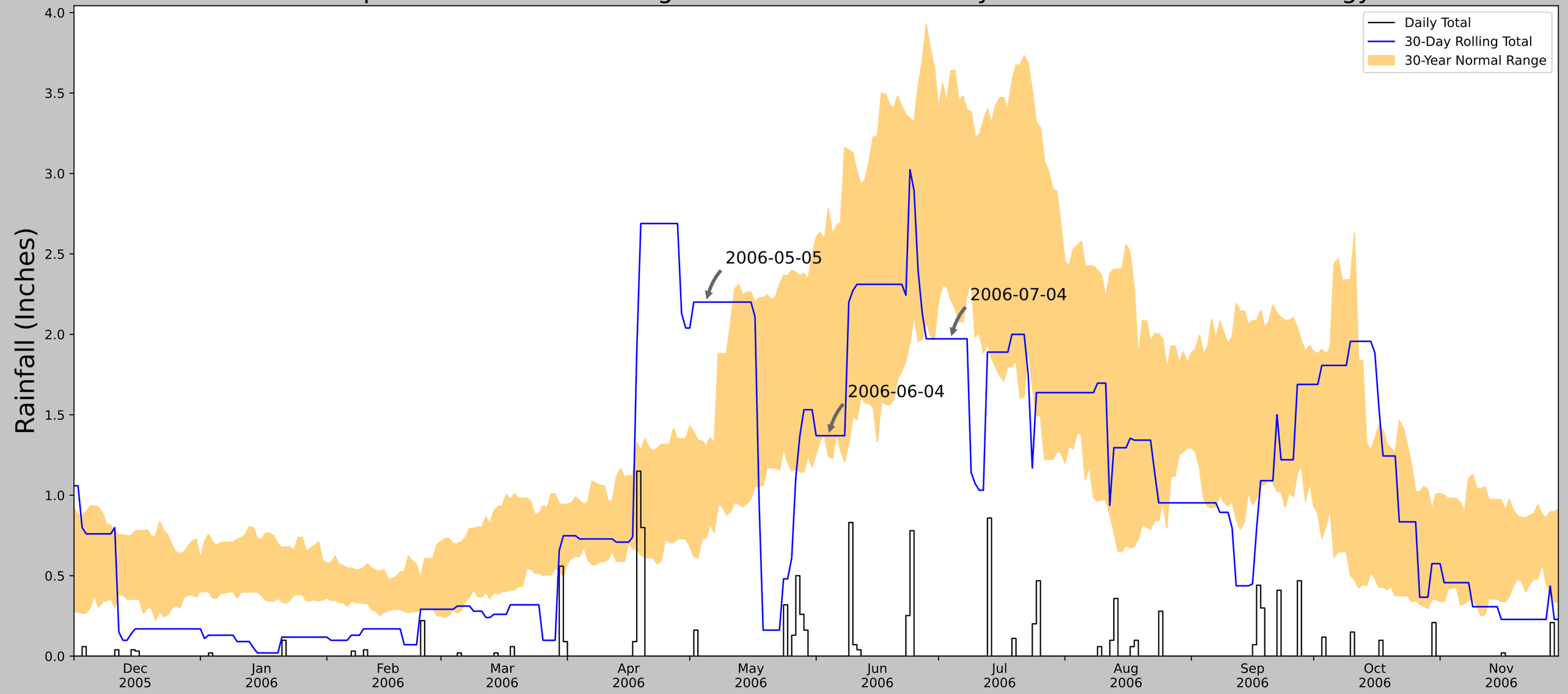
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	21.745	77.516	11.471	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2006-07-04
Elevation (ft)	2092.432
Drought Index (PDSI)	Moderate drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2006-07-04	2.214173	3.63937	1.972441	Dry	1	3	3
2006-06-04	1.242126	2.780709	1.370079	Normal	2	2	4
2006-05-05	0.731496	1.311417	2.200787	Wet	3	1	3
Result							Normal Conditions - 10

US Army Corps of Engineers

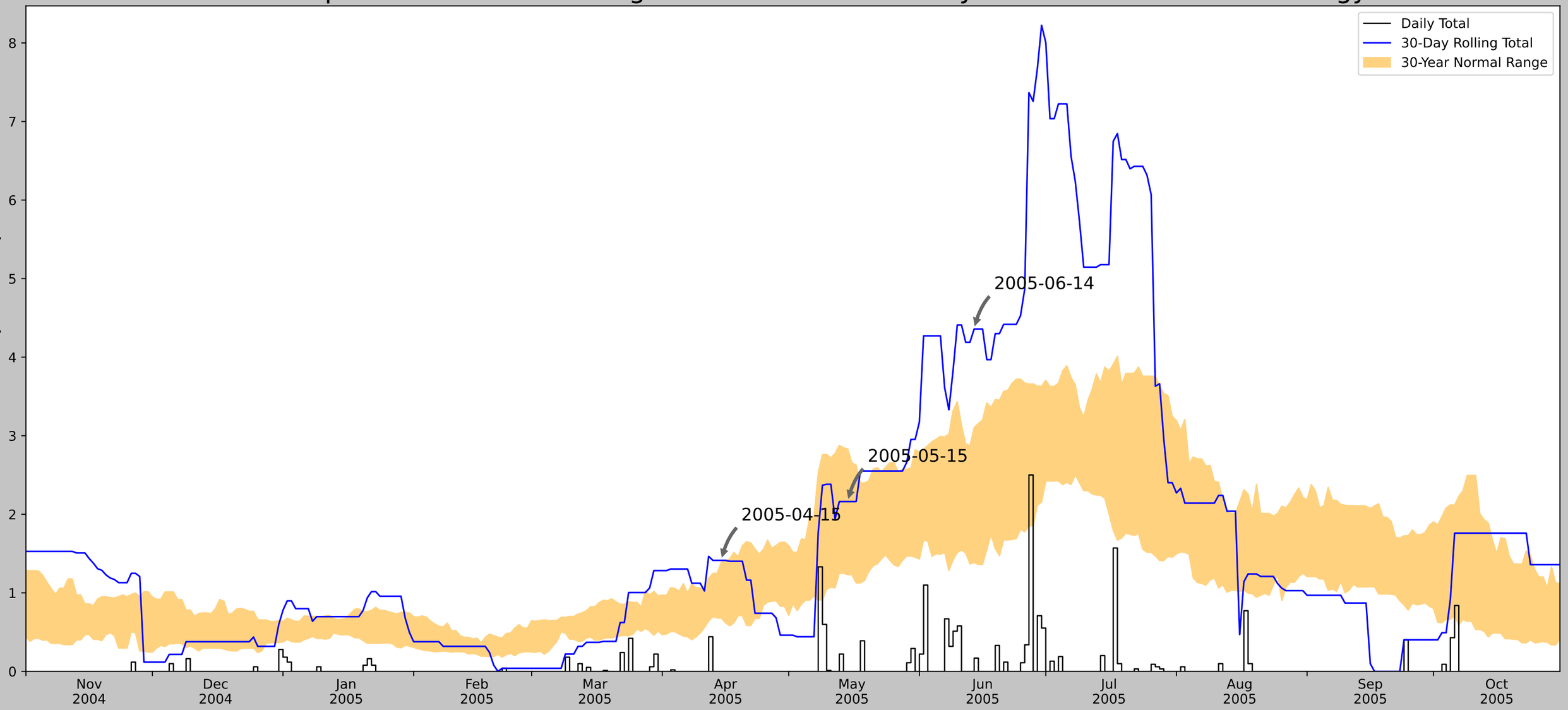
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	21.745	77.516	11.471	11338	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	13	0
STANLEY 3 NNW	48.3567, -102.4117	2279.856	22.012	109.908	12.325	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	2005-06-14
Elevation (ft)	2092.432
Drought Index (PDSI)	Moderate wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2005-06-14	1.384646	3.103937	4.358268	Wet	3	3	9
2005-05-15	1.231102	2.831496	2.161417	Normal	2	2	4
2005-04-15	0.679528	1.388583	1.413386	Wet	3	1	3
Result							Wetter than Normal - 16

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BERTHOLD	48.3139, -101.7328	2080.053	21.67	12.379	10.02	10599	84
TAGUS	48.3475, -101.9325	2169.948	9.462	89.895	5.108	752	6
FOXHOLM 7 N	48.4583, -101.5697	1674.869	12.472	405.184	10.666	1	0
MINOT EXP STN	48.1803, -101.2964	1769.029	22.099	311.024	16.818	1	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	48.032838, -101.941523
Observation Date	2003-06-27
Elevation (ft)	2092.432
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2003-06-27	1.933858	3.695276	1.897638	Dry	1	3	3
2003-05-28	1.075197	2.364173	3.15748	Wet	3	2	6
2003-04-28	0.738189	1.451575	0.929134	Normal	2	1	2
Result							Normal Conditions - 11

US Army Corps of Engineers

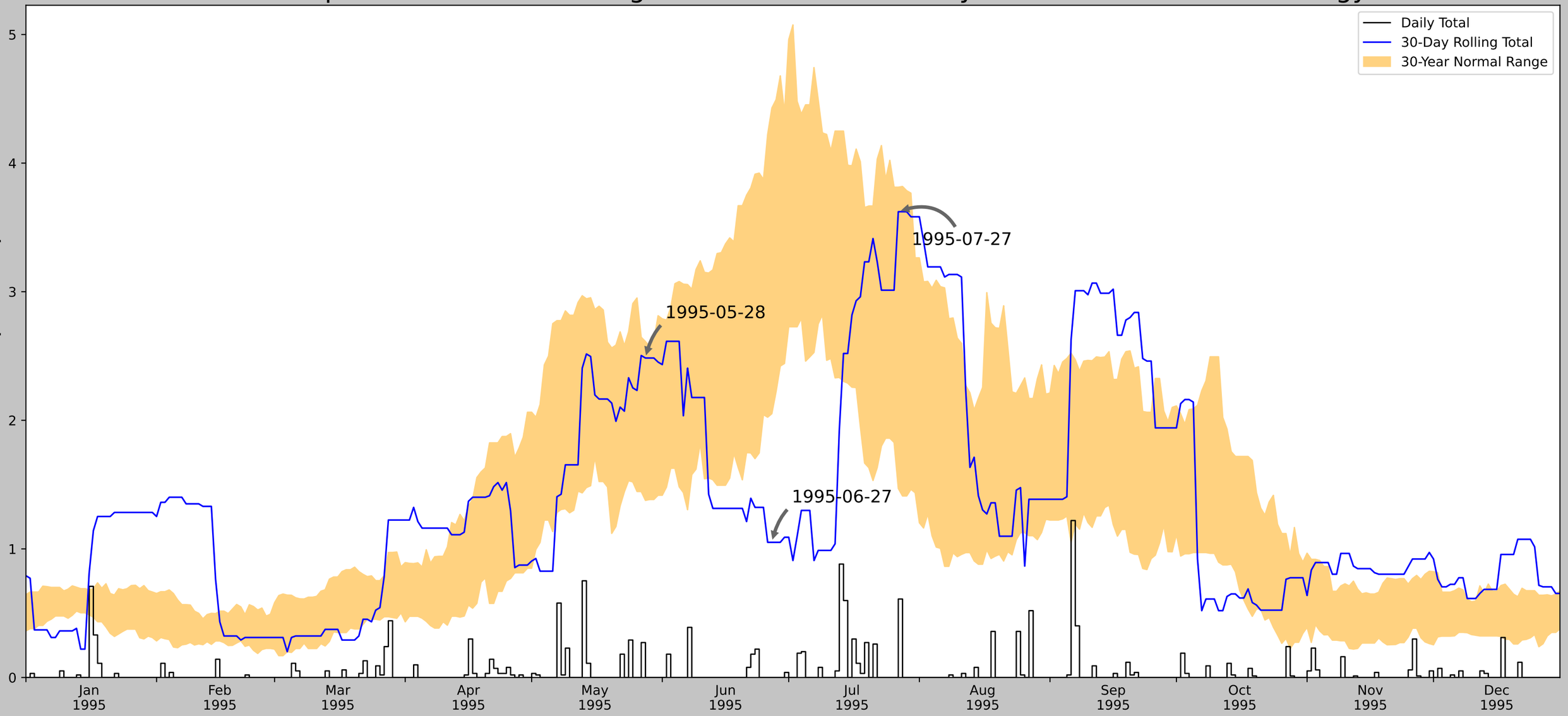
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TAGUS	48.3475, -101.9325	2169.948	21.745	77.516	11.471	11310	90
BERTHOLD	48.3139, -101.7328	2080.053	9.462	89.895	5.108	43	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	48.032838, -101.941523
Observation Date	1995-07-27
Elevation (ft)	2092.432
Drought Index (PDSI)	Extreme wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
1995-07-27	1.469685	3.812599	3.622047	Normal	2	3	6
1995-06-27	2.051181	4.42874	1.051181	Dry	1	2	2
1995-05-28	1.377165	2.612599	2.484252	Normal	2	1	2
Result							Normal Conditions - 10

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

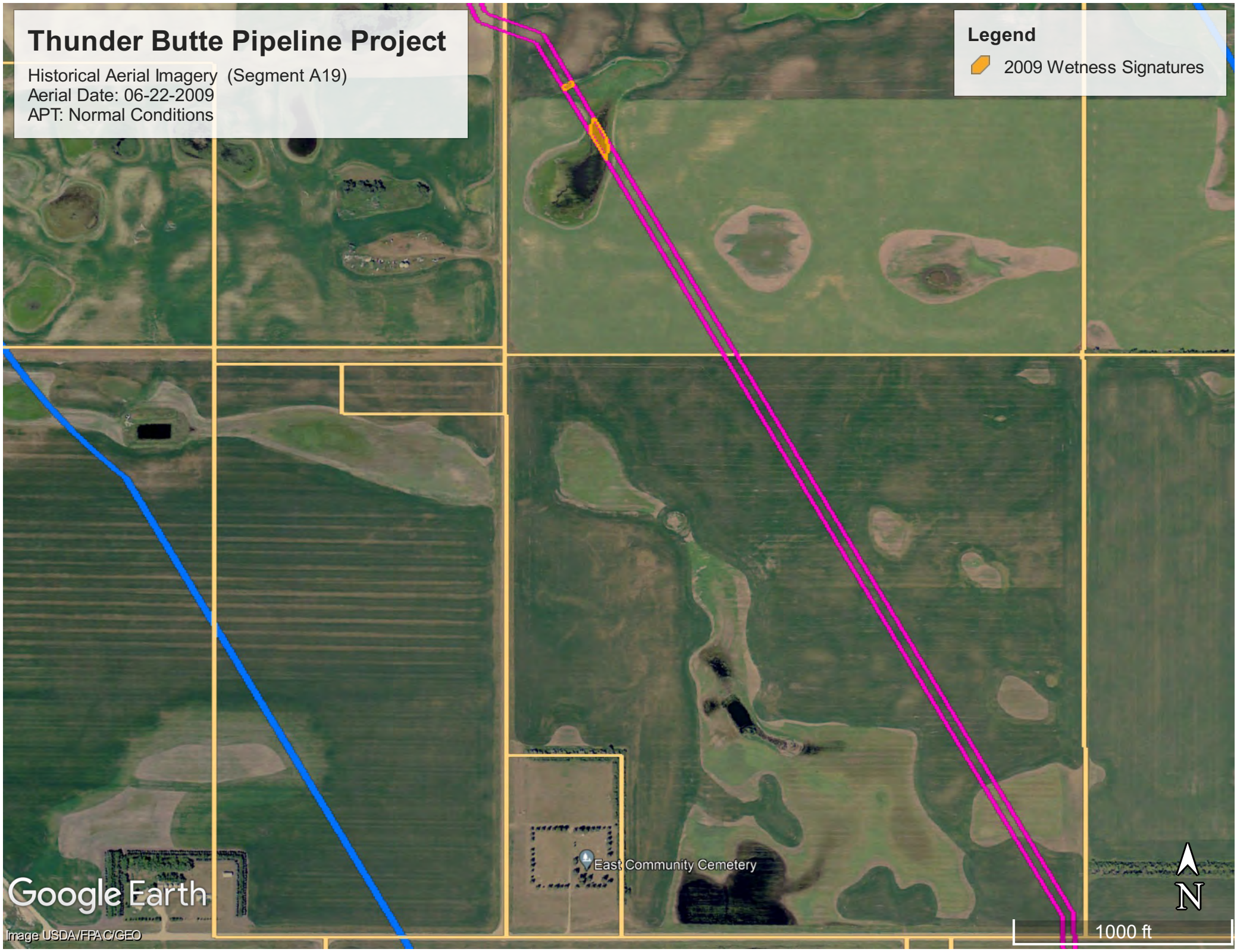
Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BERTHOLD	48.3139, -101.7328	2080.053	21.67	12.379	10.02	10952	90
TAGUS	48.3475, -101.9325	2169.948	9.462	89.895	5.108	401	0

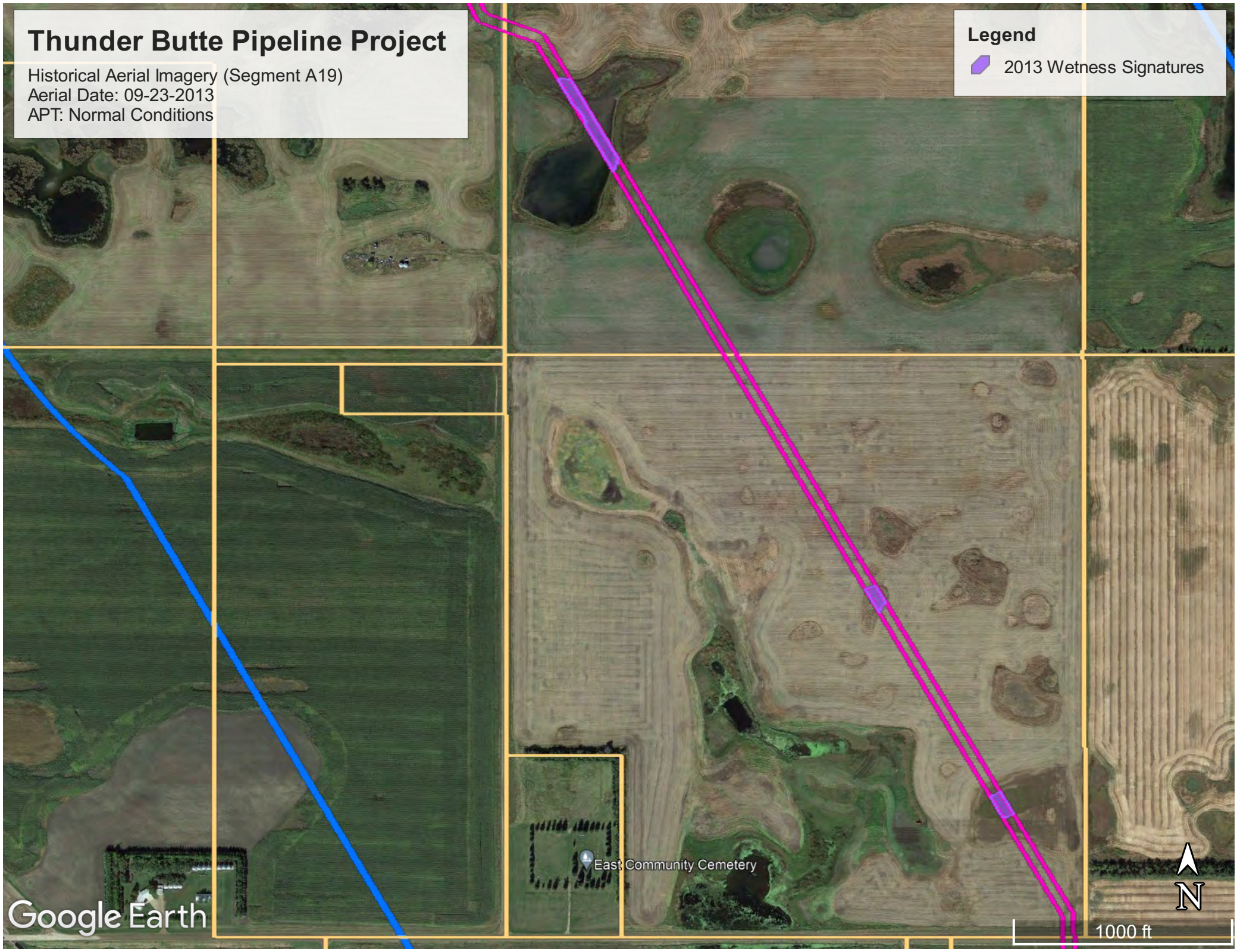
Farmed Wetland Determination - Aerial Slide Review

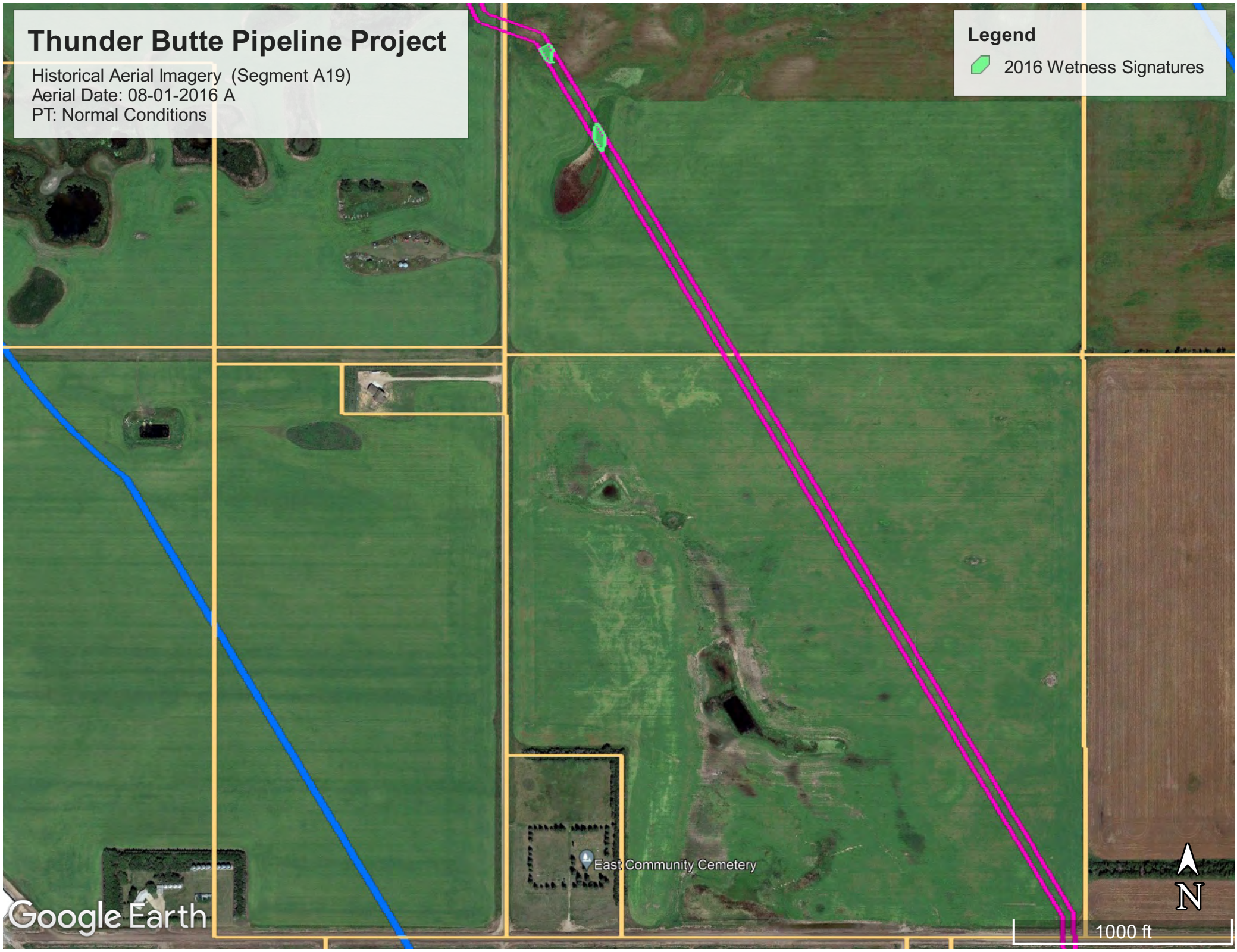
Project Name: Thunder Butte Pipeline Project: Segment A19
Investigator Stephen W. Chu,S PWS
Date: 08/16/24

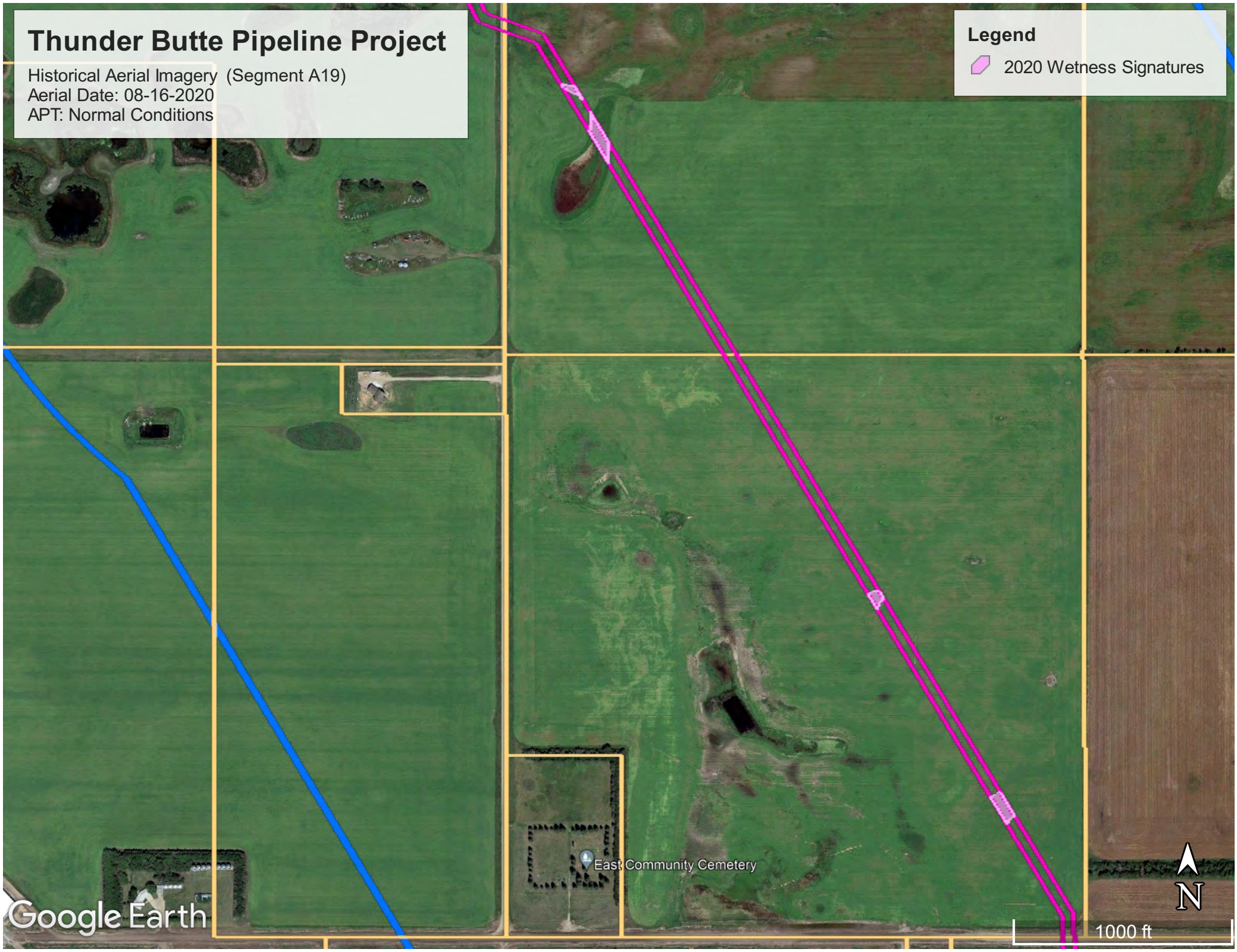
Approximate Aerial Date	Image Source	Climate Conditions (Wet, Dry, Normal)	Potential Wetness Signatures Based on Aerial Interpretation		
			PFW01	PFW02	PFW03
9/29/2023	Google Earth Pro, 2024	Normal Conditions	2023-PFW01	2023-PFW02	2023-PFW03
8/16/2020	Google Earth Pro, 2024	Normal Conditions	2020-PFW01	2020-PFW02	2020-PFW04
8/1/2016	Google Earth Pro, 2024	Normal Conditions	-	2016-PFW02	-
9/23/2013	Google Earth Pro, 2024	Normal Conditions	2013-PFW01	2013-PFW01	2013-PFW03
6/22/2009	Google Earth Pro, 2024	Normal Conditions	2009-PFW01	2009-PFW02	-
Summary Table			**PFW01**	**PFW02**	**PFW02**
Number of Normal Years			5	5	5
Number of Normal Years with Wet Signatures			4	5	3
Percent of Normal Years with Wet Signatures			80%	100%	60%
Hydric Soils present?			C132C[1]	C3A[2]	C149B
Farmed wetland present?			Wetland Present: **WA19FW01**	Wetland Present: **WA19FW02**	Wetland Present: **WA19FW03**[1]

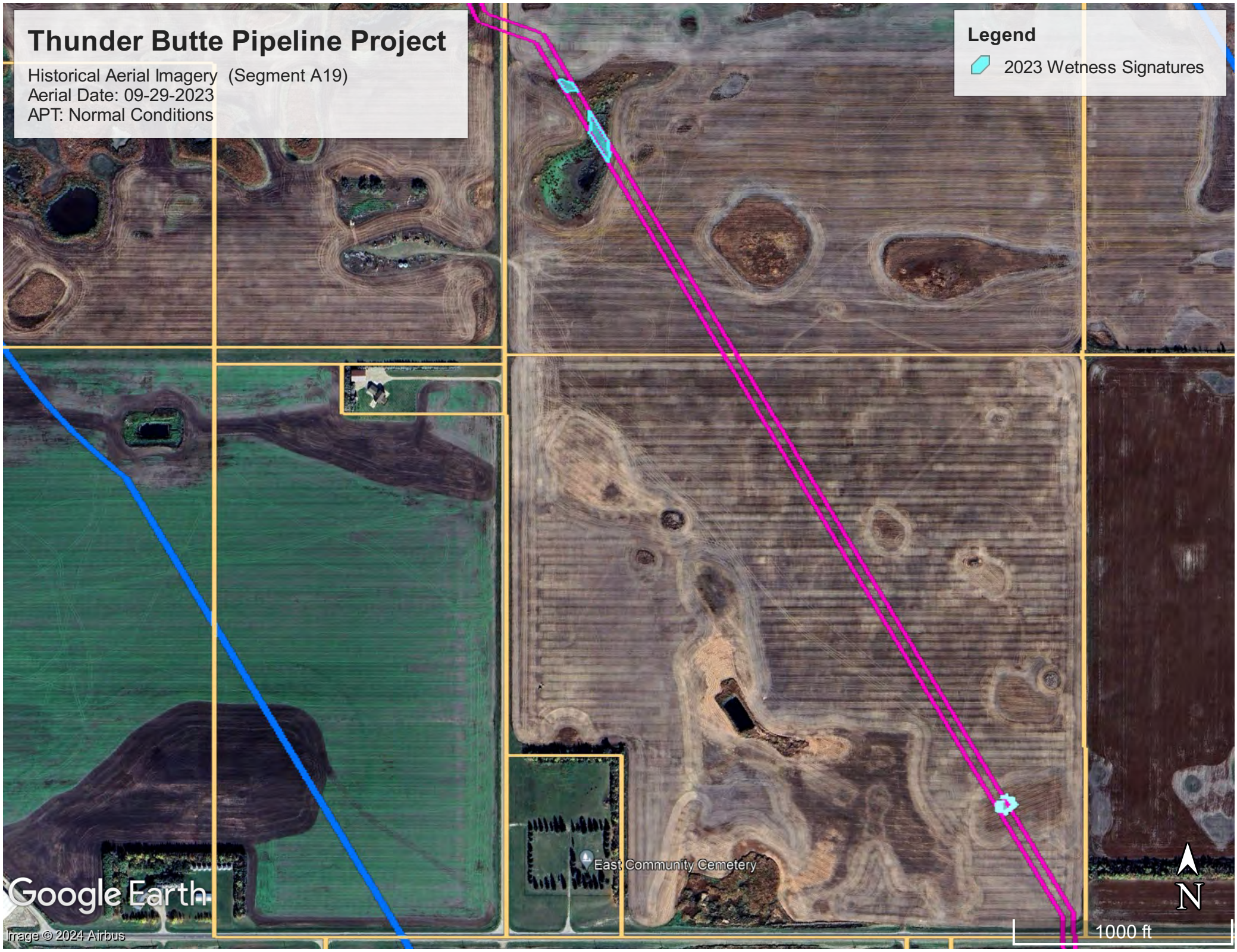
[1] - Soil map unit is classified as predominantly non-hydric.
[2] - Soil map unit is classified as hydric.

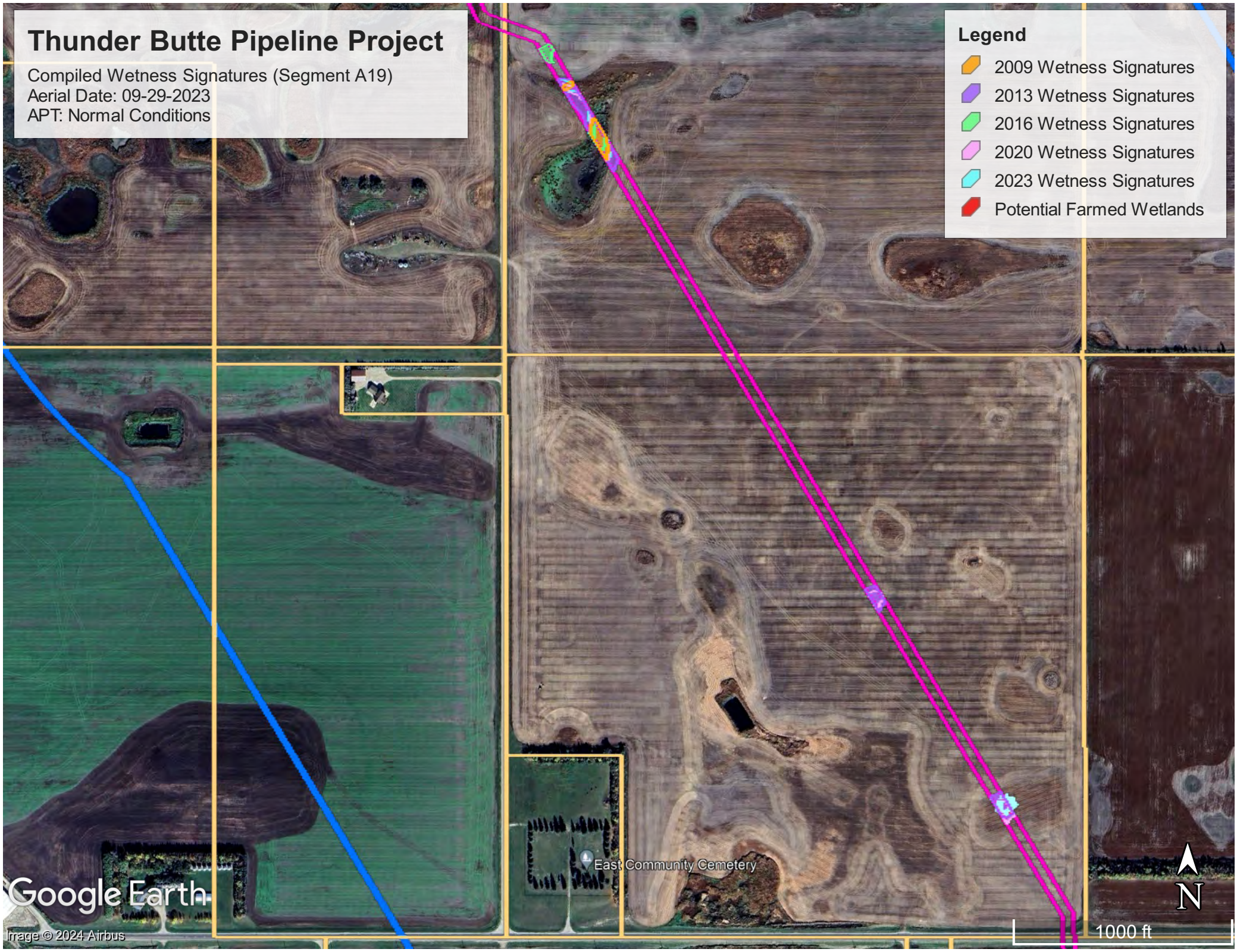

Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A19)
Aerial Date: 06-22-2009
APT: Normal Conditions
Legend
2009 Wetness Signatures
East Community Cemetery
Google Earth
Image USDA/FPAC/GEO
N
1000 ft

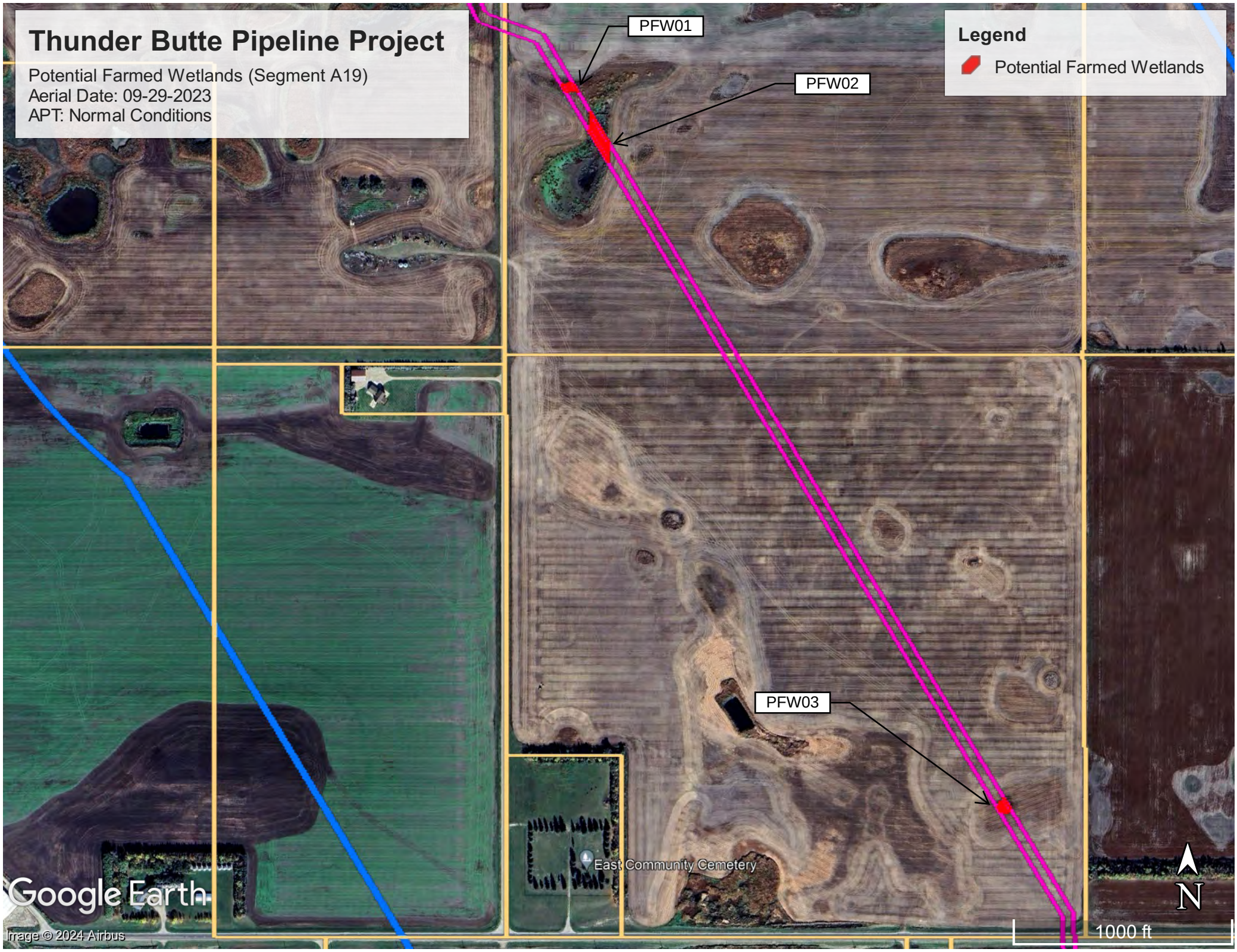

Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A19)
Aerial Date: 09-23-2013
APT: Normal Conditions
Legend
2013 Wetness Signatures
East Community Cemetery
Google Earth
N
1000 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A19)
Aerial Date: 08-01-2016 A
PT: Normal Conditions
Legend
2016 Wetness Signatures
East Community Cemetery
Google Earth
N
1000 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A19)
Aerial Date: 08-16-2020
APT: Normal Conditions
Legend
2020 Wetness Signatures
East Community Cemetery
Google Earth
N
1000 ft


Thunder Butte Pipeline Project
Historical Aerial Imagery (Segment A19)
Aerial Date: 09-29-2023
APT: Normal Conditions
Legend
2023 Wetness Signatures
East Community Cemetery
Google Earth
Image © 2024 Airbus
N
1000 ft


Thunder Butte Pipeline Project
Compiled Wetness Signatures (Segment A19)
Aerial Date: 09-29-2023
APT: Normal Conditions
Legend
2009 Wetness Signatures
2013 Wetness Signatures
2016 Wetness Signatures
2020 Wetness Signatures
2023 Wetness Signatures
Potential Farmed Wetlands
East Community Cemetery
Google Earth
Image © 2024 Airbus
N
1000 ft


Thunder Butte Pipeline Project
Potential Farmed Wetlands (Segment A19)
Aerial Date: 09-29-2023
APT: Normal Conditions
Legend
Potential Farmed Wetlands
PFW01
PFW02
PFW03
East Community Cemetery
Google Earth
Image © 2024 Airbus
N
1000 ft

Appendix D

Representative Photographs

Segment

A01

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A01

Photo: 1

Location:
DPA01RJ02

Description:
DPA01RJ02

Direction:
East

Coordinates:
48.3039283464335
-102.366533284393

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
DPA01RJ02

Description:
DPA01RJ02

Direction:
East

Coordinates:
48.3039283464335
-102.366533284393

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A01

Photo: 3

Location:
DPA01RJ02

Description:
DPA01RJ02

Direction:
East

Coordinates:
48.3039283464335
-102.366533284393

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 4

Location:
WA01RJ01

Description:
Wetland one PEM

Direction:

Coordinates:
48.307878358722
-102.378502889315

Date: 08/06/2024

Taken By:
Kenzie Connolly

Notes:
W01RJ01

Segment

A02

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A02

Photo: 1

Location:
DPA02RJ01

Description:
Upland

Direction:
North

Coordinates:
48.2843814253158
-102.333590521319

Date: 08/06/2024

Taken By:
Kenzie Connolly

Notes:
Upland DP01 A02

Photo: 2

Location:
DPA02RJ01

Description:
Upland

Direction:
North

Coordinates:
48.2843814253158
-102.333590521319

Date: 08/06/2024

Taken By:
Kenzie Connolly

Notes:
Upland DP01 A02

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A02

Photo: 3

Location:
DPA02RJ02

Description:
Upland fallow field

Direction:
North

Coordinates:
48.2863543202151
-102.337458235339

Date: 08/06/2024

Taken By:
Kenzie Connolly

Segment

A03

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A3

Photo: 1

Date: 08-06-2024

Description:
Representative upland data point DP A03SJ08 near A03WSJ04

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 2

Date: 08-06-2024

Description:
Representative upland data point DPSJ08 near WA03SJ04

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A3

Photo: 3

Date: 08-06-2024

Description:
Wetland WA03SJ04 and data point DPA03SJ07

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 4

Date: 08-06-2024

Description:
Delineated PEM wetland WA03SJ05

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
Northwest

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A3

Photo: 5

Date: 08-06-2024

Description:
Representative upland data point DPA03SJ near wetland WSA03J05

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
Northwest

Photo: 6

Date: 08-06-2024

Description:
Delineated wetland WSA03J05 and data point DPA03SJ09

Location:
A3

Photograph Taken By:
Stuart Jennings

Direction:
Northwest

Segment
A04

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 1

Date: 08-06-2024

Description:
Delineated wetland WA04SJ06 and data point DPA04SJ11

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

Photo: 2

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ12 near WA04SJ06

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

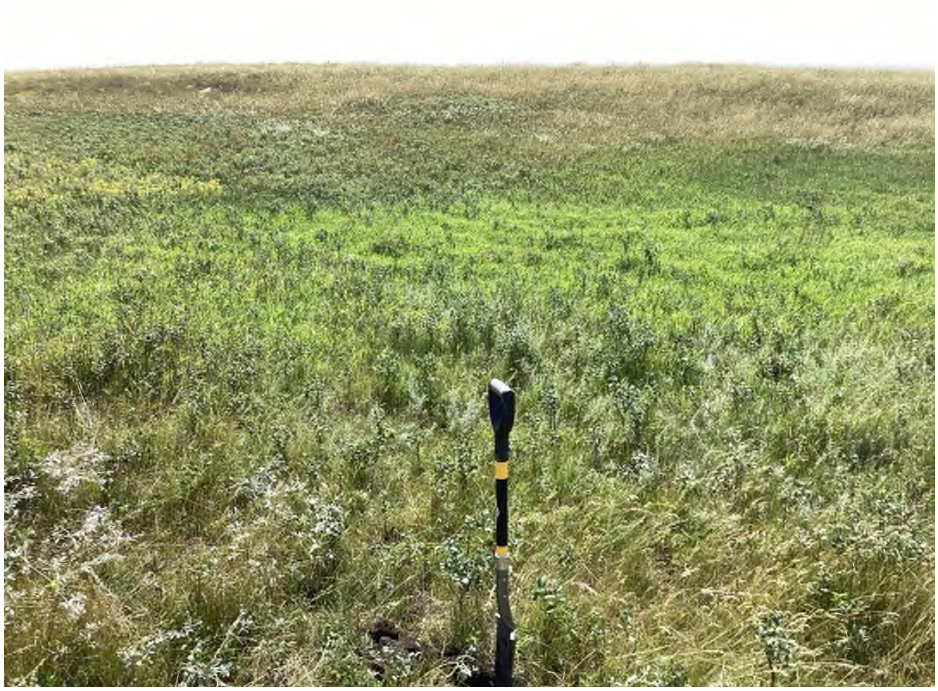


Photo: 3

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ13

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
West

Photo: 4

Date: 08-06-2024

Description:
Delineated wetland WSA04J07 and data point DPA04SJ14

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 5

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ15 near wetland WA04SJ07

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

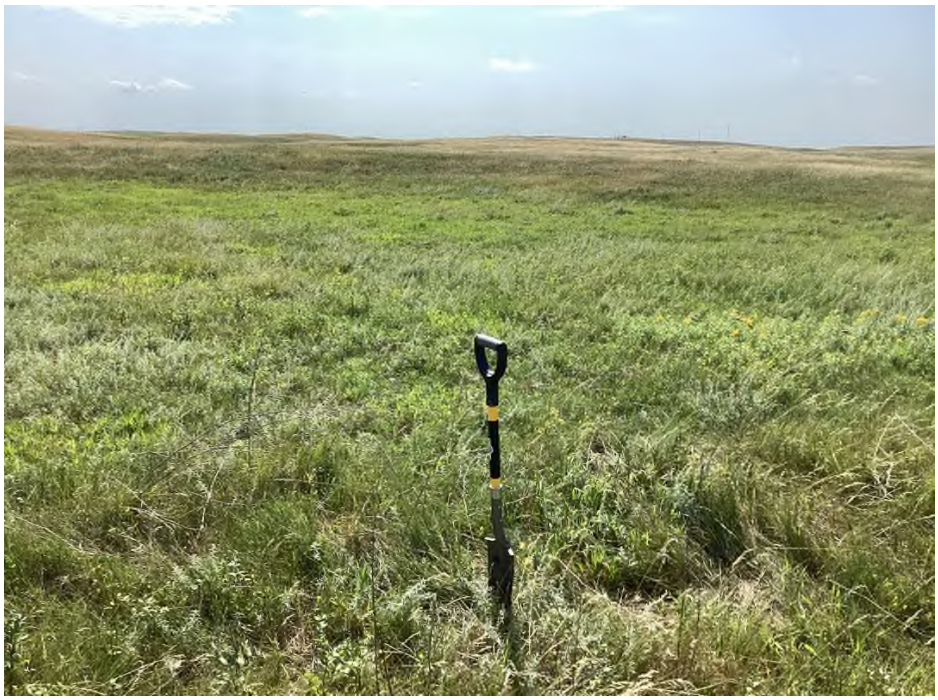


Photo: 6

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ16

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
West

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 7

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ17

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 8

Date: 08-06-2024

Description:
Delineated wetland WA04SJ08 and data point DPA04SJ18

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 9

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ19 near WA04SJ08

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 10

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ20

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
West

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 11

Date: 08-06-2024

Description:
Delineated wetland WA04SJ09 and data point DPA04SJ21

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

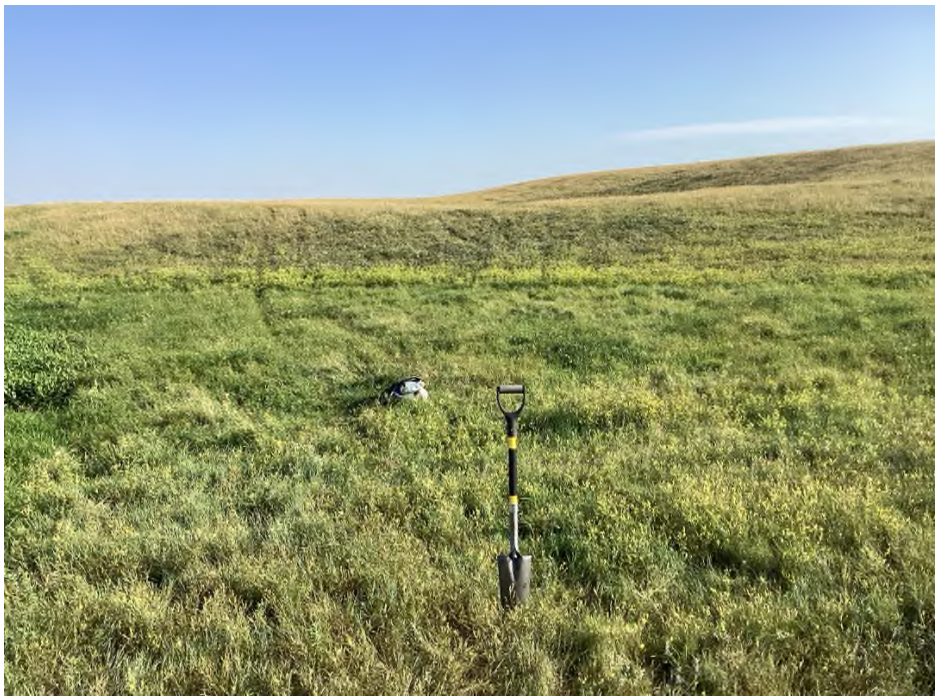


Photo: 12

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ22 near WA04SJ09

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 13

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ23

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 14

Date: 08-06-2024

Description:
Delineated wetland WA04SJ10 and data point DPA04SJ24

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
North

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 15

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ25 near wetland WA04SJ10

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
East

Photo: 16

Date: 08-06-2024

Description:
Delineated wetland WA04SJ11 and data point DPA04SJ26

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A4

Photo: 17

Date: 08-06-2024

Description:
Representative upland data point DPA04SJ27 near WSJ11

Location:
A4

Photograph Taken By:
Stuart Jennings

Direction:
South

Segment

A05

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A05

Photo: 1

Location:
DPA05RJ02

Description:
Upland area by wetland

Direction:
South

Coordinates:
48.24519877653
-102.275569381342

Date: 08/07/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
DPA05RJ04

Description:
Upland

Direction:
South

Coordinates:
48.2481526772034
-102.279363702931

Date: 08/07/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A05

Photo: 3

Location:
W01A05RJ01

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.2452050282676
-102.275566873893

Date: 08/07/2024

Taken By:
Kenzie Connolly

Photo: 4

Location:
W02A05RJ03

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.2481223325623
-102.279389192585

Date: 08/07/2024

Taken By:
Kenzie Connolly

Segment

A06

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 1

Location:
DPA06RJ02

Description:
Upland/cropland peas

Direction:
North

Coordinates:
48.2378939655118
-102.266465983259

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
DPA06RJ04

Description:
Upland area

Direction:
North

Coordinates:
48.2371346023636
-102.265553792127

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 3

Location:
DPA06RJ07

Description:
Upland data point

Direction:
East

Coordinates:
48.2338862838925
-102.260533270667

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 4

Location:
DPA06RJ07

Description:
Upland data point

Direction:
East

Coordinates:
48.2338862838925
-102.260533270667

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 5

Location:
DPA06RJ09

Description:
Upland wheat crop field

Direction:
South

Coordinates:
48.2329949126798
-102.256494035319

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 6

Location:
DPA06RJ11

Description:
Wheat crop field

Direction:
South

Coordinates:
48.230319761493
-102.250660542549

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 7

Location:
W01A06RJ01

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.237870243675
-102.26642131882

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 8

Location:
W02A06RJ03

Description:
PEM WETLAND

Direction:
South

Coordinates:
48.2370928003543
-102.26554877149

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 9

Location:
W03A06RJ05

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.2339099815559
-102.260518230327

Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 10

Location:
W04A06RJ08

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.232993611261
-102.256482773186

Date: 08/06/2024

Taken By:
Kenzie Connolly

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A06

Photo: 11

Location:
W05A06RJ10

Description:
PEM WETLAND

Direction:
North

Coordinates:
48.2303417657907
-102.250695337443

Date: 08/06/2024

Taken By:
Kenzie Connolly

Segment

A07

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A07

Photo: 1

Location:
PP01A07

Description:
Upland/cropland canola

Direction:
North

Coordinates:
48.212185°-102.224557°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
PP01A07

Description:
Upland area

Direction:
West

Coordinates:
48.212185°, -102.224557°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Segment

A08

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A8

Photo: 1

Date: 08-06-2024

Description:
PEM wetland WA08SC01 and data point DPA08SC01

Location:
Eastern portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
West

Photo: 2

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC02

Location:
Eastern portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A8

Photo: 3

Date: 08-06-2024

Description:
PEM wetland WA08SC03 and data point DPA08SC04

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
North

Photo: 4

Date: 08-06-2024

Description:
PEM wetland WA08SC04 and data point DPA08SC05

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A8

Photo: 5

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC06

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
South

Photo: 6

Date: 08-06-2024

Description:
PEM wetland WA08SC05 and data point DPA08SC07

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A8

Photo: 7

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC08

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
South

Photo: 8

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC09

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
North

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A8

Photo: 9

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC10

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
North

Photo: 10

Date: 08-06-2024

Description:
Representative Upland data point DPA08SC03

Location:
Western portion of segment A08

Photograph Taken By:
Stephen Chu

Direction:
North

Segment

A09

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A09

Photo: 1

Date: 08-05-2024

Description:
Representative Upland data point DPA09SC01

Location:
Western portion of segment A09

Photograph Taken By:
Stephen Chu

Direction:
North

Photo: 2

Date: 08-05-2024

Description:
Representative Upland data point DPA09SC02

Location:
Central portion of segment A09

Photograph Taken By:
Stephen Chu

Direction:
West

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A09

Photo: 3

Date: 08-05-2024

Description:
Representative Upland data point DPA09SC03

Location:
Central portion of segment A09

Photograph Taken By:
Stephen Chu

Direction:
South

Photo: 4

Date: 08-05-2024

Description:
Representative Upland data point DPA09SC04

Location:
Eastern portion of segment A09

Photograph Taken By:
Stephen Chu

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A09

Photo: 5

Date: 08-05-2024

Description:
Representative Upland data point DPA09SC05

Location:
Eastern portion of segment A09

Photograph Taken By:
Stephen Chu

Direction:
West

Segment

A10

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 1

Date: 08-07-2024

Description:
Representative upland data point DPA10CK01 mapped within a NWI polygon.

Location:
A10

Photograph Taken By:
Christian Kammel

Direction:
Southeast

Photo: 2

Date: 08-07-2024

Description:
Representative upland data point DPA10CK02 mapped within an NWI polygon.

Location:
A10

Photograph Taken By:
Christian Kammel

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 3

Date: 08-07-2024

Description:
Representative upland data point DPA10CK03 mapped within an NWI polygon.

Location:
A10

Photograph Taken By:
Christian Kammel

Direction:
Southeast

Photo: 4

Date: 08-07-2024

Description:
PEM wetland WA10CK01 and datapoint DPA10CK04

Location:
A10

Photograph Taken By:
Christian Kammel

Direction:
Southeast

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 5

Date: 08-07-2024

Description:
DPA10CK05 representative upland data point

Location:
A10

Photograph Taken By:
Christian Kammel

Direction:
North

Segment

A11

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 1

Date: 08-07-2024

Description:
Representative upland data point DPA11CK01 mapped within an NWI polygon.

Location:
A11

Photograph Taken By:
Christian Kammel

Direction:
West

Photo: 2

Date: 08-07-2024

Description:
Representative upland data point DPA11CK02 mapped within an NWI polygon.

Location:
A11

Photograph Taken By:
Christian Kammel

Direction:
Northwest

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 3

Date: 08-07-2024

Description: PEM wetland WA11TN03 and datapoint DPA11TN01.

Location: A11

Photograph Taken By: Hannah Saxena

Direction: West

Photo: 4

Date: 08-07-2024

Description: Representative upland data point DPA11TN02 for WA11TN01

Location: A11

Photograph Taken By: Hannah Saxena

Direction: North

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 5

Date: 08-07-2024

Description: PEM wetland WA11TN02 and data point DPA11TN03

Location: A11

Photograph Taken By: Hannah Saxena

Direction: West

Photo: 6

Date: 08-07-2024

Description: Representative upland data point DPA11TN04 for WA11TN02

Location: A11

Photograph Taken By: Hannah Saxena

Direction: Northeast

Segment
A12

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A12

Photo: 1

Date: 08-07-2024

Description:
Representative upland data point DPA12TN01

Location:
A12

Photograph Taken By:
Hannah Saxena

Direction:
North

Photo: 2

Date: 08-07-2024

Description:
Upland area in ND identified wetland PEM1AD. Datapoint DPA12TN02 upland point for WA12TN01

Location:
A12

Photograph Taken By:
Hannah Saxena

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A12

Photo: 3

Date: 08-07-2024

Description:
PEM wetland WA12TN01 and datapoint DPA12TN03

Location:
A12

Photograph Taken By:
Hannah Saxena

Direction:
Southeast

Photo: 4

Date: 08-07-2024

Description:
PEM wetland WA12SJ01 and datapoint DPA12SJ01

Location:
A12

Photograph Taken By:
Stuart Jennings

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A12

Photo: 5

Date: 08-07-2024

Description:
Representative upland data point DPA12SJ02 – overlooking WA12SJ01

Location:
A12

Photograph Taken By:
Stuart Jennings

Direction:
South

Photo: 5

Date: 08-07-2024

Description:
Representative upland data point DPA12SJ03

Location:
A12

Photograph Taken By:
Stuart Jennings

Direction:
North

Segment

A13

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A13

Photo: 1

Date: 08-07-2024

Description:
View of perennial stream SA13CK01.

Location:
A13 Shell Creek

Photograph Taken By:
Christian Kammel

Direction:
South

Photo: 2

Date: 08-07-2024

Description:
Representative upland data point DPA13CK02 for WA13CK01

Location:
A13

Photograph Taken By:
Christian Kammel

Direction:
Southeast

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A13

Photo: 3

Date: 08-07-2024

Description:
PEM wetland WA13CK01 and data point DPA13CK01.

Location:
A13

Photograph Taken By:
Christian Kammel

Direction:
South

Photo: 4

Date: 08-07-2024

Description:
View of perennial stream SA13CK01.

Location:
A13 Shell Creek

Photograph Taken By:
Christian Kammel

Direction:
North

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A13

Photo: 5

Date: 08/07/2024

Description:
Representative upland area in NWI wetland in ESA

Location:
DPA13RJ01

Coordinates:
48.1100375734148
-102.07559462527

Taken By:
Kenzie Connolly

Direction:
North

Photo: 6

Description:
Representative upland area in NWI wetland in ESA

Location:
DPA13RJ01

Coordinates:
48.1100375734148
-102.07559462527

Date: 08/07/2024

Taken By:
Kenzie Connolly

Direction:
North

Segment

A14

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 1

Date: 08-06-2024

Description:
PEM wetland WA14TN01 and data point DPA14CK01.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
North

Photo: 2

Date: 08-06-2024

Description:
DPA14CK02 representative upland data point

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 4

Date: 08-06-2024

Description:
View of perennial stream SA14TN01.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
East

Photo: 4

Date: 08-06-2024

Description:
View of perennial stream SA14TN01.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
West

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 5

Date: 08-06-2024

Description:
DPA14CK04 representative upland data point

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
South

Photo: 6

Date: 08-06-2024

Description:
PEM wetland WA14TN02 and data point DPA14CK03.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
South

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 11

Date: 08-06-2024

Description:
Representative upland data point DPA14CK05 mapped within an NWI polygon.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
East

Photo: 11

Date: 08-06-2024

Description:
Representative upland data point DPA14CK05 mapped within an NWI polygon.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 12

Date: 08-06-2024

Description:
Representative upland data point DPA14CK06 mapped within an NWI polygon.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
East

Photo: 12

Date: 08-06-2024

Description:
Representative upland data point DPA14CK06 mapped within an NWI polygon.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline Project LLC
Thunder Butte Pipeline Project

Photo: 15

Date: 08-06-2024

Description:
Representative upland data point DPA14CK07 mapped within an NWI polygon.

Location:
A14

Photograph Taken By:
Christian Kammel

Direction:
Southeast

Segment

A15

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A15

Photo: 1

Location:
PP01A15

Description:
Upland/cropland Wheat field, where NWI wetland was indicated

Direction:
East

Coordinates:
48.074401°, -102.011960°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
PP01A15

Description:
Upland/cropland Wheat field, where NWI wetland was indicated

Direction:
West

Coordinates:
48.074401°, -102.011960°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Segment

A16

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A16

Photo: 1

Location:
PP01A16

Description:
Upland/cropland
Soybean

Direction:
North

Coordinates:
48.067445°
-102.001902°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
PP01A16

Description:
Upland/cropland
Soybean

Direction:
East

Coordinates:
48.067445°
-102.001902°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Segment

A17

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A17

Photo: 1

Date: 08-05-2024

Description:
PEM wetland WA17SC01 and data point DPA17SC01

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
North

Photo: 2

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC02

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
North

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A17

Photo: 3

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC03

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
Northwest

Photo: 4

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC04

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
North

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A17

Photo: 5

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC05

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
Northwest

Photo: 6

Date: 08-05-2024

Description:
PEM wetland WA17SC02 and data point DPA17SC06

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
Southwest

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A17

Photo: 7

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC07

Location:
Central portion of Segment A17

Photograph Taken By:
Stephen Chu

Direction:
Northwest

Photo: 8

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC08

Location:
Western portion of segment A17

Photograph Taken By:
Stephen Chu

Direction:
West

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A17

Photo: 9

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC09

Location:
Western portion of segment A17

Photograph Taken By:
Stephen Chu

Direction:
South

Photo: 10

Date: 08-05-2024

Description:
Representative Upland data point DPA17SC10

Location:
Western portion of segment A17

Photograph Taken By:
Stephen Chu

Direction:
West

Segment

A18

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A18

Photo: 1

Date: 08-05-2024

Description:
Representative upland data point DPA18SJ02

Location:
A18 near 43rd st. NW

Photograph Taken By:
Stuart Jennings

Direction:
West

Photo: 2

Date: 08-05-2024

Description:
Delineated wetland WA18SJ01 and data point DPA18SJ01

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A18

Photo: 3

Date: 08-05-2024

Description:
Delineated wetland WA18SJ02 and data point DPA18SJ03

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
North

Photo: 4

Date: 08-05-2024

Description:
Representative upland data point DPA18SJ03 with view of WA18SJ02

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
East

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A18

Photo: 5

Date: 08-05-2024

Description:
Delineated wetland WA18SJ03 and data point DPA18SJ05

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
Northeast

Photo: 6

Date: 08-05-2024

Description:
Representative upland data point DPA18SJ06

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
Northeast

PROJECT PHOTOGRAPHS

Thunder Butte Pipeline, LLC
Thunder Butte Pipeline Project: Segment A18

Photo: 7

Date: 08-05-2024

Description:
Representative upland data point DPA18SJ07

Location:
A18

Photograph Taken By:
Stuart Jennings

Direction:
East

Segment
A19

PROJECT PHOTOGRAPHS

Thunder Butte Petroleum Services, Inc.
Thunder Butte Pipeline Project: Segment A19

Photo: 1

Location:
PP01A19

Description:
Upland/cropland
canola

Direction:
East

Coordinates:
48.013804°
-101.918850°
Date: 08/06/2024

Taken By:
Kenzie Connolly

Photo: 2

Location:
PP01A19

Description:
Upland area

Direction:
West

Coordinates:
48.013804°
-101.918850
Date: 08/06/2024

Taken By:
Kenzie Connolly

Appendix E

2018 Delineation Report and AJD

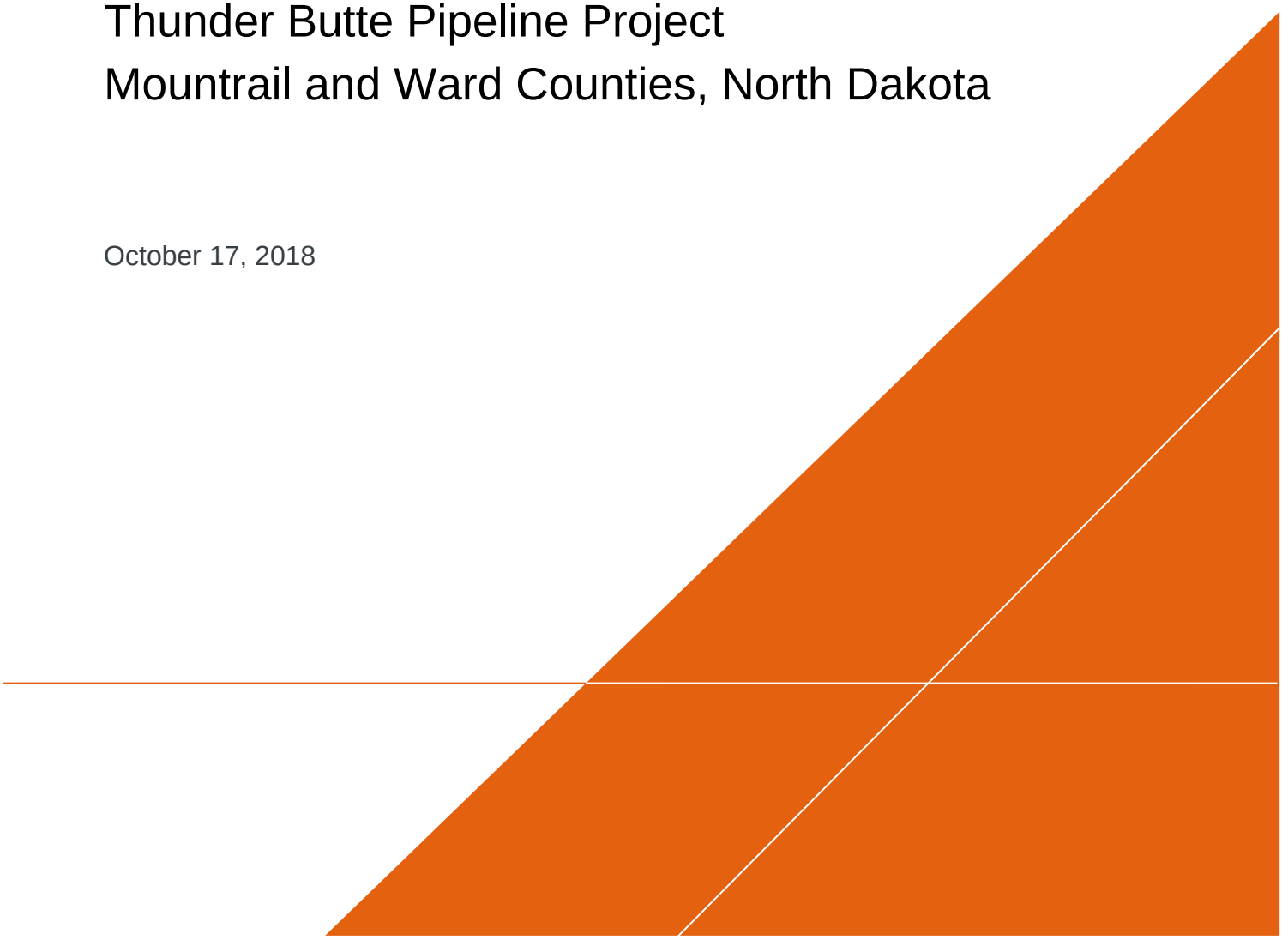
ARCADIS Design & Consultancy for natural and built assets

Thunder Butte Pipeline, LLC

WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

October 17, 2018



Stephen Chu, PWS
Senior Environmental Scientist

Douglas Anderson
Senior Environmental Scientist

David Gomes, PE, PMP
Certified Project Manager

WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties,
North Dakota

Prepared for:
Thunder Butte Pipeline, LLC
P.O Box 1227
New Town, ND 58763
701-726-5555

Prepared by:
Arcadis U.S., Inc.
126 North Jefferson Street
Suite 400
Milwaukee, Wisconsin 53202
Stephen.Chu@arcadis.com; 414.277.6228

Our Ref.:
CO002338.0001

Date:
October 17, 2018

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TABLES

FIGURES

APPENDICES

1 INTRODUCTION

This Wetland and Waterbody Delineation Report summarizes the results of a wetland and waterbody delineation survey conducted on August 7 and 8, 2018, by Arcadis U.S., Inc. (Arcadis) on behalf of Thunder Butte Pipeline, LLC. (Thunder Butte Pipeline) for the proposed construction of an approximately 3.84-mile-long crude oil pipeline and associated facilities in Mountrail and Ward Counties, North Dakota. The pipeline will originate at the existing Thunder Butte Petroleum Services Crude Storage and Loading Facility (TBPS Crude Facility) located approximately 2.7 miles northwest of Makoti, North Dakota and interconnect with the existing Enbridge crude oil pipeline at Plaza Station (**Figures 1-0** to **1-2**). The proposed pipeline and associated facilities are referred to as the Thunder Butte Pipeline Project (Project). The environmental survey area (ESA), approximately 96.85 acres, is located in Sections 18 and 19, Township 152 North, Range 87 West and Sections 2 and 11-14, Township 152 North, Range 88 West.

The proposed project involves the construction of an underground, 6-inch pipeline and associated facilities for the transport of crude oil. The ESA is comprised of the Project's 80-foot wide right-of-way (ROW) throughout the site. However, a 200-foot corridor (100 feet to each side of the center line) was surveyed to cover all potential wetland areas in the vicinity of the requested ROW. The purpose of the wetland and waterbody delineation survey was to assess the presence or absence of wetlands and other waters that may be affected by the proposed project, and to assess general ecological conditions within the ESA. Ten wetlands and one perennial stream (East Fork Shell Creek) were identified within the ESA.

2 STATEMENT OF QUALIFICATION

The wetland and waterbody delineation were performed and authored by Stephen W. Chu, Professional Wetland Scientist (PWS), Senior Environmental Scientist. Mr. Chu was the Lead Wetland Delineator for this project.

Mr. Stephen W. Chu, PWS (#1770) and Certified Senior Ecologist, earned a Master of Science degree in Natural Resources and Environmental Sciences from the University of Illinois at Urbana-Champaign. Mr. Chu has over 16 years of experience managing and completing complex ecological-related projects. His areas of expertise consist of wetland delineations, wetland mitigation design, wetland restoration, wetland and native area monitoring, habitat surveys, tree surveys, and threatened and endangered species surveys. Mr. Chu has extensive experience in fieldwork and permitting throughout the West and Midwest.

3 BACKGROUND INFORMATION

Prior to conducting the wetland and waterbody delineation survey, Arcadis reviewed the following resources to identify the potential location and extent of wetlands and waterbodies within the ESA:

- U.S. Geological Survey (USGS) topographic maps (Makoti, Wabek, Plaza, and Epworth SE quadrangle) (USGS, 2015).
- Aerial imagery (ESRI, 2016).
- USGS National Hydrography Dataset (NHD) mapped streams (USGS, 2018).
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (USFWS, 2018).
- U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) of Ward and Mountrail Counties, North Dakota (NRCS, 2018).

3.1 USGS Topographic Map

According to topographic mapping (**Figures 2-0 to 2-7**), one blueline stream, East Fork Shell Creek, is located within the central portion of the ESA. Topography was gently rolling, with elevations within the ESA ranging from 2054 to 2100 feet below sea level.

3.2 USGS NHD

The USGS NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and stream gauges. One NHD feature, East Fork Shell Creek, is mapped within the ESA. NHD mapping for the ESA is depicted in **Figures 3-0 to 3-7**.

The ESA lies within the Lake Sakakawea sub basin (HUC 10110101). The closest designated traditionally navigable waterway (TNW) to the ESA is Lake Sakakawea which flows into the Missouri River.

3.3 National Wetlands Inventory (NWI)

NWI maps are used as a guide, along with other data, to indicate the potential presence of wetlands. The information is often out of date and not necessarily field-verified. The presence of an NWI feature is not a definitive indicator that a wetland or waterbody is present. Conversely, the absence of an NWI feature is not a definitive indicator that a wetland or waterbody is not present.

The NWI data indicated a total of 13 mapped wetlands (**Figures 3-0 to 3-7**). The following below are the NWI indicated Wetlands:

- A wetland classified as a palustrine emergent (PEM)1Cd, approximately 1.87 acres (including offsite area) is located approximately half a mile northwest of the TBPS Crude Facility.
- Two Wetlands, one classified as a PEM1Cx, approximately 0.10 acres and the other classified as a PEM1Ad, approximately 0.15 acres is located approximately 0.65 miles northwest of the TBPS Crude Facility.

- Two Wetland, one classified as a PEM1A, approximately 0.21 acres and the other classified as PEM1Ad, approximately 0.40 acres is located approximately 0.10 miles northwest from NWI classified wetlands PEM1Cx and PEM1Ad.
- A wetland classified as PEM1C, approximately 0.39 acres is located approximately 0.17 miles northwest of the previous classified wetland PEM1A.
- A wetland classified as a PEM1C, approximately 1.16 acres is located approximately 0.20 miles northwest from NWI classified wetland PEM1A.
- Three wetlands, one classified as PEM1C approximately 0.76 acres and two classified as PEM1A, approximately 0.58 and 0.10 acres is located approximately 0.25 miles southeast of 66th Street.
- A wetland classified as PEM1A, approximately 0.82 acres is located approximately 0.17 miles northwest of the intersection of 66th Street and the railroad.
- A wetland classified as a PEM1A, approximately 59.13 acres (including offsite area) is located along the East Fork Shell Creek.
- A wetland classified as a PEM1A, approximately 0.67 acres is located approximately a quarter of a mile north east of intersection 62nd Avenue and 41st Street.

3.4 Aerial Imagery

A review of aerial imagery from 1995, 2003, 2005, 2006, 2009, 2010, 2013 (Google Earth Pro V 7.3.2.5487. 2018) and 2016 (ESRI 2016) shows the ESA as consisting of the railroad with adjacent agriculture and pasture land use. No other significant changes in the landscape were observed on the historic aerial imagery review.

3.5 USDA NRCS WSS of Ward and Mountrail Counties, North Dakota

According to the USDA NRCS WSS for Ward and Mountrail Counties, North Dakota, 15 soil map units, listed in **Table 1,** are mapped within the ESA. The soil units mapped were listed as:

- Predominantly nonhydric – no major component listed for a given map unit is rated hydric, and at least one contrasting minor component is rated hydric.
- Partially hydric - at least one major component listed for a given map unit is rated as hydric, and at least one other major component is not rated hydric.
- Predominantly hydric – all major components listed for a given map unit are rated as hydric, and at least one contrasting minor component is not rated hydric.

The location and extent of the soil units identified within the ESA are depicted in **Figure 4**.

Table 1 Soil Map Units Identified within the Environmental Survey Area

Soil Unit Symbol	Soil Unit Name	Hydric Rating
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly hydric
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly nonhydric
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly nonhydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly nonhydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly nonhydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly nonhydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly nonhydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly nonhydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly nonhydric
C424A	Minot silty clay, 0 to 2 percent slopes	Predominantly nonhydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly nonhydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly nonhydric

4 METHODOLOGY

A pedestrian survey was conducted within the ESA to identify wetlands and waterbodies on August 7 & 8, 2018. Wetland boundaries were field-delineated according to Section 404 of the Clean Water Act routine onsite methodology described in the Technical Report Y-87-1 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent guidance documents and the United States Army Corps of Engineers (USACE) 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2.0). The ESA is within the Northern Great Plains Land Resource Region (USACE 2012). National Wetland Indicator status and taxonomic nomenclature is referenced from The National Wetland Plant List (Lichvar 2016). Indicators of hydric soil are based on the Field Indicators of Hydric Soils in the United States guide Version 8.1 (Vasilas et al. 2017).

Wetland delineation data were recorded on the USACE Great Plains Regional Supplement wetland determination data forms. One representative data point was recorded for each wetland. Corresponding representative upland data points were recorded to document upland boundaries and conditions surrounding the wetlands within the ESA. In addition, data points were recorded in mapped NWI wetland polygons.

Streams were identified as those waters that possessed a defined “bed and bank” or ordinary high-water mark (OHWM) indicators and lacked a dominance of upland vegetation in the channel. Channels that parallel roadways or railroads were identified as upland drainage features and were not considered to be jurisdictional unless they had an identifiable OHWM, were identified on the USGS topographic map, or represented a presumed relocation of a natural channel.

The outer boundaries of each wetland and waterbody (determined by the OHWM) were delineated and recorded using a handheld Trimble Geo7X Global positioning system receiver, with submeter accuracy. As features were collected, they were given a unique feature identification (ID).

Precipitation data from approximately 90 days prior to the wetland and waterbody delineation survey were obtained from a weather station near the ESA and compared with 30-year average precipitation data obtained from the NRCS Wetlands (WETS) Table for Mountrail County to determine if antecedent hydrologic conditions at the time of the survey were normal, wetter, or drier than the normal range (Midwestern Regional Climate Center 2018).

5 SURVEY RESULTS

5.1 Antecedent Precipitation

Prior to conducting the field visit, antecedent precipitation data were analyzed. Data were obtained from a nearby weather station (PLAZA (ND) USC00327120) and compared to data from a nearby WETS station that had sufficient historical data (STANLEY 3 NNW, ND). The most recent rainfall event prior to the site visit occurred on July 10, 2018 with approximately 0.1 inches of precipitation. Precipitation for the 14 days prior to site visit was 0.0 inches. The precipitation data for the 90-day period prior to the field visit were entered into a WETS analysis worksheet to weight the information from each preceding month to analyze hydrologic conditions (**Appendix A**). Based on this analysis, the antecedent hydrologic conditions were considered to be within normal range, suggesting that climatic/hydrologic conditions were normal for this time of year.

5.2 Vegetative Communities

Vegetative communities observed within the ESA consisted of railroad ROW, agricultural land use, and PEM wetlands. Photographs of the ESA are provided in **Appendix B**.

Upland portions of the railroad ROW were dominated by smooth brome (*Bromus inermis*), common sow thistle (*Sonchus oleraceus*), sweet clover (*Melilotus officinalis*), Canada thistle (*Cirsium arvense*), quackgrass (*Elymus repens*), and Virginia wildrye (*Elymus virginicus*). The agriculture lands were planted with alfalfa (*Medicago sativa*), lentils (*Lens culinaris*), soy bean (*Glycine max*), and common wheat (*Triticum aestivum*). The PEM wetlands were dominated by reed canary grass (*Phalaris arundinacea*), broadleaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), foxtail barley (*Hordeum jubatum*), barnyard grass (*Echinochloa crus-galli*) and prairie cordgrass (*Spartina pectinata*).

5.3 Wetlands

As shown in **Figure 6**, a total of ten PEM wetlands (Wetlands W1 to W10) were identified within the ESA, for a total of 8.479 acres. USACE Wetland Determination Data Forms are provided in **Appendix C** and wetland characteristics are summarized in **Table 2**. It should be noted that the USACE make the final determination of wetland hydrologic connectivity and jurisdiction.

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W1	PEM	0.129 acres	47.981593°, -101.869972°	East Fork Shell Creek
W2	PEM	0.249 acres	47.983102°, -101.874448°	Isolated depression
W3	PEM	0.042 acres	47.983268°, -101.875925°	Isolated depression
W4	PEM	0.200 acres	47.983659°, -101.876094°	Isolated depression
W5	PEM	0.455 acres	47.984415°, -101.878144°	Isolated depression

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W6	PEM	1.695 acres	47.985850°, -101.883267°	Isolated depression
W7	PEM	1.767 acres	47.987734°, -101.888990°	Isolated depression
W8	PEM	0.276 acres	47.991424°, -101.896871°	Isolated depression
W9	PEM	3.551 acres	47.994401°, -101.901609°	East Fork Shell Creek
W10	PEM	0.115 acres	48.009752°, -101.911743°	Isolated depression

Notes:
1 The wetland may extend outside of the ESA; this acreage corresponds to the size of the feature located within the ESA.
2 The determinations of hydrologic connection are based on the boundary delineations and have not been formally approved by the USACE.

W1 is an emergent wetland that measures approximately 0.129 acres within the ESA, located northwest of the TBPS Crude Facility. One wetland data point (W01DP01) was taken within W1 and one upland data point (W01DP02) was taken in an adjacent upland area. W1 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W1 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland continues offsite to the north, via a 36-inch culvert under the railroad, and appears to eventually drain into the East Fork Shell Creek. As a result, W1 may be considered a Waters of the United States (WOUS).

W2 is an emergent wetland that measures approximately 0.249 acres within the ESA, located northwest of W1 along the railroad. One wetland data point (W02DP01) was taken within W2 and one upland data point (W02DP02) was taken in an adjacent upland area. W02 was dominated by foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Three secondary hydrology indicators observed within W2 consisted of surface soil cracks (B6), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W3 is an emergent wetland, approximately 0.042 acres within the ESA, located northwest of W2 along the railroad. One wetland data point (W03DP01) was taken within W3 and one upland data point (W03DP02) was taken in an adjacent upland area. W3 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W3 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W4 is an emergent wetland, approximately 0.200 acres within the ESA, located approximately 150 feet north of W3. One wetland data point (W04DP01) was taken within W4 and one upland data point (W03DP02) was taken in an adjacent upland area. W4 was dominated by reed canary grass. Hydric soil

indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W4 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W5 is an emergent wetland, approximately 0.455 acres within the ESA, located approximately 450 feet northwest of W4. One wetland data point (W05DP01) was taken within W5 and one upland data point (W05DP02) was taken in an adjacent upland area. W5 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W5 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W6 is an emergent wetland, approximately 1.695 acres within the ESA, located approximately 850 feet northwest of W5. One wetland data point (W06DP01) was taken within W6 and one upland data point (W06DP02) was taken in an adjacent upland area. W6 was dominated by barnyard grass and narrow-leaved cattail. Hydric soil indicator F6, redox dark surface, was observed within the wetland. One primary wetland hydrology indicator, oxidized rhizospheres on living roots (C3) was observed within the subject wetland. Two secondary hydrology indicators observed within W6 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W7 is an emergent wetland, approximately 1.767 acres within the ESA, located approximately 600 feet east of 66th Street. One wetland data point (W07DP01) was taken within W7 and one upland data point (W07DP02) was taken in an adjacent upland area. W7 was dominated by narrow-leaved cattail and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W7 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W8 is an emergent wetland, approximately 0.276 acres within the ESA, located approximately 800 feet to the west of 66th Street. One wetland data point (W08DP01) was taken within W8 and one upland data point (W08DP02) was taken in an adjacent upland area. W8 was dominated by barnyard grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Four secondary hydrology indicators observed within W8 consisted of surface soil cracks (B6), sparsely vegetated concave surface (B8), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W9 is an emergent wetland, approximately 3.551 acres within the ESA, located approximately a quarter of a mile northwest of W8. Two wetland data points (W09DP01 and W09DP03) were taken within W9 and two upland data points (W09DP02 and W09DP04) were taken in adjacent upland areas. W9 is subject to grazing pressure from cattle as the wetland is within an active cow pasture. W9 was dominated by

narrow-leaved cattail, reed canary grass, prairie cordgrass, and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W9 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to have a hydrologic surface connection with the East Fork Shell Creek and may be considered a WOUS.

W10 is an emergent wetland, approximately 0.115 acres within the ESA, located approximately a quarter of a mile north east of the intersection between 62nd Avenue and 41st Street. One Data point (W10DP01) was taken within W10 and one upland data point (W10DP02) was taken in an adjacent upland area. W10 was dominated by barnyard grass and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W10 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

5.4 Waterbodies

As shown in **Figure 5-4**, one NHD stream, the East Fork Shell Creek, was identified within delineated wetland W9, measuring approximately 246 linear feet. The waterbody is within a pasture and is subject to grazing pressure from cattle. The East Fork Shell Creek crosses through the ESA heading southwest before connecting with Lake Sakakawea. Due to the hydrologic connection between these streams and Lake Sakakawea, a TNW, they may be considered a WOUS by the USACE. It should be noted that the USACE make the final determination of significant nexus with a TNW.

6 CONCLUSIONS

A wetland and waterbody delineation survey was conducted on August 7 and 8, 2018, by Arcadis for the proposed Thunder Butte Pipeline Project in Mountrail and Ward Counties, North Dakota. Arcadis identified ten wetlands (totaling 8.479 acres) and one waterbody (East Fork Shell Creek) (totaling 246 linear feet) within the ESA. Wetland W1, W9 and the East Fork Shell Creek may be considered WOUS. Wetlands W2, W3, W4, W5, W6, W7, W8, and W10 may be considered isolated wetlands.

7 REFERENCES

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FIGURES

Midline Pump Station
Site #2 Boundary
- 1.88 acres

TB to Plaza
Route -
3.80 miles

Legend

Environmental Survey Area

0 1,000 2,000 4,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-0
OVERALL PROJECT LOCATIONS

PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
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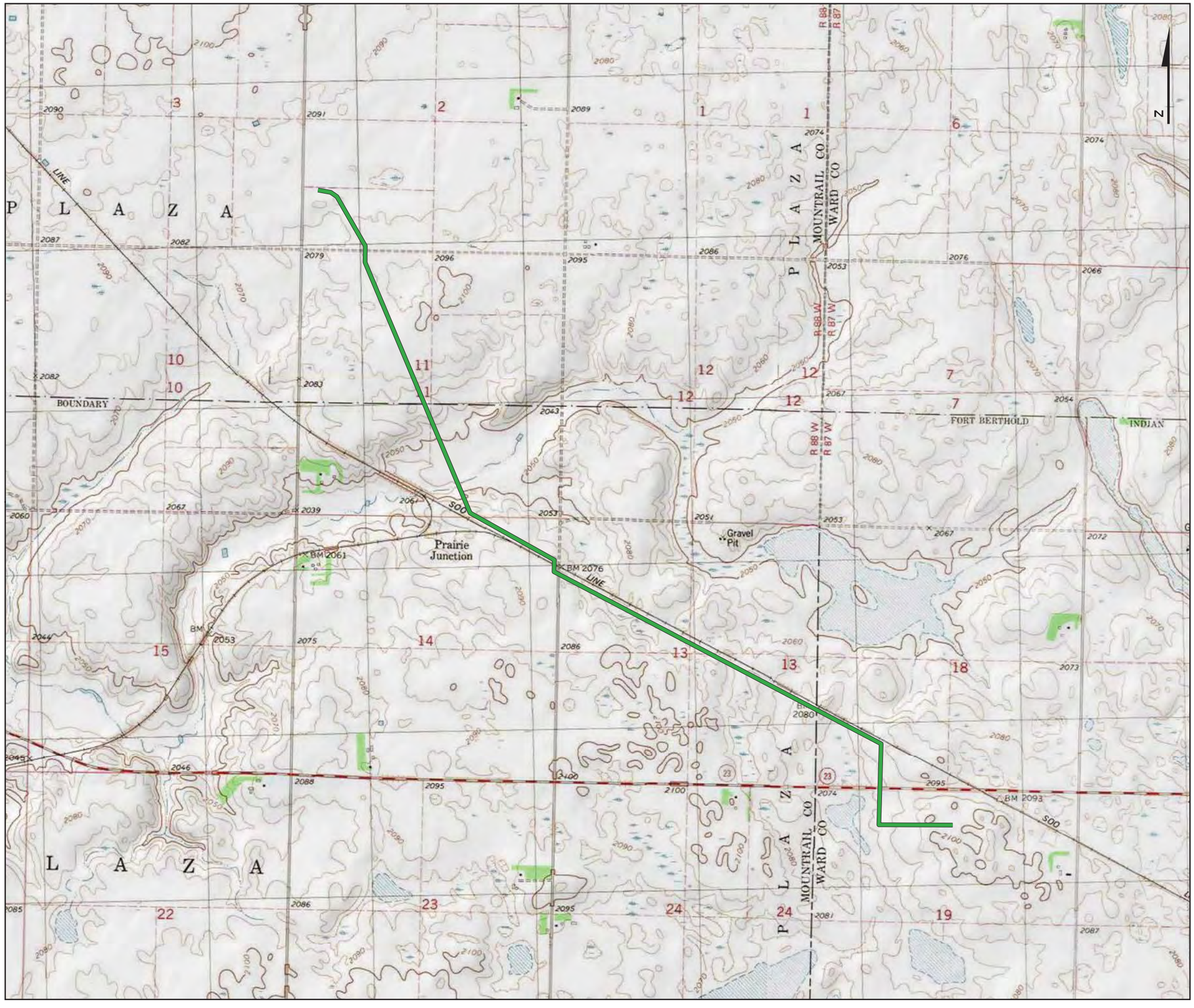
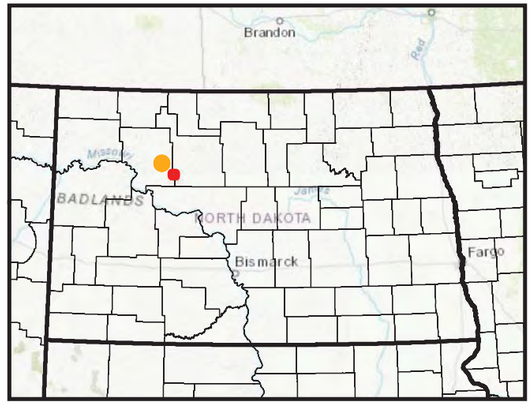




Legend

Environmental Survey Area

0 1,000 2,000 4,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

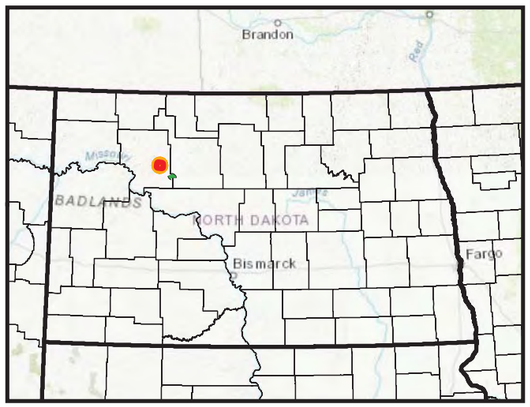
	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-1
PROJECT LOCATION
TBPS CRUDE FACILITY TO PLAZA ROUTE

PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\Fig01detail.mxd

Midline Pump Station
Site #2 Boundary
- 1.88 acres



Legend

Environmental Survey Area

0 1,000 2,000 4,000
Feet

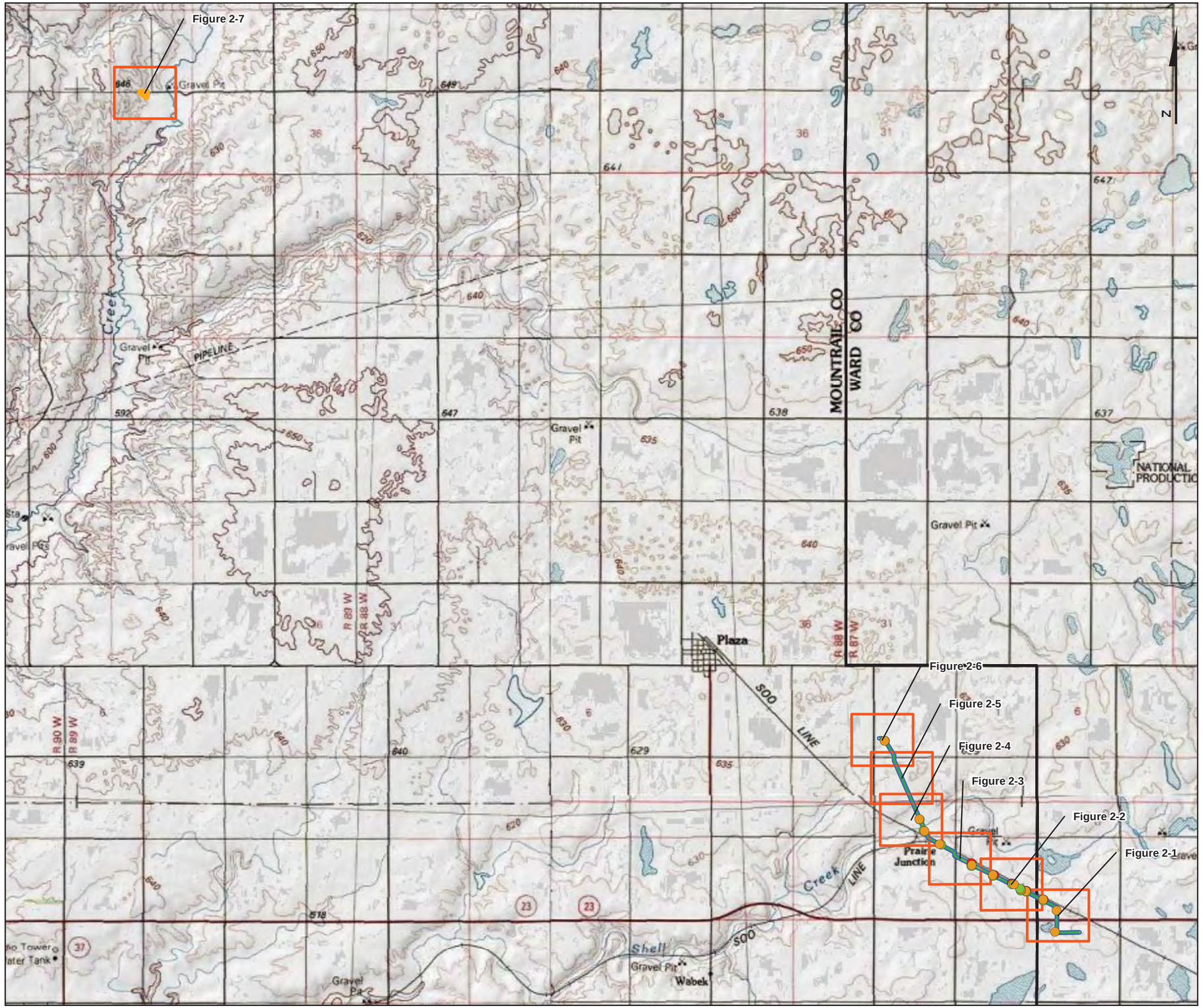
Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

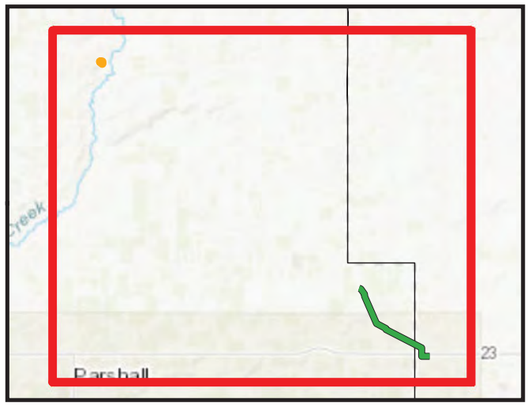
	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-2
PROJECT LOCATION
MIDLINE PUMP STATION SITE

PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\Fig01detail.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- Extents6K
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

2500 0 2500 5000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota
FIGURE 2-0 TOPOGRAPHIC MAP	
PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
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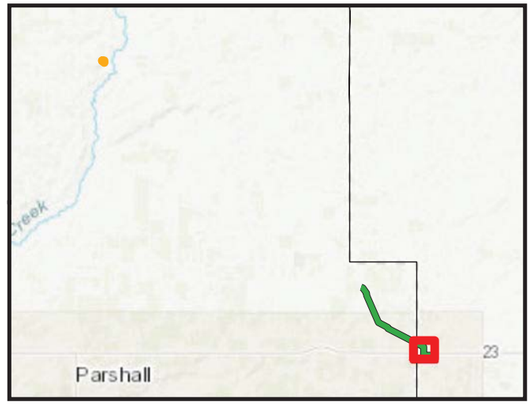

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota
FIGURE 2-1 TOPOGRAPHIC MAP	
PN:CO002338.0001	ARCADIS
Date: 10/8/2018	

Date: 10/8/2018 User Name: thahn
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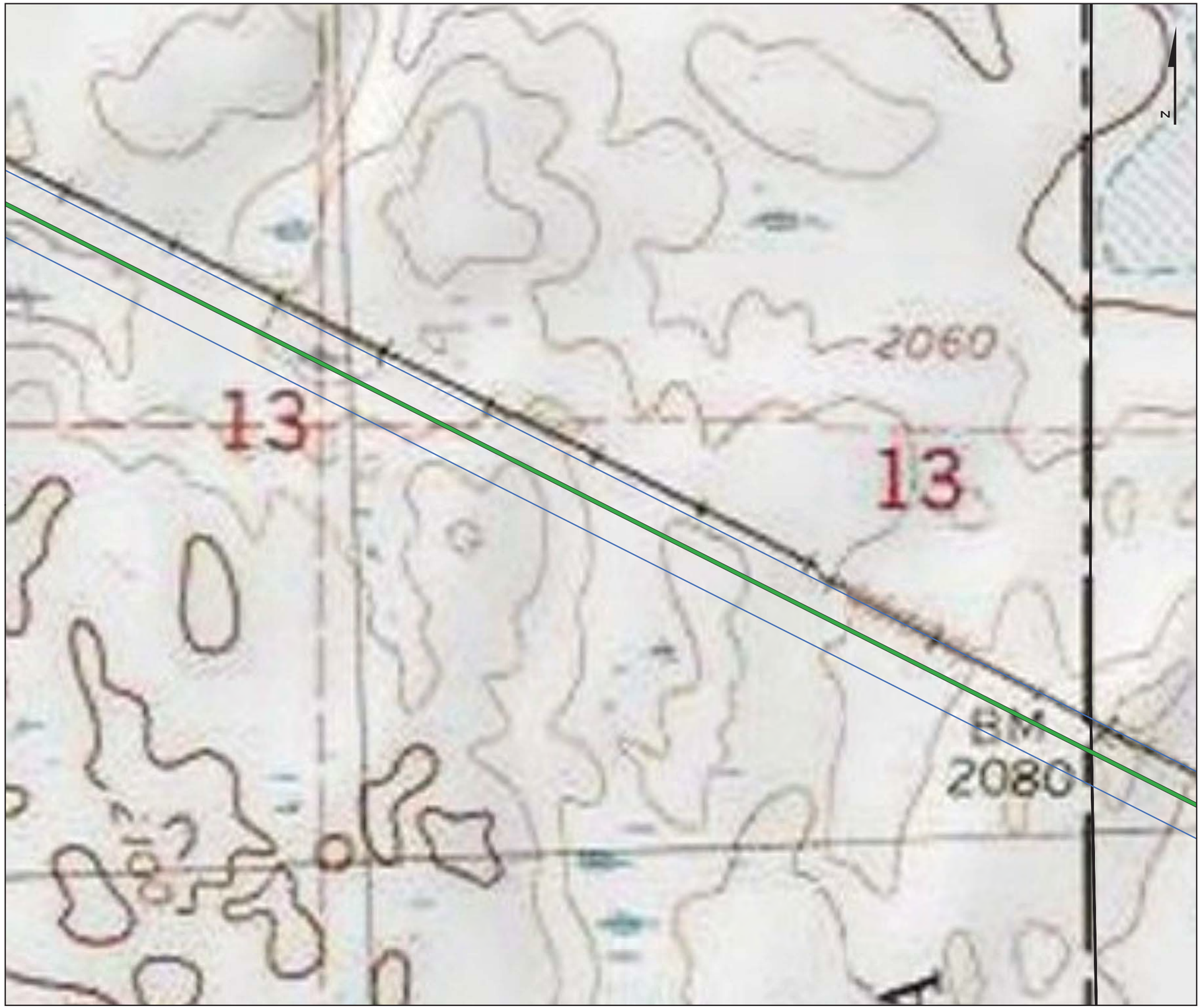

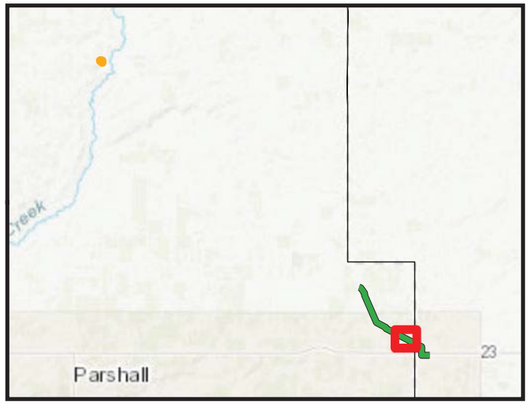

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-2
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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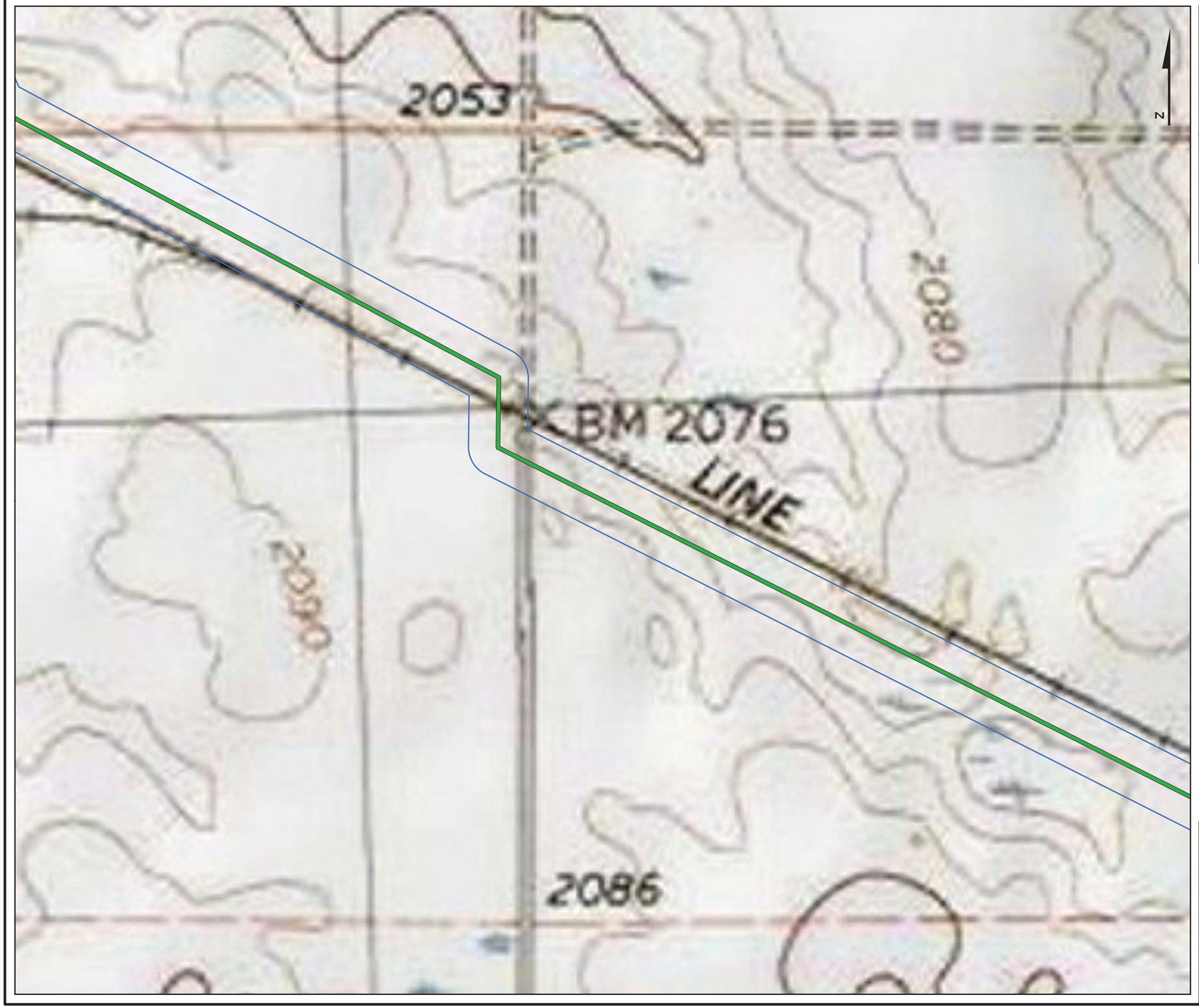

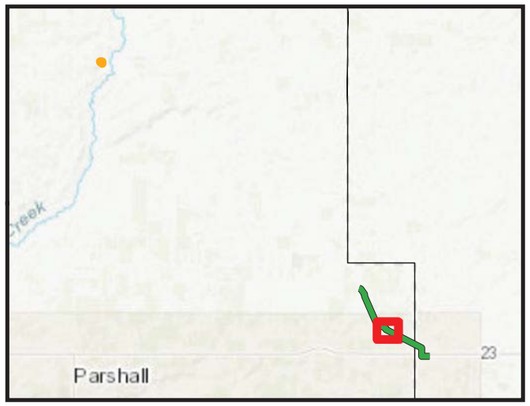

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-3
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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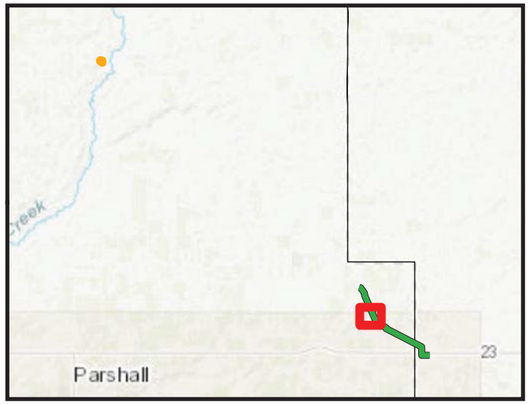

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-4
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

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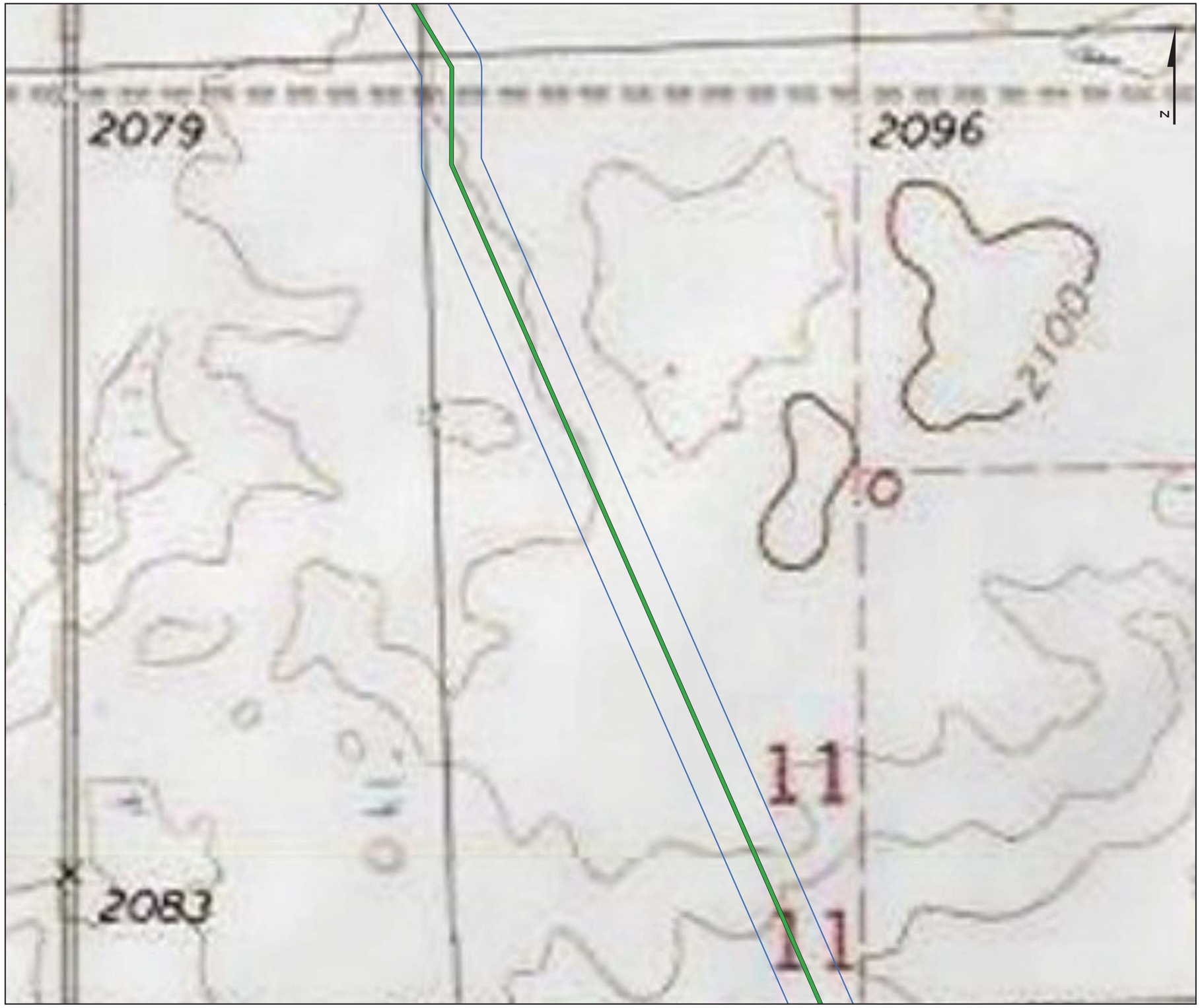

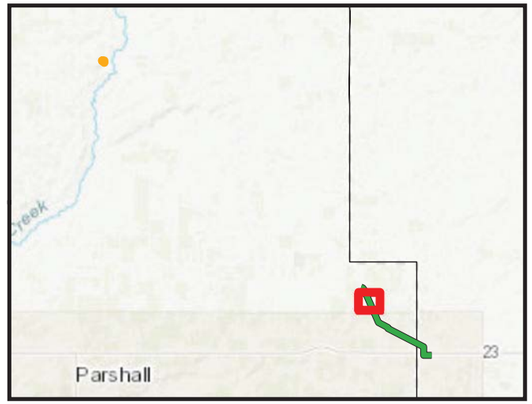

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-5
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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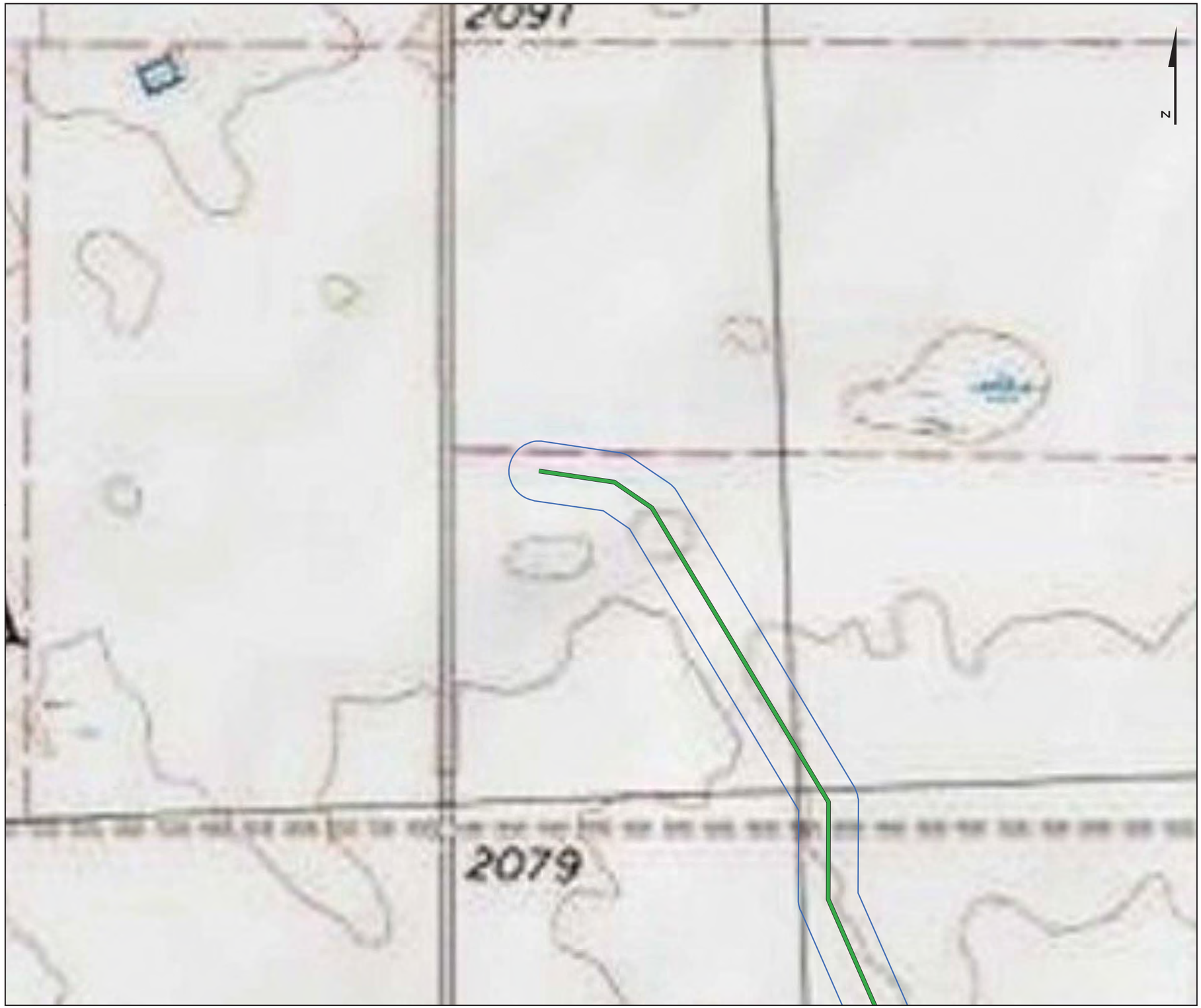

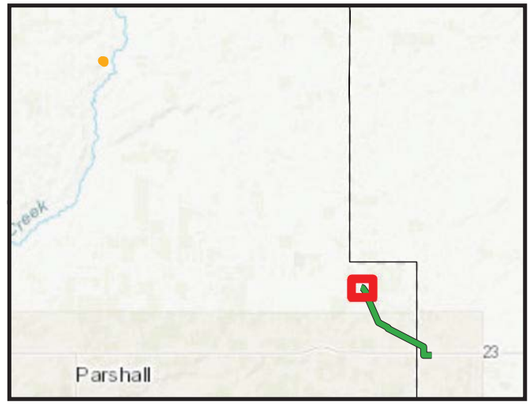

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-6
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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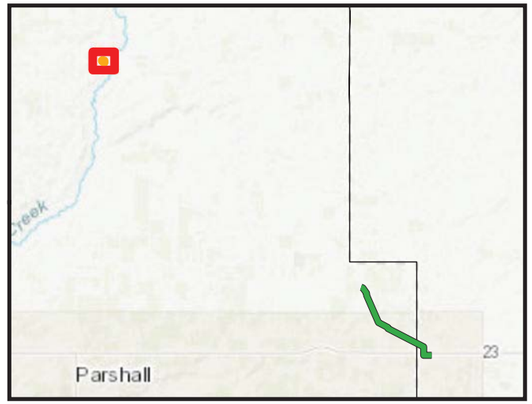

Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 2-7
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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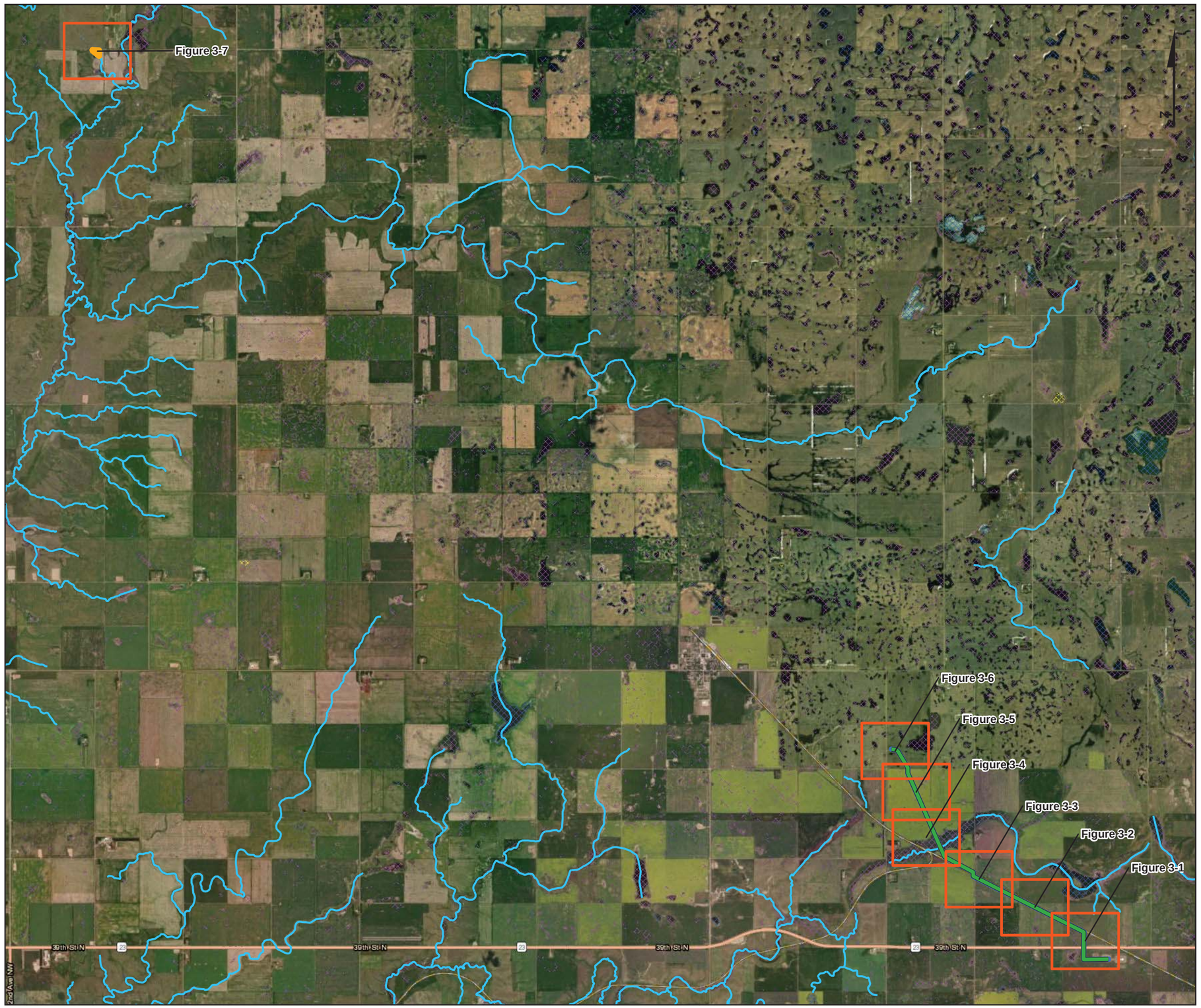

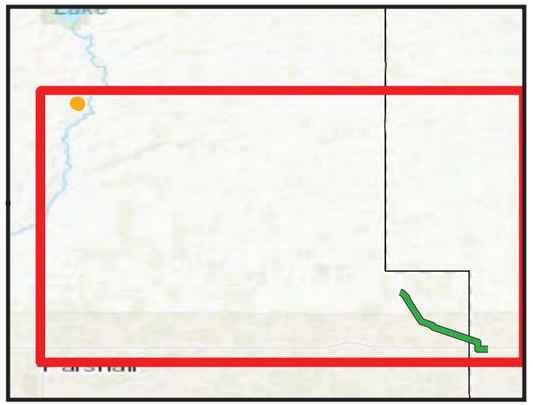

Legend

- TB to Plaza Route - 3.80 miles, Proposed
- NHD Stream

NWI Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond/Lake/River
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-0
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
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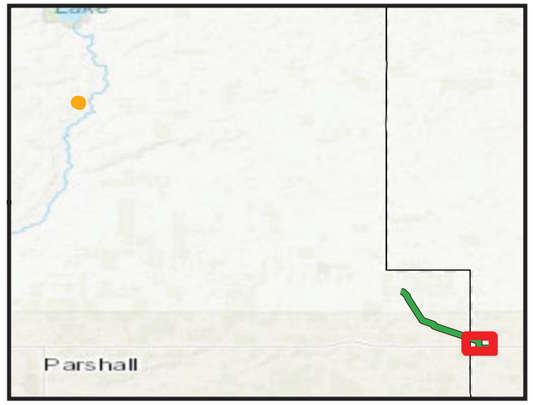

Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-1
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
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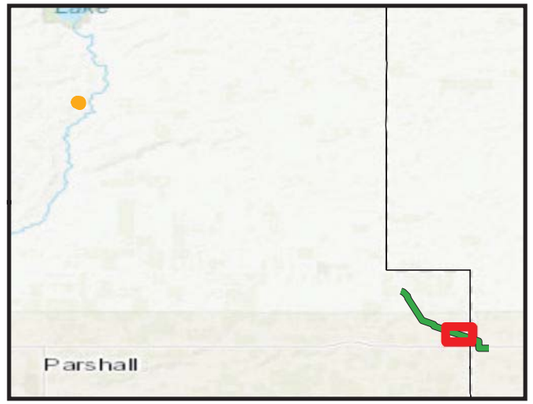

Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-2
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: nvazquez
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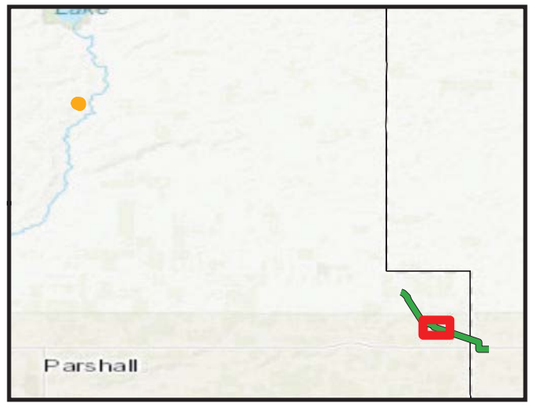

Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-3
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
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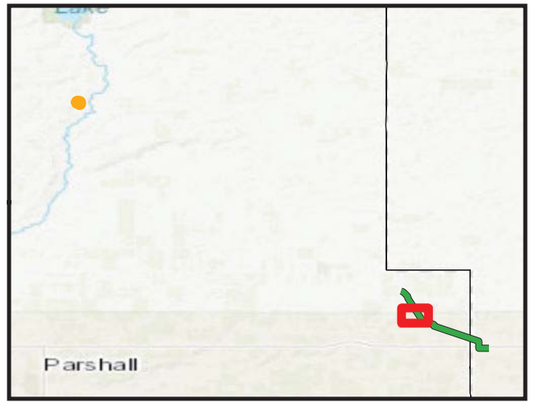

Legend

TB to Plaza Route - 3.80 miles, Proposed

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-4
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001

Date: 10/8/2018

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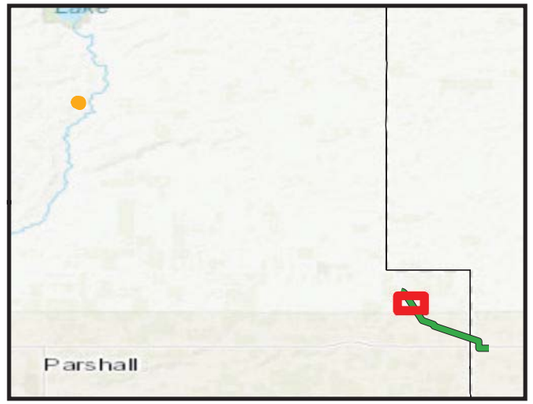
Document Path: Z:\GISProjects_EN\VMakotI_pipeline\mxd\WDR\Fig03.mxd



Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

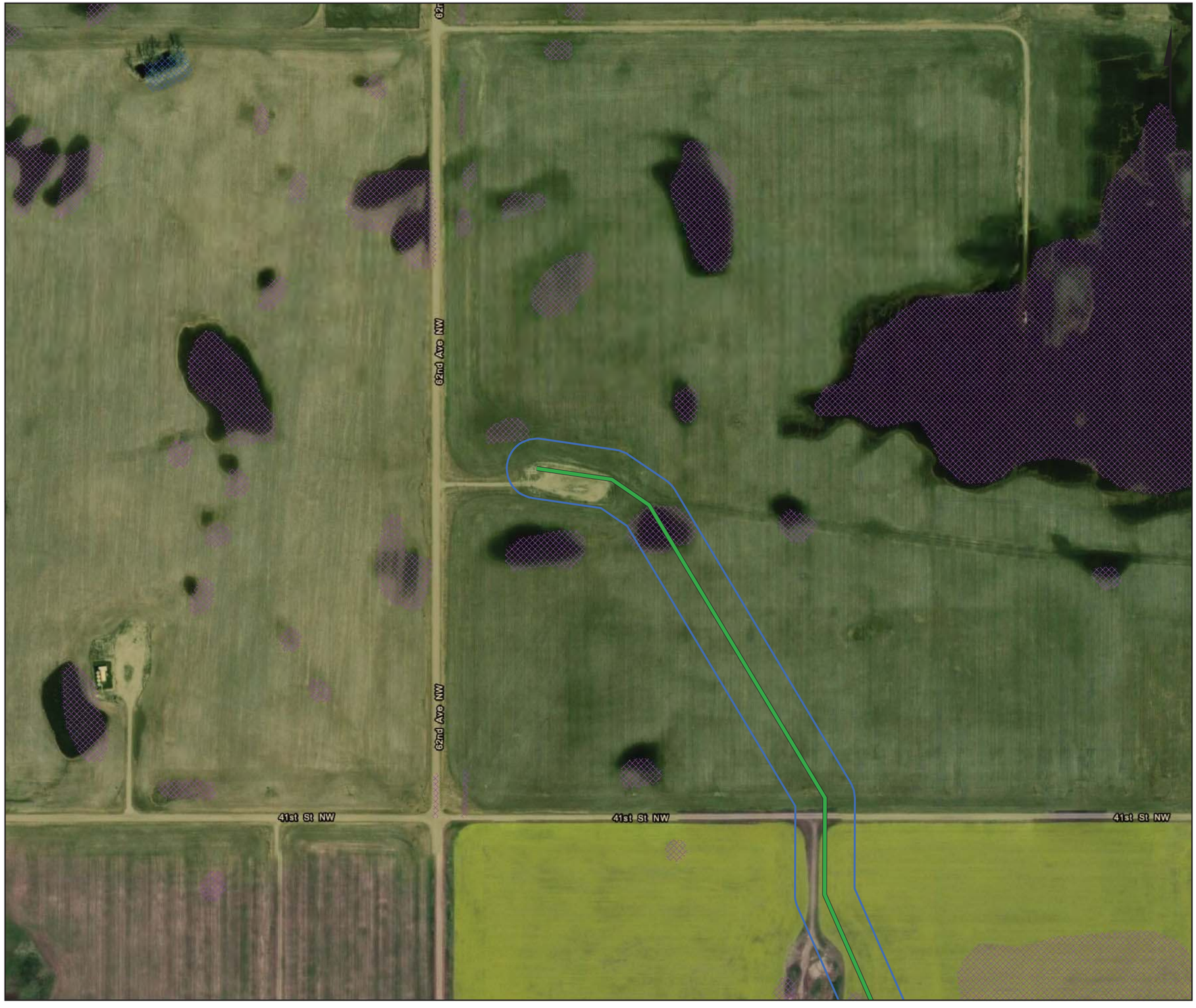
FIGURE 3-5
NWI, NHD, FEMA FLOODPLAIN MAP

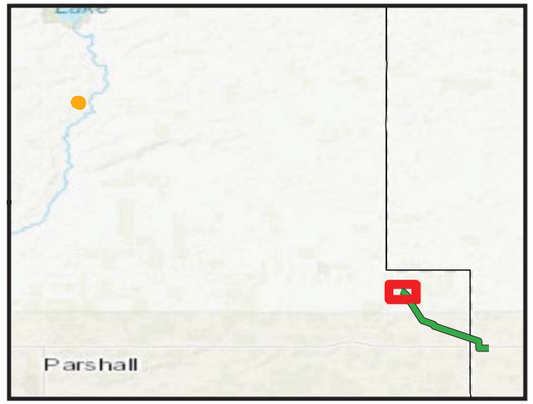
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

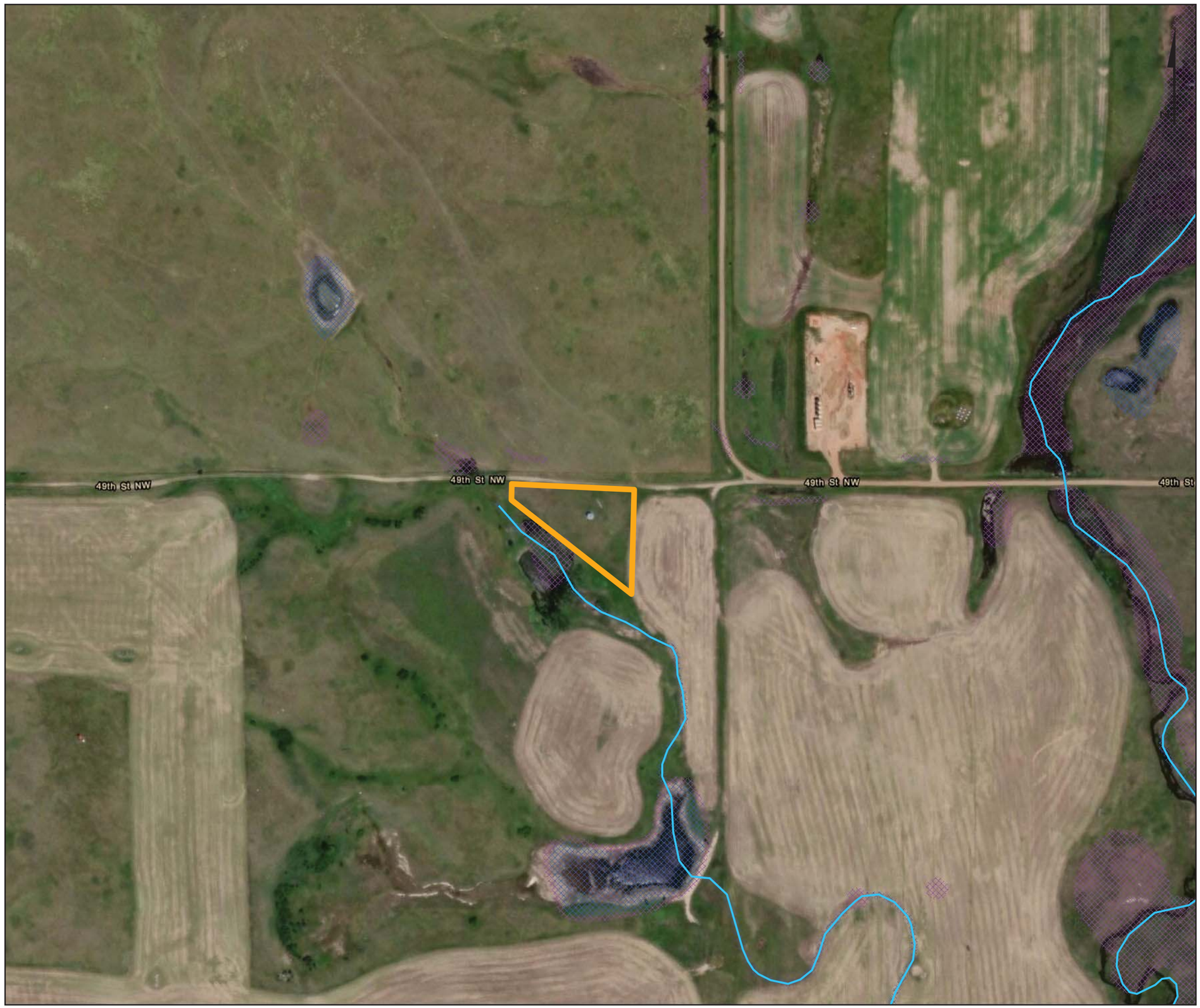
FIGURE 3-6
NWI, NHD, FEMA FLOODPLAIN MAP

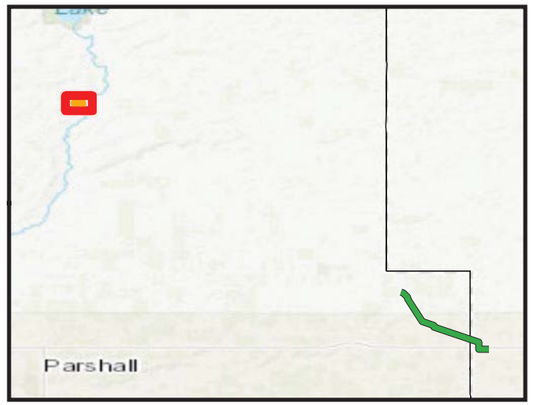
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Midline Pump Station Site #2 Boundary

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

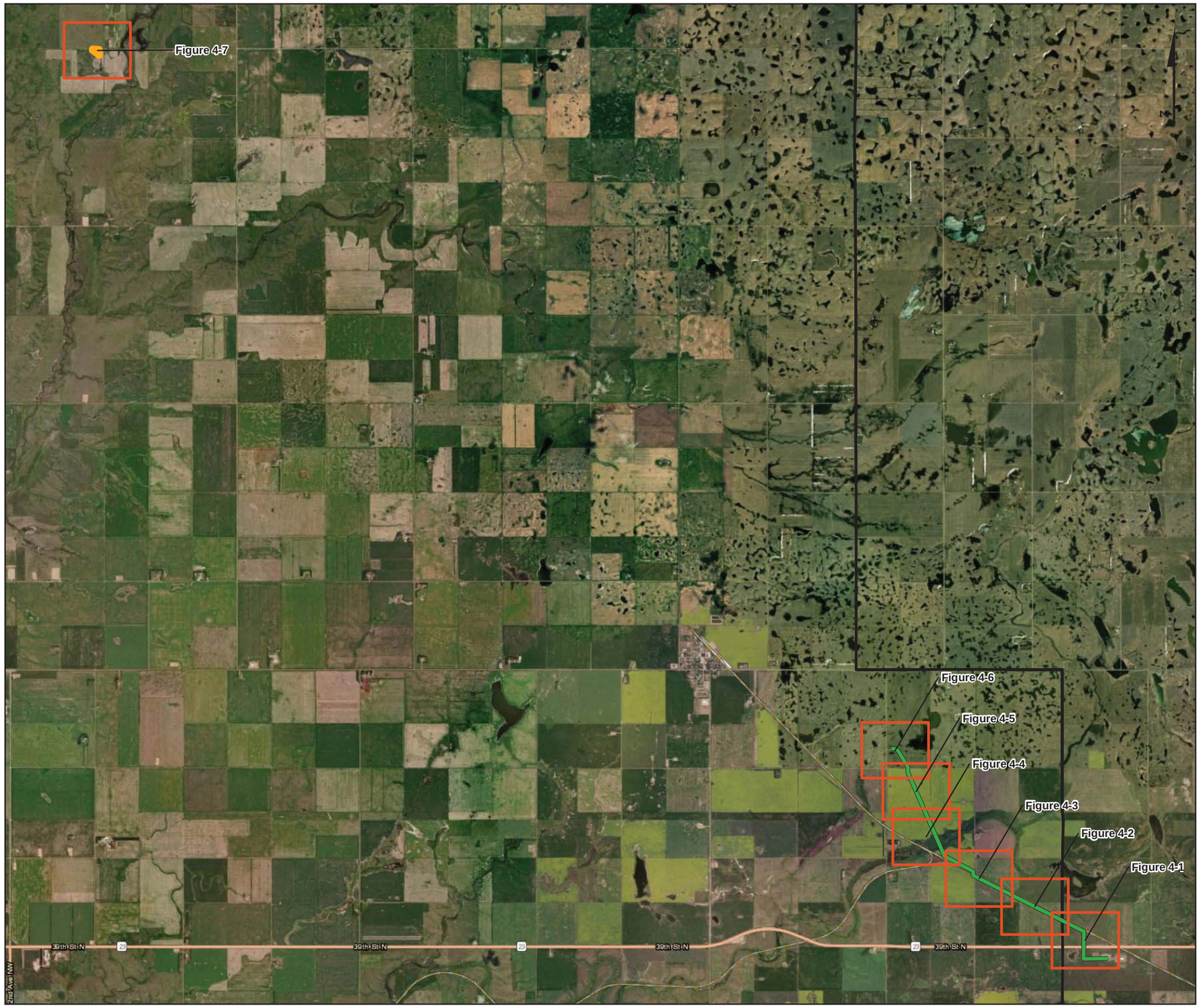
FIGURE 3-7
NWI, NHD, FEMA FLOODPLAIN MAP

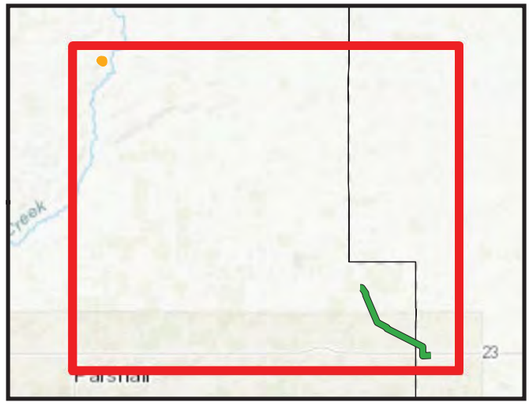
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GIS\Projects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-0
NRCS SOILS MAP

PN:CO002338.0001

Date: 10/8/2018

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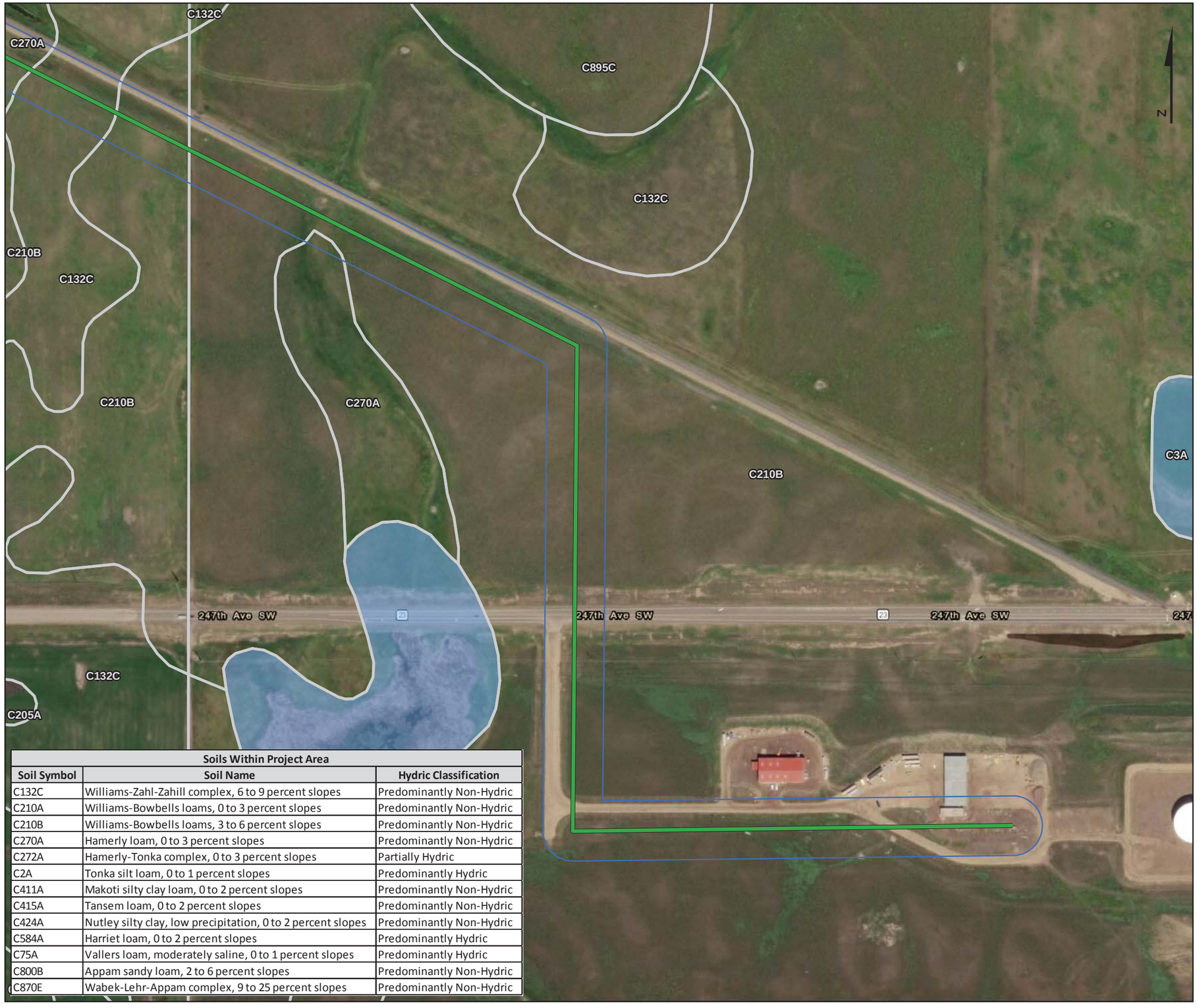
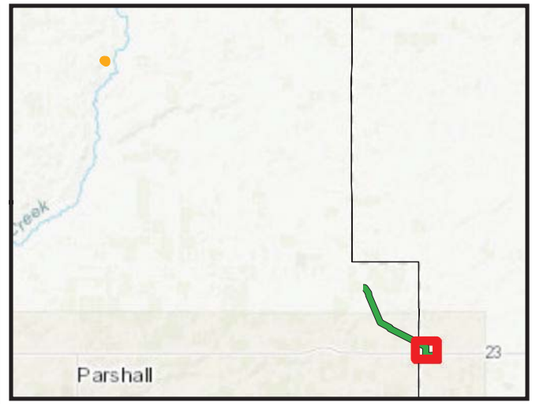
Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd



Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-1
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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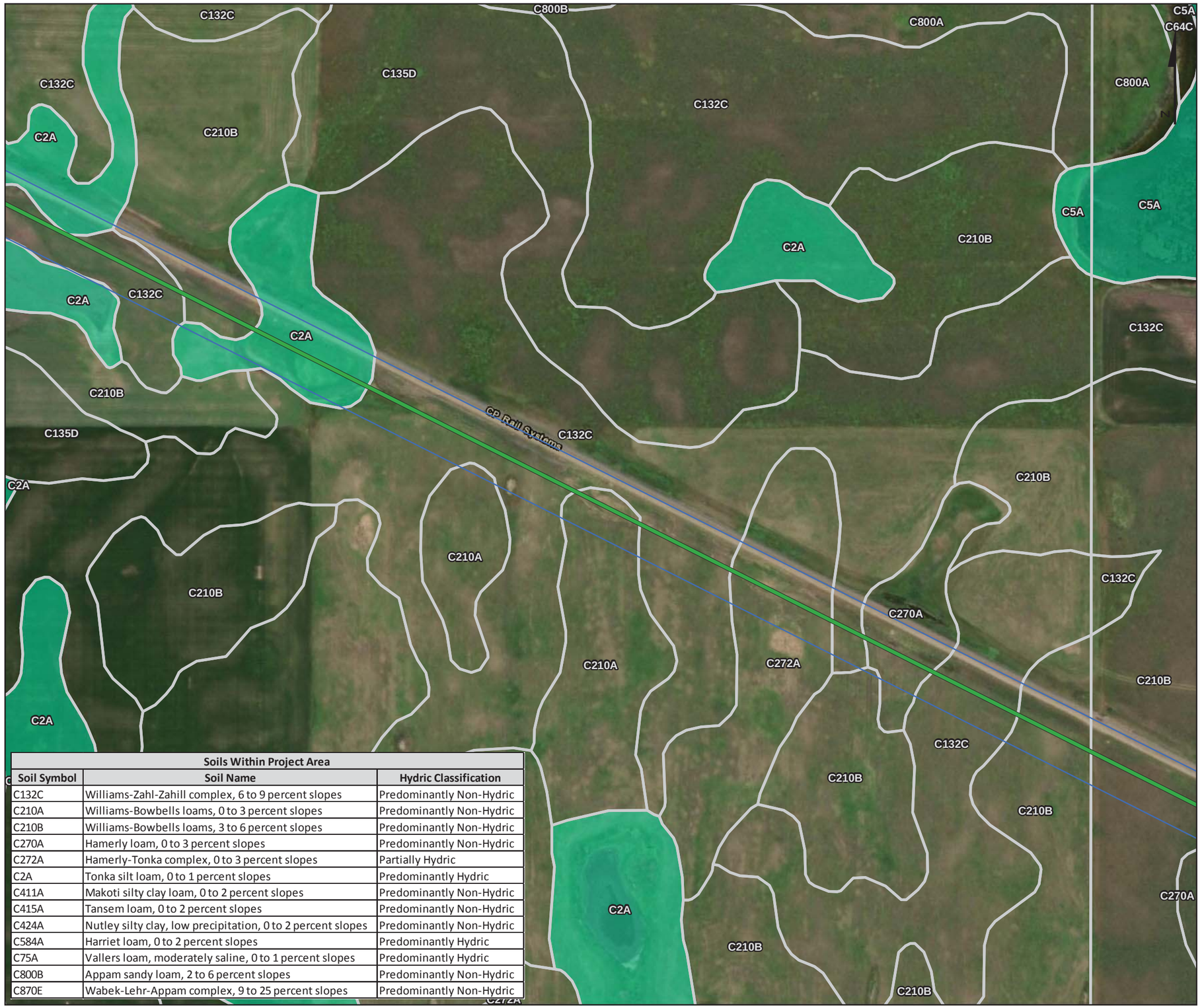

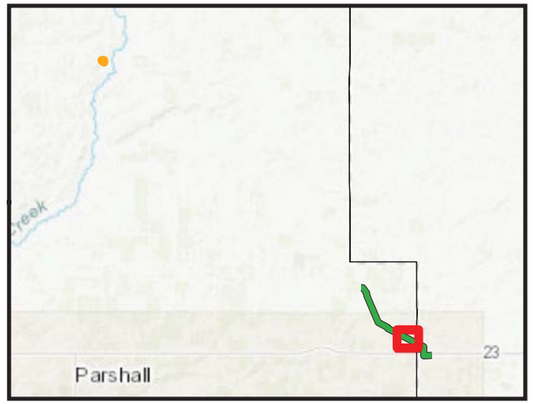

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-2
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: mvazquez
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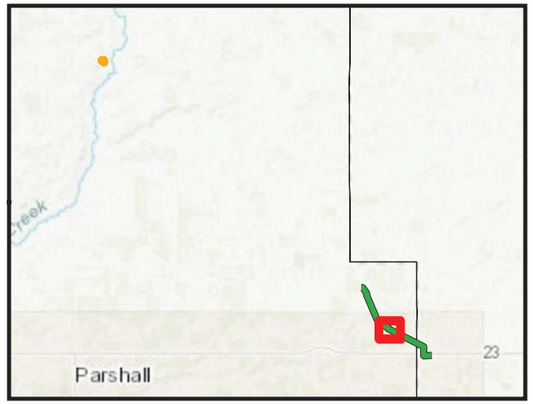

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-3
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: mvazquez
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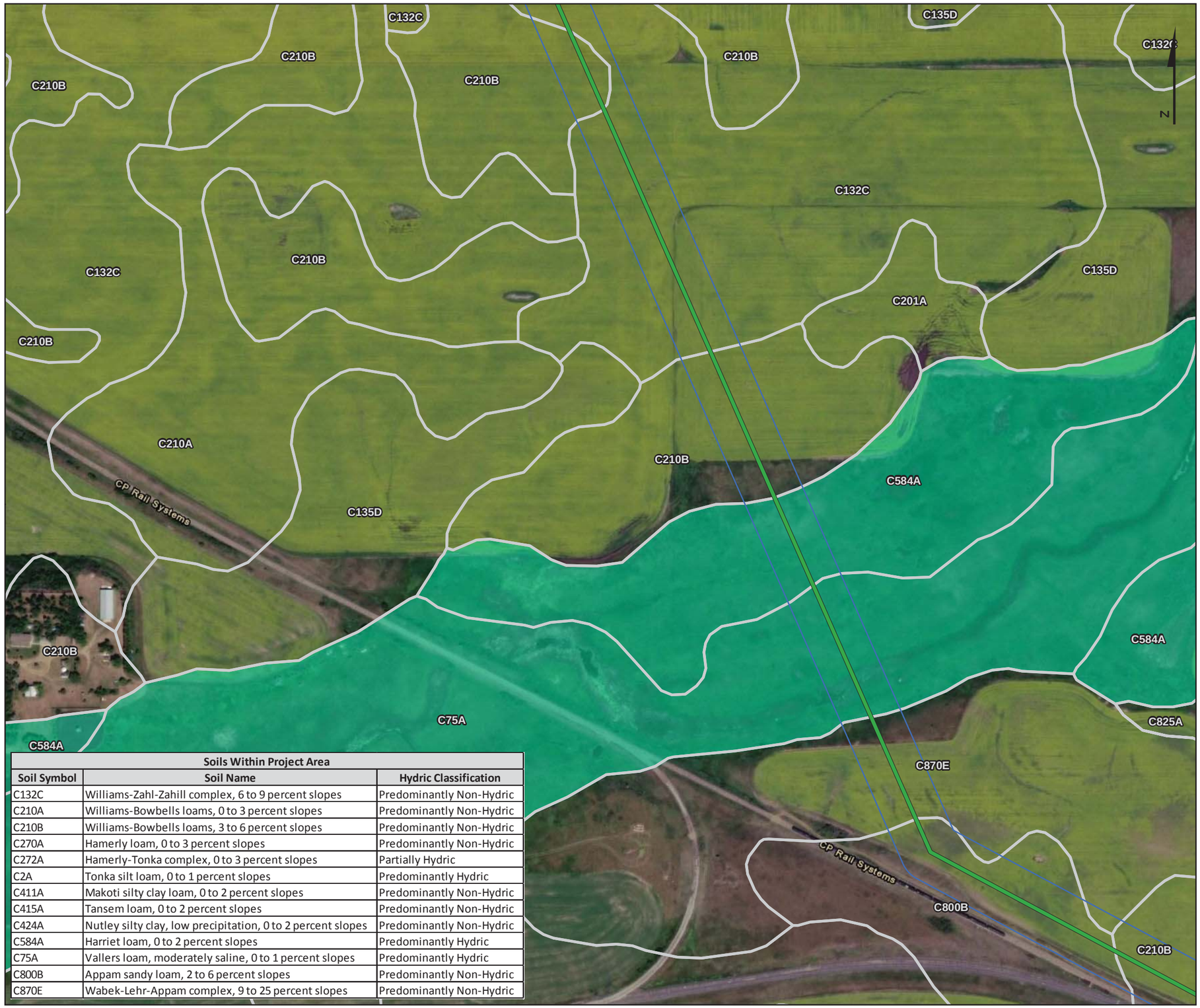

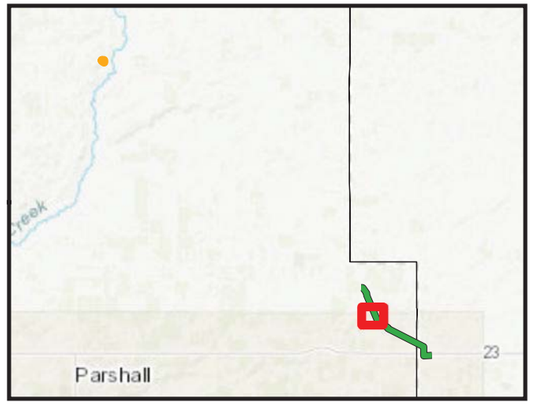

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 4-4
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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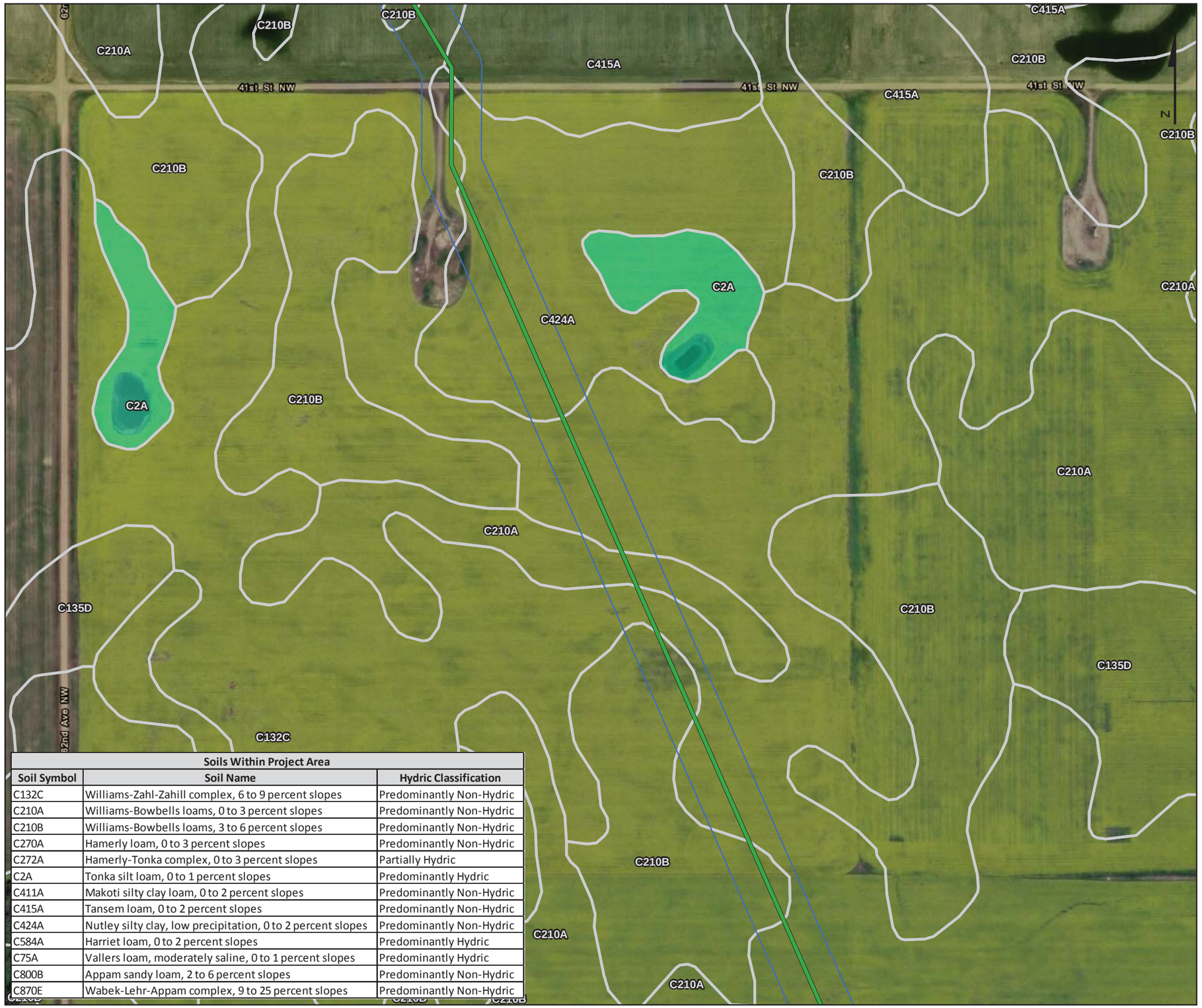

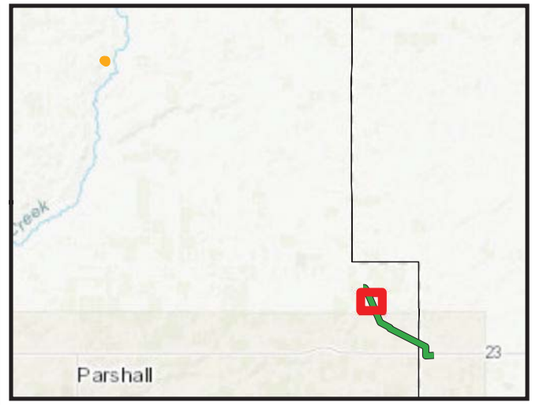

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-5
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
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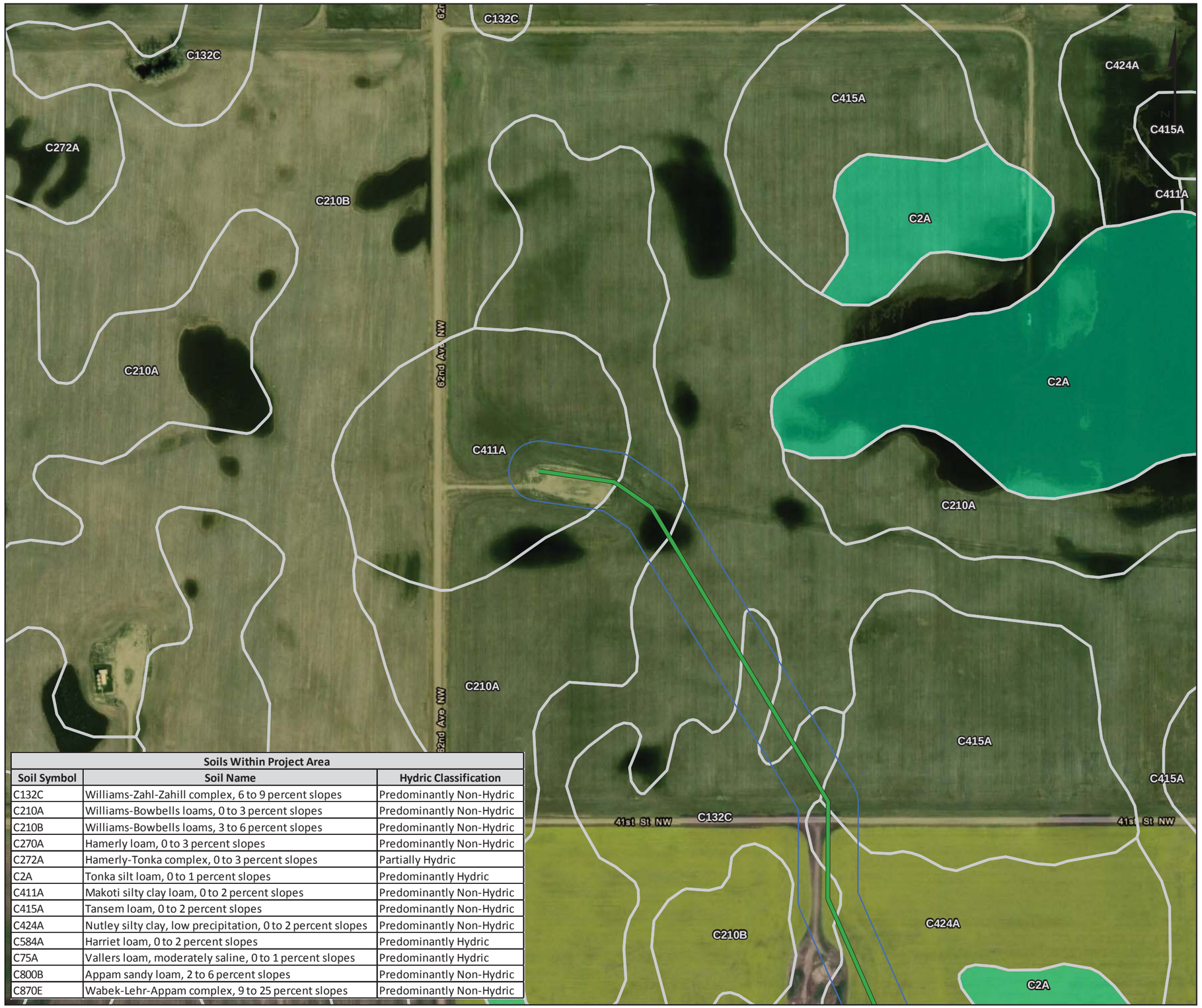
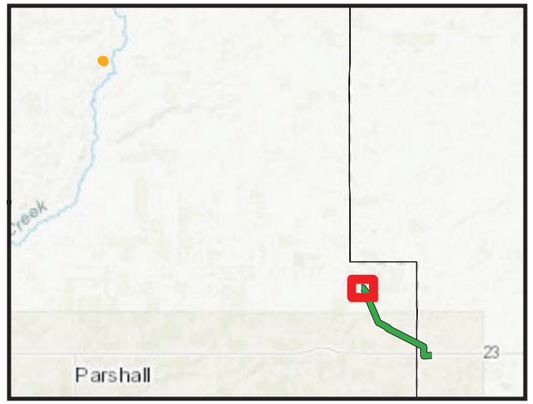




Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

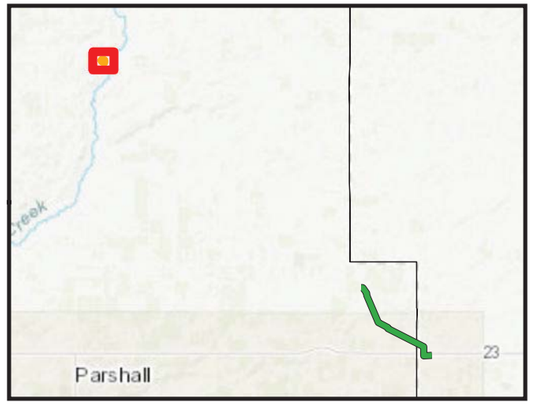
FIGURE 4-6
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-7
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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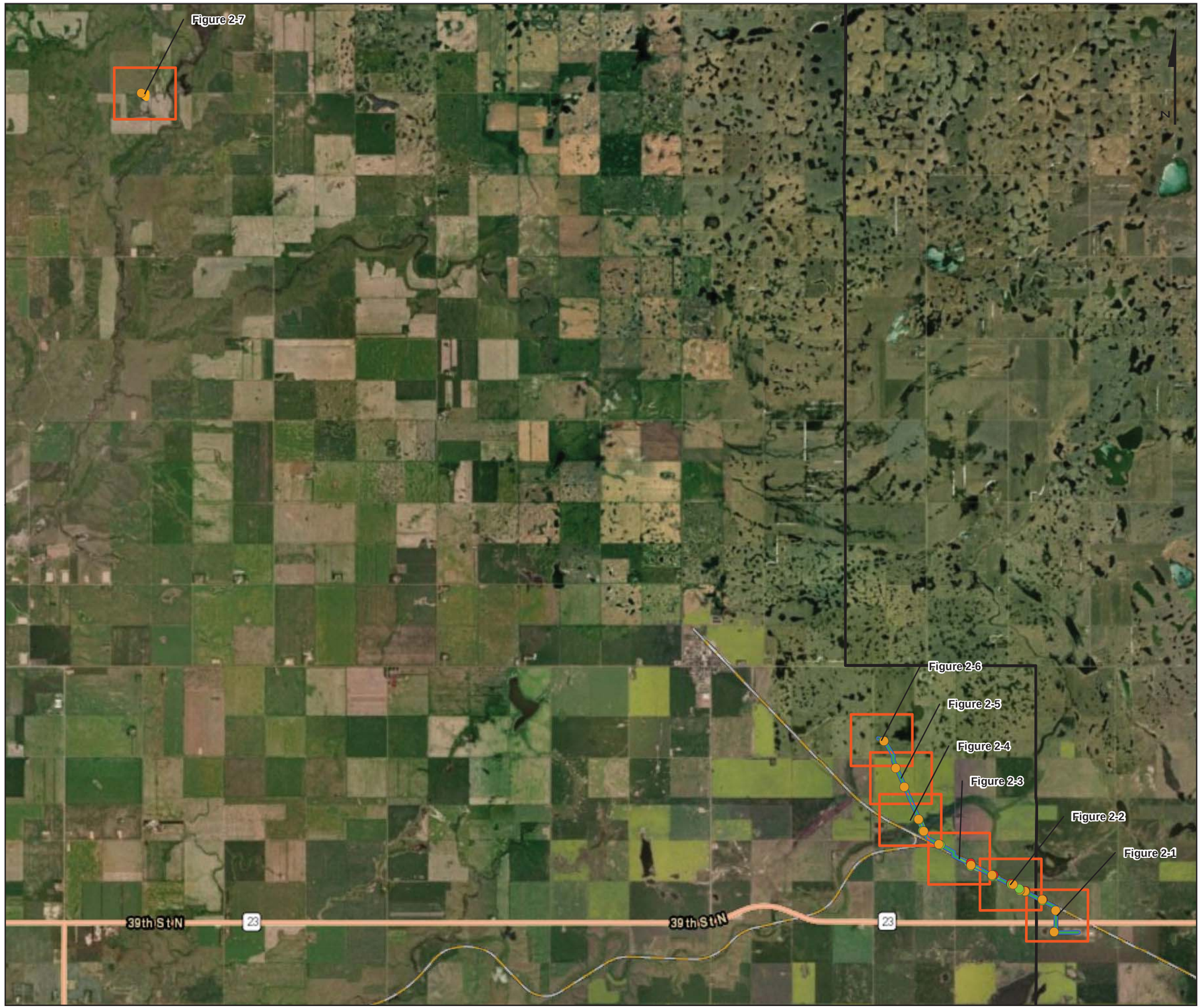
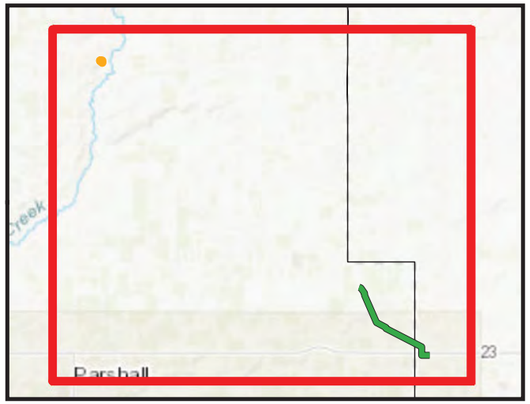
Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_EN\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

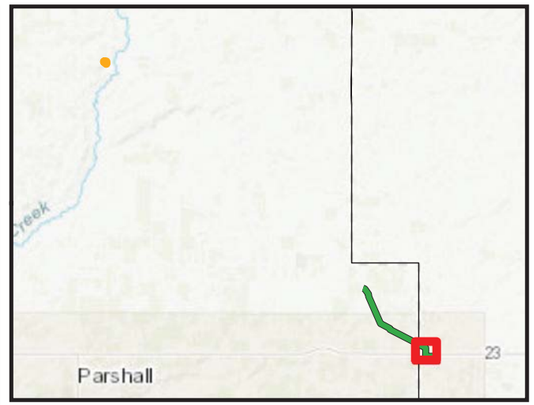
FIGURE 5-0
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig05Overview.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

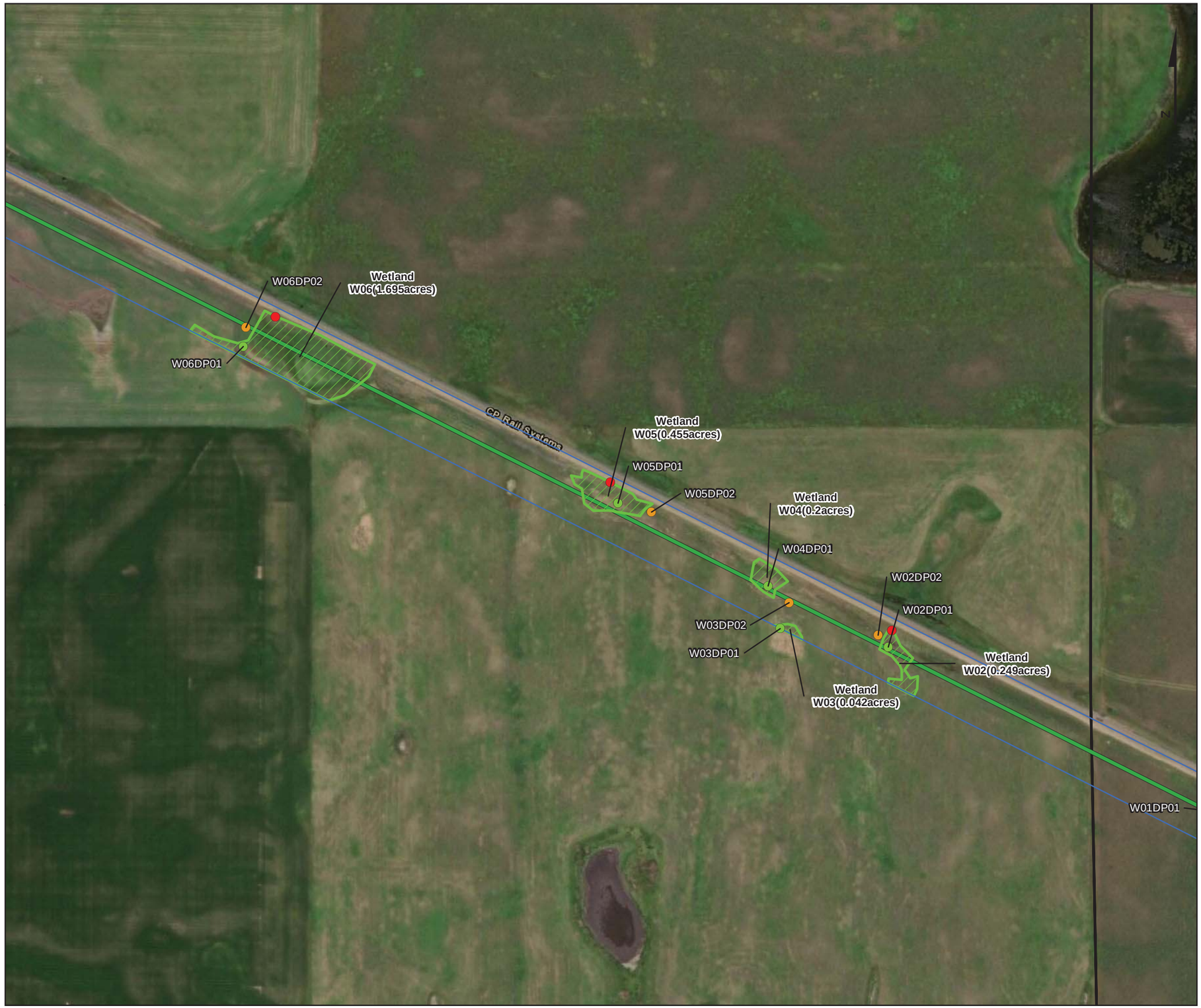
FIGURE 5-1
DELINEATED WETLANDS
AND WATERBODIES

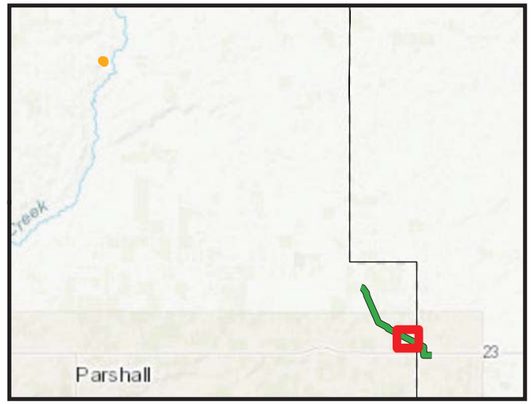
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

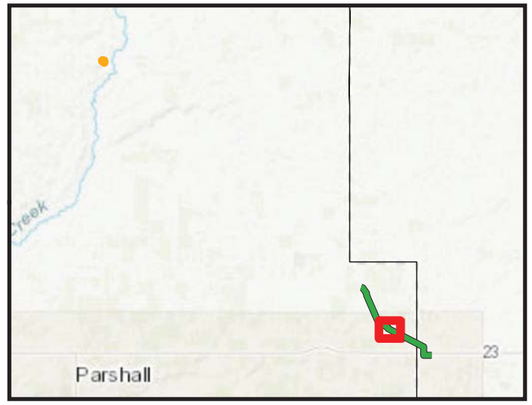
FIGURE 5-2
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

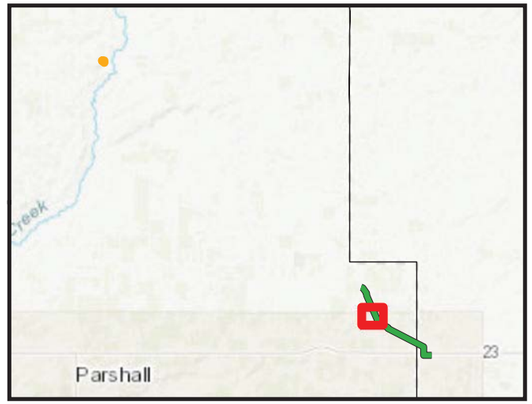
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-3
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

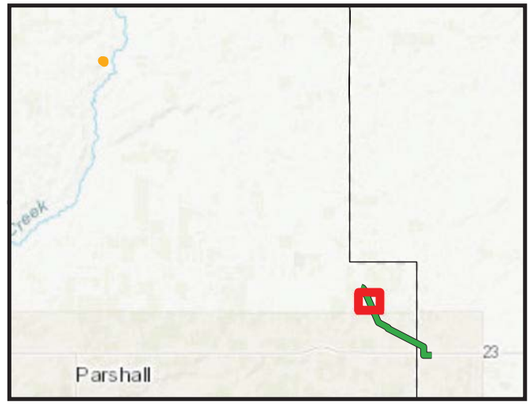
FIGURE 5-4
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

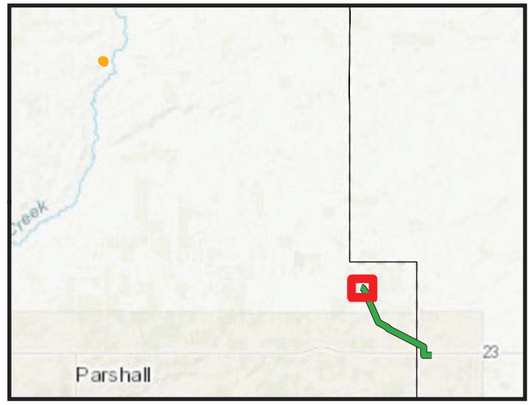
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-5
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

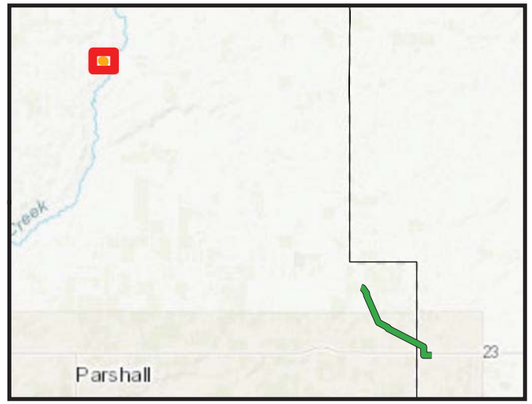
FIGURE 5-6
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04.mxd



Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 5-7
DELINEATED WETLANDS AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd

APPENDIX A

Antecedent Precipitation Tables

Antecedent Precipitation Data					
May 1, 2018 - July 31, 2018					
PLAZA (ND) USC00327120					
3rd Month Prior		**2nd Month Prior**		**1st Month Prior**	
Date	**PPT**	**Date**	**PPT**	**Date**	**PPT**
5/1/2018	0	6/1/2018	0	7/1/2018	0
5/2/2018	0	6/2/2018	1.25	7/2/2018	0
5/3/2018	0	6/3/2018	0	7/3/2018	0.45
5/4/2018	0	6/4/2018	0	7/4/2018	0
5/5/2018	0	6/5/2018	0	7/5/2018	0
5/6/2018	0	6/6/2018	0.4	7/6/2018	0
5/7/2018	0	6/7/2018	0	7/7/2018	0
5/8/2018	0	6/8/2018	0	7/8/2018	0
5/9/2018	0	6/9/2018	0	7/9/2018	0
5/10/2018	0	6/10/2018	1.06	7/10/2018	0.1
5/11/2018	0	6/11/2018	0	7/11/2018	0
5/12/2018	0	6/12/2018	0	7/12/2018	0
5/13/2018	0	6/13/2018	0	7/13/2018	0
5/14/2018	0	6/14/2018	1.35	7/14/2018	0
5/15/2018	0	6/15/2018	0	7/15/2018	0
5/16/2018	0	6/16/2018	0.68	7/16/2018	0
5/17/2018	0	6/17/2018	0	7/17/2018	0
5/18/2018	0	6/18/2018	0	7/18/2018	0
5/19/2018	0	6/19/2018	0	7/19/2018	0
5/20/2018	0	6/20/2018	0	7/20/2018	0
5/21/2018	0	6/21/2018	0	7/21/2018	0
5/22/2018	0	6/22/2018	0	7/22/2018	0
5/23/2018	0	6/23/2018	0	7/23/2018	0
5/24/2018	0.18	6/24/2018	0	7/24/2018	0
5/25/2018	0	6/25/2018	0.6	7/25/2018	0
5/26/2018	0	6/26/2018	0	7/26/2018	0
5/27/2018	0.5	6/27/2018	0	7/27/2018	0
5/28/2018	0	6/28/2018	M	7/28/2018	0
5/29/2018	0	6/29/2018	0.95	7/29/2018	0
5/30/2018	1.4	6/30/2018	0.15	7/30/2018	0
5/31/2018	0.1			7/31/2018	0
Total =	**2.18**	**Total =**	**6.44**	**Total =**	**0.55**

PPT - Precipitation in inches

T - Trace

WETS Analysis

Project Site: Makoti Pipeline
Period of interest: May 1, 2018 to July 31, 2018
County: Mountrail County, ND

Long-term rainfall records (from WETS table)

	Month	3 years in 10 less than	Normal	3 years in 10 greater than
1st month prior:	July	1.87	2.98	3.59
2nd month prior:	June	2.72	4.01	4.79
3rd month prior:	May	1.68	2.69	3.25
		Sum =	**9.68**	

Site determination

	Site Rainfall (in)	Condition Dry/Normal*/Wet	Condition** Value	Month Weight	Product
	0.55	Dry	1	3	3
	6.44	Wet	3	2	6
	2.18	Normal	2	1	2
Sum =	**9.17**			Sum*** =	**11**

*Normal precipitation with 30% to 70% probability of occurrence

Determination: Wet / Dry / X **Normal**

**Condition value:

Dry = 1
Normal = 2
Wet = 3

***If sum is:

6 to 9	then period has been drier than normal
10 to 14	then period has been normal
15 to 18	then period has been wetter than normal

Precipitation data source: PLAZA (ND) USC00327120

WETS Station: STANLEY 3 NNW, ND

Reference: Donald E. Woodward, ed. 1997. *Hydrology Tools for Wetland Determination* , Chapter 19. Engineering Field Handbook. U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, TX.

APPENDIX B

Representative Photographs

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 1

Date: 8/7/2018

Description:
Upland data point OBDP01 within a stormwater basin (facing south).

Location:
OBDP01

Photo: 2

Date: 8/7/2018

Description:
Upland data point OBDP02 (facing north).

Location:
OBDP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 3

Date: 8/7/2018

Description:
Wetland W1 and representative data point W01DP01 (facing west).

Location:
W01DP01

Photo: 4

Date: 8/7/2018

Description:
Upland data point W01DP02 (facing east).

Location:
W01DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 5

Date: 8/7/2018

Description:
Wetland W2 and representative wetland data point W02DP01. Facing west

Location:
W02DP01

Photo: 6

Date: 8/7/2018

Description:
Representative upland data point W02DP02 (facing West).

Location:
W02DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 7

Date: 8/7/2018

Description:
Wetland W3 and representative data point W03DP01 (facing west).

Location:
W03DP01

Photo: 8

Date: 8/7/2018

Description:
Upland data point W03DO02, representative upland data point for wetlands W3 and W4 (facing west).

Location:
W03DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 9

Date: 8/7/2018

Description:
Wetland W4 and representative wetland data point W04DP01 (facing south)

Location:
W04DP01

Photo: 10

Date: 8/7/2018

Description:
Wetland W5 and representative wetland data point W05DP01 (facing west).

Location:
W05DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 11

Date: 8/7/2018

Description:
Representative upland data point W05DP02 (facing east).

Location:
W05DP02

Photo: 12

Date: 8/7/2018

Description:
Wetland W6 and representative wetland data point W06DP01 (facing east).

Location:
W06DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 13

Date: 8/7/2018

Description:
Upland data point W06DP02 (Facing north).

Location:
W06DP02

Photo: 14

Date: 8/7/2018

Description:
Wetland W7 and representative wetland data point W07DP01 (facing east)

Location:
W07DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 15

Date: 8/7/2018

Description:
Upland data point W07DP02 (facing north).

Location:
W07DP02

Photo: 16

Date: 8/7/2018

Description:
Wetland W8 and representative wetland data point W08DP01 (facing north).

Location:
W08DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 17

Date: 8/7/2018

Description:
Upland data point W08DP02 (facing north).

Location:
W08DP02

Photo: 18

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP01 (facing north)

Location:
W09DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 19

Date: 8/7/2018

Description:
Upland data point W09DP02 (facing south).

Location:
W09DP02

Photo: 20

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP03 (facing south).

Location:
W09DP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 21

Date: 8/7/2018

Description:
Upland data point W09DP04 (facing north).

Location:
W09DP04

Photo: 22

Date: 8/7/2018

Description:
Upland data point OBDP03 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota

Photo: 23

Date: 8/7/2018

Description:
Upland data point OBDP04 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP04

Photo: 24

Date: 8/7/2018

Description:
Upland data point OBDP05 (facing south).

Location:
OBDP05

APPENDIX C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.97605219 | Long: -101.8668214 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point located in a constructed stormwater basin that is actively mowed. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	60	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3 *Melilotus officinalis*	15	N	FACU
4			
5			
6			
7			
8			
9			
10			
	105 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column totals	105 (A)		420 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The data point located within a stormwater basin that is actively mowed. Representative vegetation was recorded at a reference location approximately 180 feet north of the data point. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/2	100					Silt Loam	
5-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 47.97982993 | Long: -101.8663736 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Elymus repens*	10	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/2	100					Silt Loam	
4-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98159258 | Long: -101.8699723 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: PEM1Cd

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W01

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	3	N	UPL
3 *Sonchus asper*	3	N	FAC
4 *Cirsium arvense*	3	N	FACU
5			
6			
7			
8			
9			
10			
	109	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	3	x 3 =	9	
FACU species	3	x 4 =	12	
UPL species	3	x 5 =	15	
Column totals	109	(A)	236	(B)

Prevalence Index = B/A = 2.17

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W01DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 5-Mar

Subregion (LRR): F | Lat: 47.98171766 | Long: -101.8699476 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?			
Hydric soil present?		**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	40	Y	FAC
3 *Cirsium arvense*	25	Y	FACU
4 *Bromus inermis*	10	N	UPL
5 *Sonchus oleraceus*	5	N	UPL
6			
7			
8			
9			
10			
	120 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	40	x 3 =	120	
FACU species	65	x 4 =	260	
UPL species	15	x 5 =	75	
Column totals	120	(A)	455	(B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W01DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98310165 | Long: -101.8744484 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: PEM1Cx, PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W02

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Hordeum jubatum*	90	Y	FACW
2 *Melilotus officinalis*	5	N	FACU
3 *Sonchus asper*	5	N	FAC
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	90	x 2 =	180	
FAC species	5	x 3 =	15	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column totals	100	(A)	215	(B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W02DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	97	10YR 4/4	3	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%):

Subregion (LRR): F | Lat: 47.98320827 | Long: -101.8745875 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Elymus repens*	80	Y	FACU
2 *Melilotus officinalis*	25	N	FACU
3 *Bromus inermis*	10	N	UPL
4 *Cirsium arvense*	10	N	FACU
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	135	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	115	x 4 =	460	
UPL species	20	x 5 =	100	
Column totals	135	(A)	560	(B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W02DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-17	10YR 2/1	100					Silt Loam	
17-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98326846 | Long: -101.8759252 | Datum: WGS 84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W03

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Typha angustifolia*	10	N	OBL
3 *Scirpus cyperinus*	3	N	OBL
4			
5			
6			
7			
8			
9			
10			
	113	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	13	x 1 =	13	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	113	(A)	213	(B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W03DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-12	120YR 2/1	98	10YR 4/6	2	C	M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): Convex | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98350686 | Long: -101.8758045 | Datum: WGS84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland. The data point is the representative upland data point for wetlands W03 and W04.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Melilotus officinalis*	60	Y	FACU
2 *Elymus repens*	30	Y	FACU
3 *Cirsium arvense*	20	N	FACU
4 *Hordeum jubatum*	5	N	FACW
5			
6			
7			
8			
9			
10			
	115	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	5	x 2 =	10	
FAC species	0	x 3 =	0	
FACU species	110	x 4 =	440	
UPL species	0	x 5 =	0	
Column totals	115	(A)	450	(B)

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W03DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W04DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98365946 | Long: -101.8760945 | Datum:

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W04

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2			
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W04DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	85	10YR 4/6	15	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes ___	No X	Depth (inches): ___		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___		

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98441539 | Long: -101.8781437 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W05

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	5	N	UPL
3 *Melilotus officinalis*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column totals	110 (A)		245 (B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W05DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/1	100					Silt Loam	
5-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 4-Feb

Subregion (LRR): F | Lat: 47.98433642 | Long: -101.8776857 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	30	Y	FAC
3 *Bromus inermis*	30	Y	UPL
4 *Melilotus officinalis*	20	N	FACU
5 *Cirsium arvense*	10	N	FACU
6			
7			
8			
9			
10			
	130 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	30	x 3 =	90	
FACU species	70	x 4 =	280	
UPL species	30	x 5 =	150	
Column totals	130	(A)	520	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W05DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-15	10YR 2/1	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98585047 | Long: -101.8832666 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W06

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	60	Y	FAC
2 *Typha angustifolia*	30	Y	OBL
3 *Alisma subcordatum*	20	N	OBL
4 *Schoenoplectus tabernaemontani*	10	N	OBL
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	130	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	60	x 1 =	60	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	0	x 4 =	0	
UPL species	10	x 5 =	50	
Column totals	130	(A)	290	(B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W06DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-12	10YR 2/1	98	10YR 4/4	2	C	PL/M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:
The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.98602342 | Long: -101.8832301 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Sonchus oleraceus*	80	Y	UPL
2 *Medicago sativa*	30	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	110	x 5 =	550	
Column totals	110	(A)	550	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W06DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-16	10YR 2/2	100					Silt Loam	
16-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98765022 | Long: -101.8889406 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes), Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A, PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W07

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	60	Y	OBL
2 *Hordeum jubatum*	20	Y	FACW
3 *Helianthus grosseserratus*	10	N	FACW
4 *Juncus effusus*	10	N	OBL
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	70	x 1 =	70	
FACW species	30	x 2 =	60	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	130	(B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W07DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-3	10YR 2/1	100					Silt Loam	
3-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.98780184 | Long: -101.8887884 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A reference location was utilized for determining unmanged vegetation condition. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	75	Y	FACU
2 *Sonchus oleraceus*	25	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	75	x 4 =	300	
UPL species	25	x 5 =	125	
Column totals	100	(A)	425	(B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A refernce location approximately 100 feet north was utilized to determine unmanaged condition of vegetation.

SOIL

Sampling Point: W07DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP01

Investigator(s): Stephen W. Chu. PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99142408 | Long: -101.8968711 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W08

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	25	Y	FAC
2			
3			
4			
5			
6			
7			
8			
9			
10			
	25	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	25 (A)		75 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Unvegetated concave surface.The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W08DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/4	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99149797 | Long: -101.8973578 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location was utilized to determine the unmanged condition of vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	95	Y	UPL
2 *Sonchus oleraceus*	15	N	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	110	x 5 =	550
Column totals	110 (A)		550 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location, approximately 60 feet south of the data point, was utilized to determine the unmanged condition of vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W08DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99392793 | Long: -101.9016233 | Datum:

Soil Map Unit Name: Vallers loam, moderately saline (0 to 1 percent slope) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	50	Y	OBL
2 *Phalaris arundinacea*	40	Y	FACW
3 *Cirsium arvense*	20	N	FACU
4 *Schoenoplectus tabernaemontani*	5	N	OBL
5 *Heracleum maximum*	5	N	FAC
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	55	x 1 =	55	
FACW species	40	x 2 =	80	
FAC species	5	x 3 =	15	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column totals	120	(A)	230	(B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W09DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches):		
Water table present?	Yes ___	No X	Depth (inches):		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches):		

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99377312 | Long: -101.9013401 | Datum: WGS84

Soil Map Unit Name: Wabek-Lehr-Appam complex(9 to 25 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	75	Y	UPL
2 *Cirsium arvense*	25	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	75	x 5 =	375
Column totals	100 (A)		475 (B)

Prevalence Index = B/A = 4.75

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-15	10YR 2/2	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concane | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.99578757 | Long: -101.9025466 | Datum: WGS84

Soil Map Unit Name: Harriet loam (0 to 2 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Spartina pectinata*	80	Y	FACW
2 *Hordeum jubatum*	25	Y	FACW
3 *Sonchus oleraceus*	5	N	UPL
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column totals	110 (A)		235 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-2	10YR 2/1	100					Silt Loam	
2-20	10YR 2/1	98	10YR 4/4	2	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.99596295 | Long: -101.9027162 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Cirsium arvense*	90	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	120 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	120	x 4 =	480	
UPL species	0	x 5 =	0	
Column totals	120	(A)	480	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-9	10YR 2/1	100					Silt Loam	
9-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.001867° | Long: -101.906264° | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	60	Y	UPL
2 *Elymus repens*	40	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	60	x 5 =	300
Column totals	100 (A)		460 (B)

Prevalence Index = B/A = 4.60

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.005308° | Long: -101.908983° | Datum: WGS84

Soil Map Unit Name: Minot silty clay, 0 to 2 percent slopes | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	70	Y	UPL
2 *Elymus repens*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	30	x 4 =	120
UPL species	70	x 5 =	350
Column totals	100 (A)		470 (B)

Prevalence Index = B/A = 4.70

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 48.0097522 | Long: -101.9117429 | Datum:

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?		If yes, optional wetland site ID:	W10

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (*Glycine max*) rotation. Based on the presence of all three parameters, this area is a wetland. The subject wetland is a farmed wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	70	Y	FAC
2 *Hordeum jubatum*	25	Y	FACW
3			
4			
5			
6			
7			
8			
9			
10			
	95 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	25	x 2 =	50	
FAC species	70	x 3 =	210	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	95	(A)	260	(B)

Prevalence Index = B/A = 2.74

Hydrophytic Vegetation Indicators:

- Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)
The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W10DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): F | Lat: 48.00984974 | Long: -101.9118519 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location was utilized to determine the unmanaged condition of the vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Taraxacum officinale*	5	N	FACU
3 *Setaria pumila*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location, approximately 50 feet northwest of the data point, was utilized to determine the unmanaged condition of the vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W10DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-10	10YR 2/1	100					Silt Loam	
10-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP05

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T154N, R89W, Section 34

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Convex | Slope (%): 3-Jan

Subregion (LRR): F | Lat: 48.124224° | Long: -102.108232° | Datum: WGS84

Soil Map Unit Name: Zahl-Max-Arnegard loams, 15 to 60 percent slopes | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Poa pratensis*	20	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	110 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	90	x 5 =	450
Column totals	110 (A)		530 (B)

Prevalence Index = B/A = 4.82

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-14	10YR 2/2	100					Silt Loam	
14-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None

Depth (inches):

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes		No	X	Depth (inches):	
Water table present?	Yes		No	X	Depth (inches):	
Saturation present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

Arcadis U.S., Inc.

126 North Jefferson Street

Suite 400

Milwaukee, Wisconsin 53202

Tel 414 276 7742

Fax 414 276 7603

www.arcadis.com

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
3319 UNIVERSITY DRIVE
BISMARCK, NORTH DAKOTA 58504

April 22, 2024

SUBJECT: NWO-2018-01825-BIS – Thunder Butte Pipeline – Approved Jurisdictional Determination

Mr. Stephen Chu
Arcadis U.S., Inc.
126 North Jefferson Street, Suite 400
Milwaukee, Wisconsin 53202

Dear Mr. Chu:

This letter is in response to your request received on October 2, 2023 for an approved jurisdictional determination for the Thunder Butte Pipeline. The site is located in Sections 18 and 19 of Township 152 North, Range 87 West and in Sections 2 and 11 – 14 of Township 152 North, Range 88 West, Mountrail and Ward Counties, North Dakota. Your request has been assigned the Corps Regulatory File Number referenced above. Please reference this file number on any correspondence to us or to other interested parties when referencing this project or concerning this request.

The U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged and fill material into waters of the United States under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344) and structures or work in, over, and under navigable waters of the United States under Section 10 of the Rivers and Harbors Act (RHA) (33 U.S.C. 403). The implementing regulations for these Acts are published in the Code of Federal Regulations at 33 CFR parts 330-332.

Based on our evaluation of the information provided and other available information, we have determined the following resources are jurisdictional: **W1, W6, W7, W9, and OW-1**. The attached approved jurisdictional determination provides rationale for why these aquatic resources meet the definition of waters of the United States. Based on this determination, a Department of the Army permit **is** required for the discharge of dredged or fill material into these aquatic resources. This determination does not eliminate requirements to obtain any other applicable federal, state, tribal, or local permits.

Also, based on our evaluation of the information provided and other available information, we have determined the following resources are non-jurisdictional: W2, W3, W4, W5, W8, and W10. The attached approved jurisdictional determination provides rationale for why these aquatic resources do not meet the definition of waters of the United States. Based on this determination, a Department of the Army permit is not required for the discharge of dredged or fill material into these aquatic resources. This determination does not eliminate requirements to obtain any other applicable federal, state, tribal, or local permits.

Attached to this letter is the approved jurisdictional determination for your project site. This jurisdictional determination is valid for a 5-year period from the date of this letter, until **April 21, 2029**, unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR part 331. Enclosed you will find a *Notification of Administrative Appeal Options and Process and Request for Appeal* (NAO-RFA) form. If you request to appeal this determination, you must submit a completed NAO-RFA form to the address listed on the form.

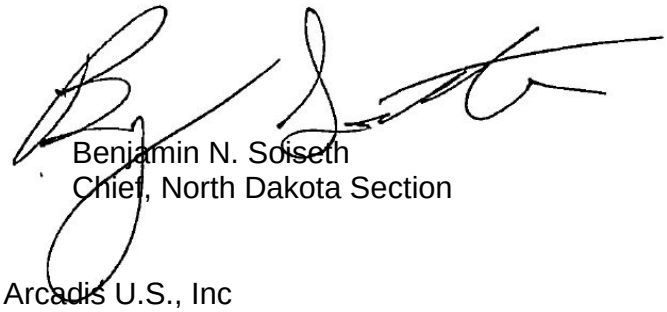
For an NAO-RFA to be accepted by the Corps, the Corps must determine that it is completed, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the NAO-RFA. Should you decide to submit an NAO-RFA form, it must be received at the Division Office by **June 20, 2024**. It is not necessary to submit an NAO-RFA form to the Division Office if you do not object to the determination in this letter.

In the event that you disagree with this approved jurisdictional determination and you have **new information** not considered in the original determination, you may request reconsideration of this determination by contacting this office prior to initiating an appeal. To request this reconsideration based upon new information, you must submit the new information to this office so that it is received within 60 days of the date of the NAO-RFA.

The Corps' Omaha District, Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at https://regulatory.ops.usace.army.mil/customer-service-survey/. If you do not have Internet access, you may call and request a paper copy of the survey that you can complete and return by mail. Additionally, further information regarding the Omaha District Regulatory Program can be obtained by visiting our website at https://www.nwo.usace.army.mil/Missions/Regulatory-Program/.

If you have any questions concerning this jurisdictional determination, please contact Mr. Hadden Carlberg at the above address, by phone at 701-255-0015, ext. 2012, or by email at *Hadden.J.Carlberg@usace.army.mil*, and reference file number **NWO-2018-01825-BIS**.

Sincerely,



Benjamin N. Soiseth
Chief, North Dakota Section

Enclosures
cc: Kathryn Cloutier, Project Manager, Arcadis U.S., Inc

Arcadis U.S., Inc.
55 Monument Circle, Suite 300B
Indianapolis
Indiana 46204
Phone: 317231 6500
www.arcadis.com