

ROUTE APPLICATION EXHIBITS – TAB 4

- Appendix 4.A Natural Resources and Wetland Determination Report
 SWCA Environmental Consultants
- Appendix 4.B Class I and Class III Cultural Resource Inventory Abstract
 SWCA Environmental Consultants
- Appendix 4.C Maps of Exclusion and Avoidance Areas



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Natural Resources and Wetland Determination Report for the Johnsons Corner Pipeline, McKenzie County, North Dakota

Prepared for

Paradigm Midstream Services – ND, LLC

Prepared by

SWCA Environmental Consultants

September 2015

**Natural Resources and Wetland Determination Report
for the Johnsons Corner Pipeline,
McKenzie County, North Dakota**

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1.0 INTRODUCTION

1.1 BACKGROUND

Paradigm Midstream Services, ND-LLC (Paradigm) proposes to construct an approximately 12.9-mile-long, 8-inch-diameter pipeline between the Paradigm Sakakawea pipeline, located approximately 2.3 miles south of Keene, North Dakota, and the PAA Johnsons Corner to Alexander pipeline, located approximately 11.8 miles northwest of Mandaree, North Dakota. The proposed pipeline and associated facilities are referred to as the Johnsons Corner Project (Project). The Project is located entirely in McKenzie County, North Dakota and has an anticipated construction start date of 2016. SWCA Environmental Consultants (SWCA) conducted natural resource field surveys to identify exclusion and avoidance areas as specified in North Dakota Administrative Code 69-06-08-02 for the proposed Johnsons Corner Project.

As proposed, the Johnsons Corner pipeline is approximately 12.9 miles long, spanning private lands in North Dakota (Appendix A). The project falls under the jurisdiction of the North Dakota Public Service Commission (NDPSC).

SWCA conducted field surveys within a 200-foot-wide survey corridor (100-foot-wide construction right-of-way [ROW]) and temporary workspace on September 27 and November 14 and 15, 2013; August 6, 2014; March 11, 2015; and August 10 and 11, 2015, to determine the potential presence and extent of wetlands and water bodies, including potentially jurisdictional waters of the U.S., within the survey area for the proposed project. Concurrently with the wetland/water-body determinations, SWCA conducted a wildlife survey and habitat assessment that covered threatened and endangered species; a tree, sapling, and shrub enumeration survey; and a noxious weed survey. Site layout maps of the survey area and natural resource features identified during the field surveys are provided in Appendix A.

This report presents the methodology that SWCA's ecologists used to complete each of the aforementioned surveys. Additionally, this report presents the results of the completed field surveys and regulatory recommendations to facilitate compliance with the NDPSC and the U.S. Army Corps of Engineers (USACE) Nationwide Permit 12.

1.2 REGULATORY BACKGROUND

1.2.1 Clean Water Act, Section 404

Section 404 of the Clean Water Act prohibits the discharge of dredge and fill material into waters of the U.S., including certain wetlands, also known as jurisdictional waters, without a permit from the USACE.

1.2.2 USACE Nationwide Permit 12

The USACE Nationwide Permit 12 authorizes the placement of fill material for the construction of utility lines and associated facilities in waters of the U.S., provided that the activity does not result in the permanent loss of greater than 0.5 acre of waters of the U.S., including wetlands, and meets the Nationwide Permit General Conditions.

Nationwide Permit 12 requires that the permittee submit a pre-construction notification prior to commencing construction if any of the following criteria are met.

- The activity involves mechanized land clearing in a forested wetland.
- A Section 10 permit is required to cross a navigable water body (Rivers and Harbors Act).
- The utility line exceeds 500 feet in length through any single crossing of a water of the U.S.
- The utility line is placed within a jurisdictional area (i.e., water of the U.S.) and it runs parallel to a streambed that is within that jurisdictional area.
- Discharges result in the permanent loss of greater than 0.1 acre of waters of the U.S.
- Permanent access roads are constructed above grade for a distance of more than 500 feet in waters of the U.S..
- Permanent access roads are constructed with impervious materials in waters of the U.S..

1.2.3 U.S. Army Corps of Engineers Regional Conditions

The USACE has published several regional conditions for projects operating under Nationwide Permits in North Dakota (USACE 2013). The regional conditions apply to wetlands classified as “fens,” waters adjacent to natural springs, the Missouri River, historic properties, and fish spawning areas.

2.0 METHODS

2.1 SURVEY AREA

Overall, northwest North Dakota is characterized by a moderate to cool climate, with cold, dry winters and mild to warm summers. Mean annual precipitation for the area is 14 to 16 inches (Bryce et al. 1998).

The proposed project is located in the Great Plains (level I) ecoregion. Further, the proposed project is located in the West-Central Semi-Arid Prairies (level II) ecoregion, the Northwestern Great Plains (level III) ecoregion, and the Missouri Plateau (level IV) ecoregion. The Northwestern Great Plains ecoregion encompasses the Missouri Plateau section of the Great Plains and consists of semiarid rolling plains of shale, siltstone, and sandstone punctuated by buttes and badlands (Bryce et al. 1998). Figures 1 and 2 are overviews of the project area.

The inventoried area discussed herein is situated on the U.S. Geological Survey Keene (1967), Johnsons Corner (1966), and Blue Buttes (1967) North Dakota, quadrangles. The proposed project corridor that was surveyed on September 27, November 14 and 15, 2013, March 11, 2015, August 6, 2014, and August 10 and 11, 2015, encompasses portions of 17 sections within four townships and ranges:

- Sections 13 through 15 and 22 through 25, Township (T) 151 North (N), Range (R) 96 West (W);
- Sections 30 through 33, T151N, R95W;
- Sections 4, 7 through 9, and 18, T150N, R95W; and
- Section 13, T150N, R96W



Figure 1. Project area overview depicting general topography toward the southern end of pipeline corridor, facing north (photo taken August 11, 2015).



Figure 2. Project area overview depicting general topography toward north end of pipeline corridor, facing south (photo taken August 10, 2015).

2.2 WETLANDS

National Wetlands Inventory mapping for the region indicates the presence of wetlands within the project area (U.S. Fish and Wildlife Service [USFWS] 2012). SWCA ecologists conducted wetland determinations within the survey area based on the principles and guidelines provided in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Determination Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010). As requested, SWCA ecologists delineated wetland boundaries by recording indicators of hydrology and hydrophytic vegetation. The Supplement suggests that soils also be taken into account. Therefore, soil data would be collected at a later date if project permitting requirements dictate. All wetlands and water bodies geographically referenced within the survey area during field survey are depicted on the site layout maps in Appendix A.

2.2.1 Hydrophytic Vegetation

Ecologists recorded all plants within the vegetative community based on the respective stratum each species occupied. A tree is defined by the Supplement to be a woody-stemmed plant with a trunk diameter at breast height (DBH) of equal to or greater than 3 inches, regardless of height. The sapling and shrub stratum is defined by the Supplement to be composed of woody-stemmed plants with a trunk DBH of less than 3 inches, regardless of height. The herbaceous stratum includes all non-woody-stemmed plants, regardless of height. Finally, the woody vine stratum includes all woody-stemmed vines, regardless of diameter.

SWCA recorded the binomial scientific name and percent cover of all plants within a 30-foot radius for the tree stratum, a 15-foot radius for the sapling/shrub stratum, a 5-foot radius for the herbaceous stratum, and a 30-foot radius for the woody vine stratum. SWCA ecologists noted each plant species' respective USFWS indicator status (i.e., upland [UPL], facultative upland [FACU], facultative [FAC], facultative wetland [FACW], and obligate [OBL]). In some instances the size and shape of the vegetative sampling plot was manipulated to better encompass each wetland or upland area, though the overall area assessed remained unchanged. Vegetation communities met the hydrophytic vegetation criterion for wetlands if more than 50% of dominant species had an indicator status of FAC, FACW, or OBL. SWCA also noted and geospatially referenced all populations of North Dakota state- or county-listed noxious weeds identified within the survey area.

2.2.2 Wetland Hydrology

A wetland was determined to contain wetland hydrology if at least one primary indicator or at least two secondary indicators of wetland hydrology were present, as defined by the Manual and Supplement. Common hydrologic indicators include the presence of surface water, high water table, soil saturation, water marks on trees or other objects, sediment deposits, water-stained leaves, and oxidized rhizospheres on living roots.

2.3 WATER BODIES

Water bodies (i.e., ponds, creeks, streams, rivers) were identified by the presence of an ordinary high water mark (OHWM). Common identifiable indicators of an OHWM include open water

or evidence of a clear, natural line visible on the bank; shelving; changes in soil characteristics; the destruction of terrestrial vegetation; the presence of litter and debris; and water marks on structures that are inundated during normal high water conditions. The OHWM typically represents the potential limits of the USACE jurisdiction for open waterbodies. The USACE has full discretion in determining the jurisdictional status of referenced wetlands and water bodies.

SWCA classified streams as perennial, intermittent, or ephemeral, based on field observations. During a typical year, a perennial stream contains flowing water year-round and the water table is located above the stream bed. Groundwater is the primary water source for stream flow, whereas precipitation runoff is supplemental. SWCA's ecologists classified streams that showed significant flow during the field survey as perennial. Additionally, the ecologists used the U.S. Geological Survey topographic maps as reference.

An intermittent stream contains flowing water for only portions of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not contain flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

An ephemeral stream contains flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

2.4 NOXIOUS WEED SURVEYS

SWCA conducted a noxious weed survey of all populations of North Dakota state- or county-listed noxious weeds within the project area.

2.5 TREE, SAPLING, AND SHRUB COUNT

SWCA ecologists determined the total number of trees, saplings, and shrubs present within the survey area using several different techniques, depending on the type of woody vegetation habitat (i.e., forested upland, shrubland, or shelterbelt) encountered and the overall extent of each habitat within the ROW. The boundary of all forested upland, shrubland, and shelterbelt habitat was geographically referenced using a Trimble GeoXT series handheld global positioning system (GPS) unit. In forested upland and shrubland habitat, SWCA counted or estimated the number of all woody-stemmed vegetation with a DBH of one-inch or greater in diameter. In shelterbelt areas, all woody-stemmed vegetation, regardless of DBH, was inventoried via direct count. Ecologists taxonomically identified all recorded individuals to the species level within each habitat type.

2.6 WILDLIFE, INCLUDING THREATENED AND ENDANGERED SPECIES

Prior to conducting field surveys, SWCA reviewed information obtained from the USFWS list of threatened and endangered species by North Dakota county (USFWS 2015) regarding the presence of threatened or endangered species that could occur within the survey area. This document does not represent a comprehensive survey but rather acknowledges the past and/or

current presence of listed species. The lack of discovery of threatened or endangered species during the survey does not signify their non-existence within the area, only that no primary or secondary indications of these species were recorded. SWCA completed a survey for all listed species and suitable habitat.

A line-of-sight binocular survey for raptor species was also conducted for a distance of approximately 0.5 mile. SWCA ecologists noted all wildlife observed during the field survey. Wildlife sightings can involve primary observations (i.e., actual sighting of an animal) or secondary observations (i.e., observation of scat, tracks, or fur deposits).

2.7 MAPPING

The boundaries of each wetland, water body, woody vegetation habitat, and noxious weed assemblage were geographically recorded using a Trimble GeoXT GPS unit. The aforementioned GPS unit is capable of recording geographic data with sub-meter accuracy. SWCA used Universal Transverse Mercator Zone 13 North as the projected coordinate system and North American Datum 1983 as the datum. ArcGIS v10.0 (ESRI Redlands, California) was used to analyze recorded features, calculate areas, and generate the maps provided in Appendix A and Appendix B. All data collected using the GPS unit and displayed on the attached maps are for review purposes only and do not represent a professional civil survey.

3.0 RESULTS

3.1 VEGETATION

During the field survey, SWCA ecologists identified four general types of vegetative communities within the survey area. These vegetative communities were classified as herbaceous upland, woody vegetation, cropland, and palustrine emergent (PEM) wetland. PEM wetlands are characterized by the presence of herbaceous hydrophytic or submergent aquatic macrophytes. Photographs of the survey area are provided in Appendix C.

Vegetation communities met the hydrophytic vegetation criterion for wetlands if more than 50% of dominant species had an indicator status of FAC, FACW, or OBL. The upland communities failed to meet at least one of the three assessed wetland criteria.

3.1.1 Herbaceous Upland

The herbaceous upland community consists of areas dominated by non-woody vegetation such as grasses and forbs. Herbaceous uplands observed commonly consisted of smooth brome (*Bromus inermis*), green needlegrass (*Stipa viridula*), western snowberry (*Symphoricarpos occidentalis*), upright prairie coneflower (*Ratibida columnifera*), stiff sunflower (*Helianthus pauciflorus*), white sagebrush (*Artemisia ludoviciana*), buffalo grass (*Bouteloua dactyloides*), Kentucky bluegrass (*Poa pratensis*), silverleaf scurf pea (*Psorlea argophylla*), prairie sagewort (*Artemisia frigida*), ragweed (*Ambrosia* spp.), prairie Junegrass (*Koeleria macrantha*), and crested wheatgrass (*Agropyron cristatum*).

3.1.2 Woody Vegetation

Forested upland vegetation consisted of green ash (*Fraxinus pennsylvanica*), silver buffaloberry (*Sheperdia argentea*), bur oak (*Quercus macrocarpa*), Siberian elm (*Ulmus pumila*), and chokecherry (*Prunus virginana*).

3.1.3 Cropland

Cropland was confirmed in the survey area. The crops were primarily wheat (*Triticum aestivum*) and flax (*Linum usitatissimum*).

3.1.4 Hydrophytic Vegetation

Aquatic vegetation species confirmed during the survey included prairie cordgrass (*Spartina pectinata*), reed canarygrass (*Phalaris arundinacea*), broad-leaf cattail (*Typha latifolia*), foxtail barley (*Hordeum jubatum*), curly dock (*Rumex crispus*), mountain rush (*Juncus balticus*), Dudley’s rush (*Juncus dudleyi*), and western dock (*Rumex occidentalis*).

3.2 HYDROLOGY

Wetland communities observed during the determination effort displayed at least one primary or two secondary indicators of wetland hydrology, as defined by the Manual and Supplement. Upland communities failed to display hydrologic indicators or failed to meet the hydrophytic vegetation criterion, as defined by the Manual and Supplement. Common indicators of wetland hydrology observed during field surveys include Surface Water (A1), High Water Table (A2), Saturation (A3), Water Marks (B1), Sediment Deposits (B2), Drift Deposits (B3), Algal Mat or Crust (B4), Surface Soil Cracks (B6), Inundation Visible on Aerial Imagery (B7), Sparsely Vegetated Concave Surface (B8), Drainage Patterns (B10), Aquatic Invertebrates (B13), Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

According to National Weather Service preliminary climatological data for Williston, North Dakota (approximately 36 miles northwest of the project area), 21.27 inches of precipitation were recorded for 2013—6.90 inches above normal—indicating a wet year; 10.68 inches of precipitation fell in 2014—3.70 inches below normal—indicating a moderately dry year; and 15.21 inches of precipitation fell from January 1 to September 7, 2015—0.97 inch above normal—indicating a moderately normal year (Table 1).

Table 1. Recorded Rainfall at National Weather Service Station in Williston, North Dakota

Period	Recorded Precipitation (inches)	Normal Precipitation (inches)	Difference (inches)
January 1 – December 31, 2013	21.27	14.37	+6.90
January 1 – December 31, 2014	10.68	14.38	-3.70
January 1 – September 7, 2015	15.21	14.24	+0.97

Source: National Oceanic and Atmospheric Administration (2015).

3.3 WETLANDS

SWCA recorded 10 PEM wetlands totaling approximately 3.11 acres within the survey area. Approximately 2.67 acres of PEM wetlands are within the 100-foot construction ROW. WET1 and WET6 are likely isolated wetlands; the remaining wetlands (WET2–WET5 and WET7–WET10) are likely jurisdictional due to their connectivity to a larger water body. However, the USACE has the final authority to determine jurisdictional status.

Table 2. PEM Wetland Acreage within the Survey Area

Feature ID	Wetland Type	USACE Jurisdiction*	Total PEM Size (acres)	100-Foot-Construction ROW Impact (acres)	Length of Required Crossing (feet)
WET1	Seasonal	Likely isolated	0.06	0.00	0.00
WET2	Seasonal	Likely jurisdictional	0.08	0.08	10.20
WET3	Seasonal	Likely jurisdictional	0.05	0.00	0.00
WET4	Seasonal	Likely jurisdictional	0.27	0.27	17.39
WET5	Seasonal	Likely jurisdictional	0.33	0.00	44.32
WET6	Permanent	Likely isolated	0.22	0.22	30.38
WET7	Permanent	Likely jurisdictional	0.75	0.75	151.50
WET8	Semipermanent	Likely jurisdictional	0.56	0.56	46.58
WET9	Seasonal	Likely jurisdictional	0.38	0.38	99.74
WET10	Seasonal	Likely jurisdictional	0.41	0.41	33.86
Total			3.11	2.67	

* The USACE has the final authority on the jurisdictional status of a water body.

PEM = palustrine emergent
 ROW = right-of-way
 USACE = U.S. Army Corps of Engineers

3.4 WATER BODIES

SWCA identified four water bodies during the field survey: one ephemeral stream, two intermittent streams, and one water body (stock dam) (Table 3).

Table 3. Water Body Acreage within the Survey Area

Feature ID	Water Body Type	USACE Jurisdiction*	Average Width of OHWM (feet)	Total Size (acres)	100-Foot-Construction ROW Impact (acres)	Length of Required Crossing (feet)
STR1	Intermittent	Likely jurisdictional	4	0.05	0.00	0.00
STR2	Intermittent	Likely jurisdictional	6	0.29	0.21	34.70
STR3	Ephemeral	Likely jurisdictional	4	0.11	0.05	14.17
WB1	Stock dam	Likely jurisdictional	0	0.10	0	0.00
Total				0.55	0.26	48.87

* The USACE has the final authority on the jurisdictional status of a water body.

USACE = U.S. Army Corps of Engineers

OHWM = ordinary high water mark

3.5 SOILS

Based on Natural Resources Conservation Service (NRCS) mapping (NRCS 2014), 42 soil types are present in the project construction corridor (Appendix B). The project area analyzed for soils covers the 100-foot-wide construction corridor. Table 4 lists all soil units within the project area from those covering the greatest number of acres to those cover the fewest number of acres. The soil component descriptions that follow Table 4 represent the most prevalent soil series found within the survey area (NRCS 2014).

Table 4. NRCS Soil Series Present within the 100-foot-wide Right-of-way

Soil Types	Slopes (%)	Acres within 100-foot-wide Right-of-way	Percent (%) within Map Unit
Belfield-Grail clay loams	0–2	58.33	13.96
Zahl-Williams-Cabba complex	6–9	41.77	10.00
Farnuf loam	2–6	23.50	5.62
Cabba-Chama-Shambo loams	9–50	21.64	5.18
Cabba-Chama-Sen silt loams	9–15	21.13	5.06
Daglum-Belfield complex	0–6	20.54	4.91
Amor-Cabba loams	9–15	20.44	4.89
Savage-Grail silty clay loams	0–2	19.78	4.73
Chama-Cabba-Sen silt loams	6–9	13.47	3.22
Belfield-Savage-Daglum complex	2–6	10.52	2.52
Farnuf loam	0–2	9.12	2.18
Williams-Zahl loams	3–6	8.88	2.13

*Natural Resources and Wetland Determination Report for the Johnsons Corner Pipeline,
McKenzie County, North Dakota*

Soil Types	Slopes (%)	Acres within 100-foot-wide Right-of-way	Percent (%) within Map Unit
Dogtooth-Janesburg-Cabba complex	6–35	8.49	2.03
Williams-Zahl loams	6–9	8.15	1.95
Zahl-Cabba-Maschetah complex	6–70	7.50	1.80
Niobell-Williams loams	3–6	7.40	1.77
Moreau-Barkof silty clays	3–6	7.36	1.76
Brandenburg-Searing-Dogtooth complex	6–15	7.32	1.75
Lawther silty clay	0–2	6.99	1.67
Moreau-Wayden silty clays	6–9	6.28	1.50
Moreau-Cabba complex	9–15	6.07	1.45
Korchea-Fluvaquents complex, channeled, frequently flooded	0–2	6.02	1.44
Savage silty clay loam	2–6	5.35	1.28
Golva silt loam	0–2	4.88	1.17
Flasher-Vebar-Parshall complex	9–35	4.64	1.11
Cabba-Chama-Havrelon, occasionally flooded complex	2–70	4.41	1.05
Farnuf loam	6–9	4.35	1.04
Brandenburg-Cabba-Dogtooth complex	15–70	4.33	1.04
Zahl-Cabba-Williams complex	9–15	4.31	1.03
Arikara-Shambo-Cabba loams	9–70	4.12	0.98
Manning-Schaller-Wabek complex	6–35	3.99	0.96
Regent-Cabba complex	6–9	3.97	0.95
Rhoades-Daglum complex	0–6	3.95	0.95
Noonan-Niobell-Williams loams	3–6	3.94	0.94
Beisigl-Flasher-Telfer loamy fine sands	6–15	3.81	0.91
Zahl-Williams loams	9–15	3.76	0.90
Amor-Shambo loams	3–6	3.59	0.86
Dogtooth-Janesburg silt loams	0–6	3.25	0.78
Golva silt loam	2–6	3.19	0.76
Savage silty clay loam	6–9	2.67	0.64
Vebar-Flasher-Tally complex	9–15	2.52	0.60
Williams-Bowbells loams	3–6	2.17	0.52
Total		417.91	100.00

Source: Natural Resources Conservation Service (2014)

3.5.1 Belfield

The Belfield series consists of deep and very deep, well- to moderately well-drained, very slowly permeable soils found on upland flats, terraces, and swales with slopes ranging from approximately 0% to 9%. The mean annual precipitation found throughout the spatial extent of

this soil type is approximately 15 inches, and mean annual air temperature is approximately 43°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), and green needlegrass (*Stipa viridula*) (NRCS 2014).

3.5.2 Grail

The Grail series consists of deep to very deep, slowly permeable soils that are well- to moderately well-drained. This soil type is found on uplands with slopes ranging from 0% to 15%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches, and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivating crops. Native vegetation species common to this soil type include western wheatgrass, big bluestem (*Andropogon gerardii*), and green needlegrass (NRCS 2014).

3.5.3 Zahl

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1% to 60%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches, and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem (*Schizachyrium scoparium*), and needle-and-thread grass (*Hesperostipa comata*) (NRCS 2014).

3.5.4 Williams

The Williams series consists of very deep, slowly permeable, well-drained soils found on glacial till plains and moraines with slopes at approximately 0% to 35%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches, and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation. Native vegetation species common to this soil type include western wheatgrass, needle-and-thread grass, blue grama, and green needlegrass (NRCS 2014).

3.5.5 Cabba

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2% and 70 %. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches, and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem, green needlegrass, and other various herbs, forbs, and shrub species (NRCS 2014).

3.5.6 Farnuf

The Farnuf series consists of very deep, well-drained soils that formed in alluvium, glaciolacustrine, or glaciofluvial deposits. These soils are on alluvial fans, stream terraces, hills, sedimentary plains, glacial lake plains, moraines, and outwash plains. Slopes are 0% to 35%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches, and mean annual air temperature is approximately 42°F. Farnuf soils

are used mainly for irrigated and non-irrigated cropland. The potential native vegetation is primarily mid and short grasses such as western wheatgrass, prairie sandreed (*Calamovilfa longifolia*), green needlegrass, little bluestem, needle-and-thread grass, blue grama, shrubs, and forbs (NRCS 2014).

3.6 TREE, SAPLING, AND SHRUB COUNT

During SWCA’s work, thirty-one upland tree areas were geographically referenced within the survey area. SWCA recorded all trees with a DBH of 1 inch or greater. Table 5 summarizes the number of trees estimated to be impacted by the project as currently proposed. The NDPSC requires a 2:1 post- to pre-construction mitigation for all trees, saplings, and shrubs impacted during the construction of the proposed pipeline. Therefore, 1,088 replacement trees, saplings, or shrubs will be necessary.

Table 5. Tree, Sapling, and Shrub Count

Feature ID	Species	Type	Size (Acres)	Number of Trees		Estimated Mitigation Commitment
				Survey Corridor	100-foot-wide Construction ROW*	
WV1	Russian olive Silver buffaloberry	Natural	0.02	5	0	0
WV2	Chokecherry Hawthorn Boxelder Eastern cottonwood	Natural	0.31	50	0	0
WV3	Boxelder	Natural	0.09	15	0	0
WV4	Green ash Chokecherry	Natural	0.19	4 300	1 99	2 198
WV5	Boxelder Green ash Siberian elm Silver buffaloberry Hawthorn	Natural	0.01	5 20 10 20 5	5 20 10 20 5	10 40 20 40 10
WV6	Boxelder Green ash Siberian elm Silver buffaloberry Hawthorn	Natural	0.96	20 100 20 30 10	11 54 11 16 5	22 108 22 32 10
WV7	Green ash	Natural	.04	100	0	0
WV8	Green ash Russian olive Silver buffaloberry	Natural	.36	60 30 10	0 0 0	0 0 0
WV9	Green ash Silver buffaloberry	Natural	.49	105 45	60 26	120 52
WV10	Green ash	Natural	0.01	5	0	0
WV11	Green ash Silver buffaloberry	Natural	0.02	3 2	1 1	2 2

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Feature ID	Species	Type	Size (Acres)	Number of Trees		Estimated Mitigation Commitment
				Survey Corridor	100-foot-wide Construction ROW*	
WV12	Green ash	Natural	.002	50	0	0
WV13	Green ash	Natural	1.35	150	55	110
	Silver buffalo berry			100	37	74
WV14	Green ash	Natural	.21	36	1	2
	Silver buffaloberry			24	1	2
WV15	Green ash	Natural	.15	60	13	26
WV16	Green ash	Natural	.04	11	0	0
WV17	Green ash	Natural	.89	140	7	14
	Burr oak			60	3	6
WV18	Green ash	Natural	.2	40	15	30
WV19	Chokecherry	Natural	.02	10	0	0
	Green ash					
WV20	Silver buffaloberry	Natural	.01	1	0	0
	Chokecherry					
WV21	Green ash	Natural	.04	7	3	6
WV22	Green ash	Natural	.01	5	0	0
WV23	Green ash	Natural	.00001	1	0	0
WV24	Green ash	Natural	.09	20	0	0
	Burr oak					
	Siberian elm					
WV25	Green ash	Natural	1.05	100	45	90
	Silver Buffaloberry					
	Burr oak					
WV26	Green ash	Natural	.05	15	0	0
	Siberian elm					
	Burr oak					
WV27	Green ash	Natural	.02	6	0	0
	Siberian elm					
WV28	Green ash	Natural	.2	8	8	16
WV29	Green ash	Planted	.43	50	3	6
	Siberian peashrub					
WV30	Chokecherry	Natural	.34	7	6	12
WV31	Green ash	Natural	1.21	9	2	4
	Chokecherry					
Total			4.14	1,197	544	1,088

* Estimated value based off of the observed density of trees.
ROW = right-of-way

3.7 NOXIOUS WEEDS

“Noxious weeds” is a general term used to describe plant species that are not native to a given area, spread rapidly, and have adverse ecological and economic impacts. These species may have high reproduction rates and are usually adapted to occupy a diverse range of habitats

otherwise occupied by native species. These species may subsequently out-compete native plant species for resources, causing a reduction in native plant populations.

Noxious weeds have the potential to detrimentally affect public health, ecological stability, and agricultural practices. North Dakota Century Code (Chapter 63-01.1) and the North Dakota Department of Agriculture recognize 11 species as noxious, as shown in Table 6 (North Dakota Department of Agriculture 2015). Each county has the authority to add additional species to its list of noxious weeds. McKenzie County has listed black henbane (*Hyoscyamus niger*), common burdock (*Arctium minus*), houndstongue (*Cynoglossum officinale*), halogeton (*Halogeton glomeratus*), and baby’s breath (*Gypsophila paniculata*) in addition to the 11 state-listed noxious weeds. In 2014, nine state noxious weed species were found on 246 acres in McKenzie County.

Table 6. Documented Noxious Weed Occupied Area in McKenzie County, North Dakota

Common Name	Scientific Name	McKenzie County (acres)
Absinth wormwood	<i>Artemisia absinthium</i>	12
Canada thistle	<i>Cirsium arvense</i>	178
Dalmatian toadflax	<i>Linaria dalmatica</i>	0
Diffuse knapweed	<i>Centaurea diffusa</i>	2
Leafy spurge	<i>Euphorbia esula</i>	38
Musk thistle	<i>Carduus nutans</i>	2
Purple loosestrife	<i>Lythrum salicaria</i>	0
Russian knapweed	<i>Acroptilon repens</i>	1
Salt cedar	<i>Tamarix ramosissima</i>	3
Spotted knapweed	<i>Centaurea stoebe</i>	9
Yellow toadflax	<i>Linaria vulgaris</i>	1

Source: North Dakota Department of Agriculture (2015).

No noxious weeds were noted during the survey for the proposed Johnsons Corner Project.

3.8 WILDLIFE

Several wildlife species that may exist in McKenzie County are listed as threatened or endangered under the Endangered Species Act (ESA) (USFWS 2015) (16 USC 1531 et seq.) According to the USFWS, ESA-listed endangered species in McKenzie County, North Dakota, include the black-footed ferret (*Mustela nigripes*), gray wolf (*Canis lupus*), whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*). Threatened species include the piping plover (*Charadrius melodus*) and its designated critical habitat, Dakota skipper (*Hesperia dacotae*) and its designated critical habitat, rufa red knot (*Calidris canutus rufa*), and northern long-eared bat (*Myotis septentrionalis*). In addition, Sprague’s pipit (*Anthus spragueii*) is a candidate species. SWCA conducted a threatened and endangered species survey concurrently with the wetland determination. Biologists observed no primary indication (i.e., actual sighting) or secondary indication (i.e., tracks, scat, fur, or feathers) of the presence of threatened or endangered species.

Due to a lack of suitable habitat, the proposed project is not expected to result in take of the gray wolf and black-footed ferret. The whooping crane, interior least tern, piping plover, and rufa red knot have the potential to occur within the project area as migrants. However, due to the low probability of occurrence and only temporary disturbance during construction, take of those species is not expected. The project area occurs within the same watershed as Lake Sakakawea; the lake, however, is 21.37 stream miles from the project area, so take of the pallid sturgeon is not expected. The northern long-eared bat has the potential to occur within the project area, which may contain suitable habitat. However, due to the relatively minor impact to the area's woody vegetation, take of the northern long-eared bat is not expected. Also, under an ESA Section 4(d) interim rule, incidental take of this species is exempt in North Dakota. Field surveys confirmed a lack of suitable habitat for the Dakota skipper; therefore, take of that species is not expected. As a candidate species, no requirement to consider effects to Sprague's pipit exists under the ESA. Nevertheless, the proposed project is not likely to contribute to the future listing of the Sprague's pipit.

3.8.1 Black-footed Ferret

Federal Status: Endangered

Effects Determination: No unauthorized take anticipated

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). The species has been listed by the USFWS as endangered since 1967 and has been the object of extensive re-introduction programs (USFWS 2013b). Ferrets inhabit the extensive prairie dog complexes of the Great Plains, which are typically composed of several smaller colonies in proximity to one another, providing a sustainable prey base. The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size were not observed during the field survey. Therefore, **no unauthorized take is anticipated.**

3.8.2 Gray Wolf

Federal Status: Endangered

Effects Determination: No unauthorized take anticipated

The gray wolf, listed as endangered in the United States in 1978, was believed extirpated from North Dakota in the 1920s and 1930s, with only sporadic reports from the 1930s to present (Licht and Huffman 1996; USFWS 1978). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings within western North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountain region of north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population, located approximately 17 miles (28 kilometers [km]) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2013a). Due to a lack of forested habitat and distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and the vulnerability of the latter to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation may further act as a barrier against wolf recolonization in western North Dakota. Therefore, **no unauthorized take is anticipated.**

3.8.3 Whooping Crane

Federal Status: Endangered

Effects Determination: No unauthorized take anticipated

The whooping crane was listed as endangered in 1970 in the United States by the USFWS and in 1978 in Canada. Historically, population declines were caused by shooting of individuals and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species include habitat destruction, especially suitable wetland habitats that support breeding and nesting as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and USFWS 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2013c). Only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, exists and nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and USFWS 2007; USFWS 2013c). Cass County, including the project area, is outside the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and USFWS 2007). Whooping cranes are omnivores, and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. The majority of time spent during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and USFWS 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 0.6 mile (1 km) of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and USFWS 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland and wetlands >0.04 hectare) was observed within the survey area. In addition, the project area is located within the delineated 95% migration corridor for the whooping crane. The nearest verified sighting occurred approximately 15.9 miles northwest of the proposed alignment (unpublished data, M. Tacha, USFWS); thus, it is unlikely that the species would occur in the project area. SWCA recommends that if whooping crane(s) are sited within 1.0 mile of the project area Paradigm stop construction until the whooping crane has left the area and contact the USFWS. Therefore, **no unauthorized take is anticipated.**

3.8.4 Interior Least Tern

Federal Status: Endangered

Effects Determination: No unauthorized take anticipated

The interior population of the least tern is listed as endangered by the USFWS (1985a). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches long. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2013d).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota often will be found sharing sandbars with the piping plover, a threatened species (USFWS 2013d).

Census data indicate that more than 8,000 least terns comprise the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS 1990a, 2013d). Approximately 100 pairs breed in North Dakota (USFWS 2013d). Details of their migration are unknown, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2013d).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande river systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2013d). Current conservation strategies include identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2013d).

Lake Sakakawea is approximately 21.37 river miles and 6.86 straight line miles from the nearest point of the project area. To minimize or reduce potential impacts of the proposed Project on the tern, construction should be scheduled to avoid the breeding season to the extent practicable (February 1 to July 15). The interior least tern is not expected to be impacted by the proposed project if Paradigm follows these recommendations. **No unauthorized take is anticipated.**

3.8.5 Pallid Sturgeon

Federal Status: Endangered

Effects Determination: No unauthorized take anticipated

The pallid sturgeon was listed as endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas; destroyed spawning habitat; altered flow conditions,

which can delay spawning cues; and reduced food sources by lowering productivity (USFWS 2007a). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels; dynamic flow patterns; flooding of terrestrial habitats; and extensive microhabitat diversity (USFWS 1990b).

Pallid sturgeon populations occur in the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007a). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007a). Hatchery-reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to use the 15.5 miles (25 km) of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007a). Larval pallid sturgeon have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeon are found in the headwaters of Lake Sakakawea, the North Dakota Game and Fish Department has caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook areas. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, USFWS, to SWCA, September 3, 2010).

Desktop analysis concluded that suitable pallid sturgeon habitat is not present in the project area. Potential pollution from construction activities, hydrostatic testing, and pipeline operations are concerns for downstream populations of the pallid sturgeon. Activities associated with the proposed project are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. **No unauthorized take is anticipated.**

3.8.6 Piping Plover

Federal Status: Threatened

Effects Determination: No unauthorized take anticipated

The piping plover is a small shorebird that breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened and the Great Lakes population listed as endangered (USFWS 1985b).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2012b). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2012b). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known

nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2012b).

Desktop analysis concluded that critical habitat for the threatened piping plover is not present in the project area. However, piping plovers are known to use the Yellowstone River, which lies within the project area, for feeding and breeding. To minimize or reduce potential impacts of the proposed Project on the plover, construction should be scheduled to avoid the breeding season to the extent practicable (February 1 to July 15). The piping plover is not expected to be impacted by the proposed Project if Paradigm follows these recommendations. **No unauthorized take is anticipated.**

3.8.7 Designated Critical Habitat of Piping Plover

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat including the shoreline of Lake Sakakawea in Mountrail and McKenzie Counties, North Dakota (USFWS 2002).

The proposed project would not modify, alter, disturb, or affect the shoreline of Lake Sakakawea. The proposed project would not destroy or adversely modify designated critical habitat of the piping plover.

3.8.8 Dakota Skipper

Federal Status: Threatened

Effects Determination: No unauthorized take anticipated

The Dakota skipper is a small butterfly with a 1-inch wingspan. The male wing ranges from a tawny orange to brown and the female wing is darker brown with tawny orange spots and faint white spots (U.S. Fish and Wildlife Service [USFWS] 2011). The Dakota skipper was found to be warranted for protection under the Endangered Species Act, was precluded for higher-priority species in 1995, and was the subject of a proposed rule for listing as threatened under the Endangered Species Act. On October 24, 2014, the USFWS determined a threatened species status for the Dakota skipper, and the final rule became effective November 24, 2014 (79 Federal Register 63672). The primary causes for decline in Dakota skipper populations include the loss or fragmentation of high-quality native prairie habitat due to overgrazing, conversion to agriculture, invasion by non-native plants, urbanization, and disruption of natural prairie fire cycles.

The primary cause for the decline of this species is the loss of high-quality native prairie habitat due to overgrazing, conversion to agriculture, and disruption of natural prairie fire cycles (USFWS 2011a). “Type A” habitat is low wet-mesic prairie with little topographic relief occurring near-shore glacial lake deposits (Royer and Marrone 1992). Three plants species dominate Type A habitat and include wood lily (*Lilium philadelphicum*), bluebell bellflower (*Campanula rotundifolia*), and mountain deathcamas (*Zigadenus elegans*) (McCabe 1981). “Type B” habitat of the Dakota skipper occurs on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem, little bluestem, and needlegrasses (*Stipa* spp.) and may include bluebell bellflower and wood lily (USFWS 2014b). Additionally, Type B habitat supports extensive stands of purple coneflower, upright prairie coneflower (*Ratibida*

columnifera), and common gaillardia (*Gaillardia artistata*) (USFWS 2014b). During the surveys cultivated, non-native grass prairie was dominant in the proposed project area and included species such as smooth brome, crested wheatgrass, and western wheatgrass. Dakota skippers are not known to occur in the project area. Additionally, field surveys concluded that cultivated areas and native grass prairie are dominant in the project area. **No unauthorized take is anticipated.**

3.8.9 Dakota Skipper Designated Critical Habitat

On October 1, 2015, the USFWS designated critical habitat for the Dakota skipper in 21 counties across its range and 5 counties in North Dakota (80 Federal Register 59247), and the final ruling will become effective on November 2, 2015 (USFWS 2015b). The nearest known Dakota skipper population, designated critical habitat Unit 12, is approximately 10.9 miles northeast of the project area.

Two units of designated critical habitat occur west of the Missouri River in McKenzie County, North Dakota. Designated Units 11 (McKenzie Pasture 12 East) and 12 (McKenzie Pasture 12 West) are located on the Little Missouri National Grassland, also in McKenzie County. Based on a 2014 survey, the Dakota skipper should be able to persist in Units 11 and 12 due to the presence of suitable habitat (Royer et al. 2014).

The proposed project would not modify, alter, disturb, or affect the designated critical habitat for the Dakota skipper.

3.8.10 Rufa Red Knot

Federal Status: Threatened

Effects Determination: No unauthorized take anticipated

The rufa red knot is a medium-sized shorebird approximately 9 to 11 inches tall with breeding plumage consisting of red around the face and a prominent stripe above the eye, breast, and upper belly and non-breeding plumage of dusky gray and white (Bureau of Indian Affairs 2014). The USFWS published a proposal to list the rufa red knot as threatened under the ESA in the Federal Register in September 2013 (78 *Federal Register* 60023). On December 11, 2014, the USFWS determined a threatened species status for the rufa red knot, and the final rule became effective on January 12, 2015 (79 *Federal Register* 73705).

The primary reasons for decline of this species are reduced food supplies in Delaware Bay due to commercial harvest of horseshoe crabs and areas of range loss due to rising sea levels, shorelines projects, and development (USFWS 2013e). The rufa red knot breeds in the Canadian Arctic and migrates 19,000 miles to winter on the U.S. Gulf Coast and in South America. The species generally occurs along the ocean coasts during migration, but a small number have been reported across the interior United States.

Suitable habitat along Lake Sakakawea is approximately 21.37 river miles from the nearest point of the project area. However, the likelihood of the rufa red knot occurring in the project area is low. **No unauthorized take is anticipated.**

3.8.11 Sprague's Pipit

Federal Status: Candidate

Effects Determination: Will not contribute to the future listing of the species

Sprague's pipit is a small passerine, 10 to 15 centimeters long, endemic to the Northern Great Plains (USFWS 2011b). Sprague's pipit requires large tracts of unplowed native prairie habitat throughout its life cycle. Because native grasslands are disturbance-dependent, Sprague's pipit prefers grassland habitats that are regularly disturbed. The frequency of disturbance required for habitat maintenance depends on how quickly grasses grow to an intermediate height (4 to 12 inches) following a disturbance event.

In North Dakota, Sprague's pipit has been found in areas of moderate grazing. Sprague's pipits are sensitive to patch size and avoid edges between grasslands and other habitat features (USFWS 2011b). They may avoid non-grassland features including roads, trails, oil wells, croplands, woody vegetation, and wetlands. The Sprague's pipit is reported to stay up to 350 meters away from anthropogenic features such as roads, oil wells, and wind turbines (USFWS 2011b). The USFWS has estimated that each new oil well and associated road in North Dakota results in potential impacts to approximately 51 acres of pipit habitat due to avoidance and habitat fragmentation (USFWS 2011b). Because of increasing habitat fragmentation, especially by energy development, throughout the Sprague's pipit range and the loss of native prairie habitat, Sprague's pipit was listed as a Candidate Species under the ESA in 2010 (USFWS 2011b).

In North Dakota, Sprague's pipit breeds throughout the state except for the easternmost counties. During the breeding season the birds prefer large patches of well-drained, open native grassland with a minimum size of 358.3 acres (range = 170 to 776 acres). They have not been observed in areas smaller than 71.6 acres on their breeding grounds (USFWS 2011b).

Field surveys concluded that cultivated areas and native grass prairie were dominant in the proposed project area. The proposed project is unlikely to directly affect habitat due to lack of adequate patch sizes required by the Sprague's pipit for breeding grounds in the immediate project area but may indirectly contribute to reduced use of any nearby suitable grassland habitat patches within 350 meters of the proposed project. Will not contribute to the future listing of the species.

3.8.12 Northern Long-eared Bat

Federal Status: Threatened

Effects Determination: No unauthorized take anticipated

On May 4, 2015, the USFWS listed the northern-long eared bat as threatened under the ESA (USFWS 2015). USFWS also issued an interim rule pursuant to Section 4(d) of the Act in conjunction with the final rule to list the species as threatened, which also took effect on May 4, 2015. For areas of the country not affected by whitenose syndrome (i.e., areas outside the 150-mile white-nose syndrome buffer zone), including all of North Dakota, the interim 4(d) rule exempts incidental take from certain activities. This medium-sized bat ranges across the eastern and north-central United States and all of the Canadian provinces (USFWS 2013f). Throughout most of this species' range, populations are patchily distributed. They emerge at

dusk to fly through the understory of forested hillsides and ridges, feeding on moths, flies, leafhoppers, caddisflies, and beetles.

Most records of northern long-eared bats are from winter hibernacula surveys, with more than 780 hibernacula identified within the United States. No known hibernacula are located in North Dakota, due either to a lack of suitable hibernacula present or to a lack of survey efforts (USFWS 2013g). This bat species occupies a wide range of rocky and forested habitats. Suitable winter habitat contains large caves and mines (USFWS 2013f). Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, under loose bark, and rock fissures (Jones and Choate 1978).

Northern long-eared bats are not known to occur in the project area, although species-specific surveys have not been conducted. Suitable winter habitat for northern long-eared bats does not occur within the project area. Nearby trees can act as suitable summer day roosts. The project construction plans include the minimal removal of woody vegetation. SWCA identified 544 trees and shrubs with a DBH of 1-inch or greater within the 100-foot construction corridor. The project is located outside the 150-mile whitenose syndrome buffer zone. Incidental take of northern long-eared bats is exempt throughout North Dakota. **No unauthorized take is anticipated.**

3.8.13 Migratory Birds

Status: Protected under the Migratory Bird Treaty Act

Effects of Project: No incidental take anticipated

Suitable habitat for migratory birds exists in the entire project area. Specifically, grassland nesting birds have the potential to occur and nest in the project area, especially during the migratory bird breeding season. Suitable woodland nesting habitat also occurs in the project area. Paradigm can choose one of the following options to avoid all incidental take during construction of the project.

- Complete all construction outside of the migratory bird breeding season, which occurs generally between February 1 and July 15.
- Clear and grub or mow the project alignment prior to the bird breeding season and maintain vegetation in a degraded state within the project construction area during the breeding season to deter migratory birds from nesting in the project area until construction is completed.
- If project construction commences during the bird breeding season, have a qualified avian biologist conduct a survey of breeding birds in the project area no more than 5 days before construction begins, and if active nests are discovered, notify the USFWS for further direction.
- If nests are identified in the construction area, they will be taxonomically identified by a qualified avian biologist to determine if the species are considered migratory. If the species are migratory, the construction ROW will be marked by placing wooden laths on each side of the construction ROW, and caution tape will be strung across the ROW between laths. A 100-foot setback from active nests will be maintained. Per general

guidance and recommendation of the USFWS, no ground clearing, including mowing, may commence within an avoidance area until the identified nest ceases to be active.

If Paradigm follows one of these options, the proposed project is **unlikely to cause incidental take of any migratory birds or active nests**.

3.8.14 Bald Eagle

Federal Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No unauthorized take anticipated

The bald eagle (*Haliaeetus leucocephalus*) feeds on fish and carrion and typically roosts in large trees near water sources. Bald eagle nesting habitat typically consists of mature stands of conifer or cottonwood trees in association with rivers, streams, reservoirs, lakes, or any significant body of water. Bald eagles in eastern North Dakota are usually observed along the Red River and Sheyenne River. The nearest known bald eagle nest is located approximately 6.2 miles from the project area (North Dakota Game and Fish Department 2015). Bald eagles frequently migrate through grassland habitats; however, no bald eagles or nests were observed during the field surveys. Therefore, **no unauthorized take is anticipated** for the bald eagle.

3.8.15 Golden Eagle

Federal Status: Unlisted; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No unauthorized take anticipated

The golden eagle (*Aquila chrysaetos*) prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles in North Dakota can be found in proximity to badland cliffs, which provide suitable nesting habitat. No golden eagles, nests, or nesting habitat were observed during the field surveys. The closest known golden eagle nest is approximately 4.69 miles from the project area. Therefore, **no unauthorized take is anticipated** for the golden eagle.

3.8.16 Wildlife Observed

During the field survey, SWCA ecologists observed various wildlife species that use wetlands and other habitats within the survey area (Table 7). Common wildlife species may be affected both directly through incidents with construction equipment or indirectly through the temporary fragmentation of habitat as a result of construction activities.

Table 7. Wildlife Observed during Field Surveys within the Survey Area

Common Name	Scientific Name	Observation Type
American crow	<i>Corvus brachyrhynchos</i>	Primary
Black-billed magpie	<i>Pica hudsonica</i>	Primary
Blue-winged teal	<i>Anas discors</i>	Primary
Canada goose	<i>Branta canadensis</i>	Primary
Coyote	<i>Canis latrans</i>	Primary
Gray catbird	<i>Dumetella carolinensis</i>	Primary

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Common Name	Scientific Name	Observation Type
Gray partridge	<i>Perdix perdix</i>	Primary
Mourning dove	<i>Zenaida macroura</i>	Primary
Raccoon	<i>Procyon lotor</i>	Primary
Red-tailed hawk	<i>Buteo jamaicensis</i>	Primary
Ring-billed gull	<i>Larus delawarensis</i>	Primary
Ring-necked pheasant	<i>Phasianus colchicus</i>	Primary
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	Primary
White-tailed deer	<i>Odocoileus virginianus</i>	Primary
Wilson's snipe	<i>Gallinago delicata</i>	Primary

4.0 CONCLUSIONS AND RECOMMENDATIONS

1. SWCA ecologists recorded approximately 3.11 acres of wetlands within the survey area.
2. In total, approximately 2.67 acres of PEM wetland *may* be temporarily impacted by construction activities.
3. SWCA ecologists recorded four water bodies totaling approximately 0.26 acres within the survey area.
4. The USACE makes any final determination on the jurisdiction of a water body. Boring underneath the water bodies identified should not require a permit from the USACE. If fill is to be placed, including the side-casting of excavated material and/or backfilling, a USACE permit under Section 404 of the Clean Water Act may be needed. SWCA recommends requesting the completion of an official Jurisdictional Determination by the USACE if project plans include any placement of dredged or fill material into wetlands or water bodies.
5. SWCA estimates that 544 trees, saplings, and shrubs will be impacted. Therefore, 1,088 2-year-old saplings should need to be replanted to fulfill the PSC 2:1 mitigation requirement.

According to the recommendations of the North Dakota Forest Service, tree species selection for replacement should be accomplished through collaboration with a reputable area nursery. This will allow for species to be selected based on various factors, including species hardiness and area soil type.

6. No threatened or endangered species were observed during the field survey.
7. Migratory bird habitat was observed throughout the entire project area. A 0.5-mile line-of-sight survey for raptor nests was conducted throughout the survey area. No raptor nests were observed during the survey.

In order to avoid unauthorized take of migratory birds, SWCA recommends following one of the options specified: 1) conducting all construction outside the migratory bird breeding season 2) if construction will occur during the bird breeding season (generally between February 1—July 15), SWCA recommends mowing, maintaining in a degraded state, or completely removing vegetation within the project construction area; or conducting an avian survey of the project area no more than 5 days before construction begins. If active nests are discovered, either notify the USFWS for further direction or have the nests taxonomically identified by a qualified avian biologist to determine if the species are considered migratory. If the species are migratory, the construction ROW may be marked by placing wooden laths on each side of the construction ROW and stringing caution tape across the ROW between laths. A 100-foot setback from active nests should be maintained. Per the recommendation of the USFWS, no ground clearing, including mowing, may commence within an avoidance area until the identified nest ceases to be active.

8. No areas of noxious weeds were identified in the survey area. If noxious weeds are confirmed during construction activities, actions should be taken to reduce the potential to spread any state-listed noxious weed species, especially to native areas.

5.0 LITERATURE CITED

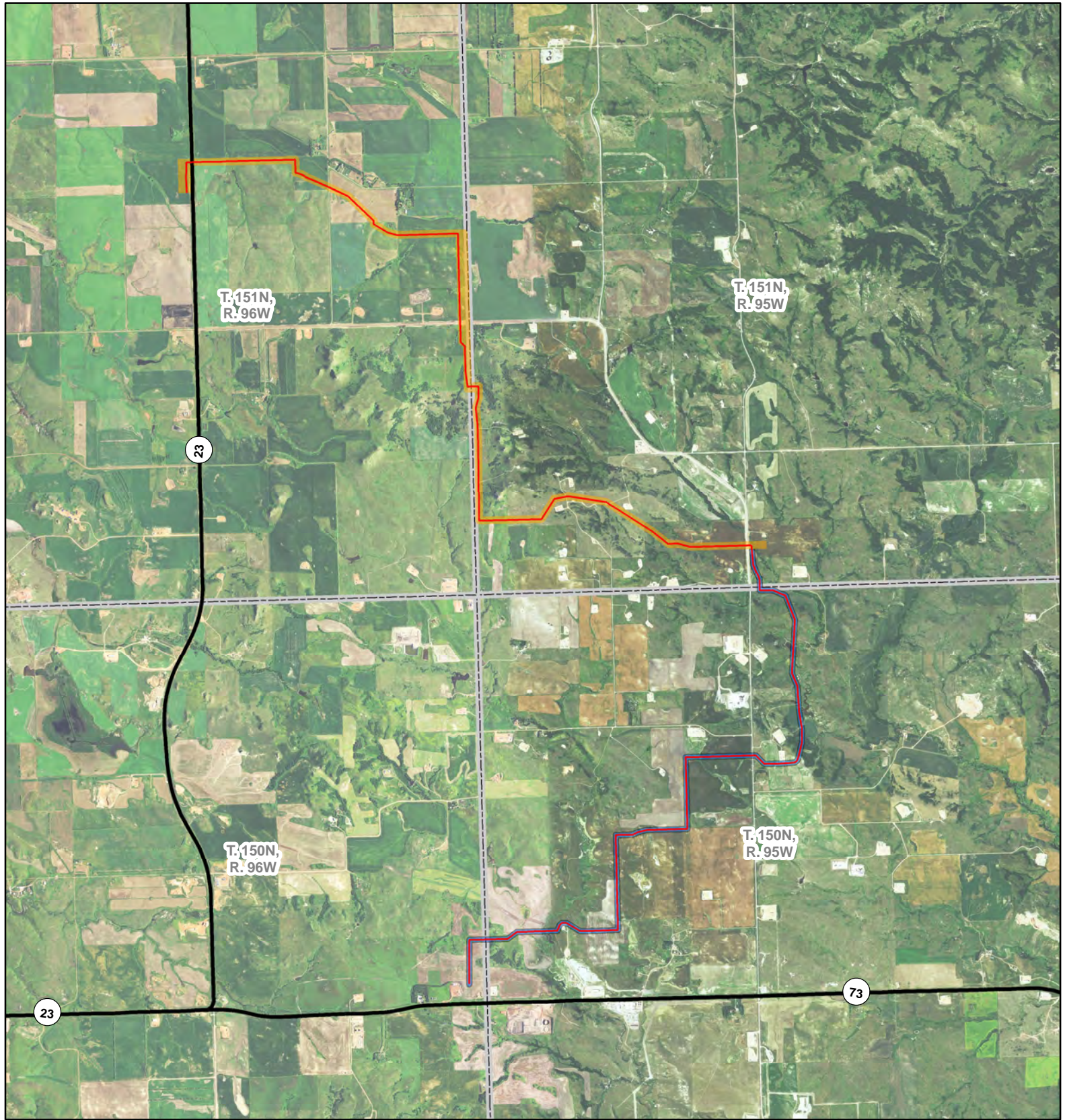
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APPENDIX A
Vicinity and Site Layout Maps

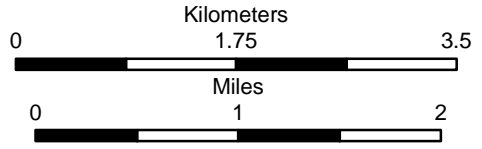


Johnsons Corner Connector

- Proposed Pipeline
- State Highway
- Survey Area
- Previously Inventoired Area
- Township/Range Boundary

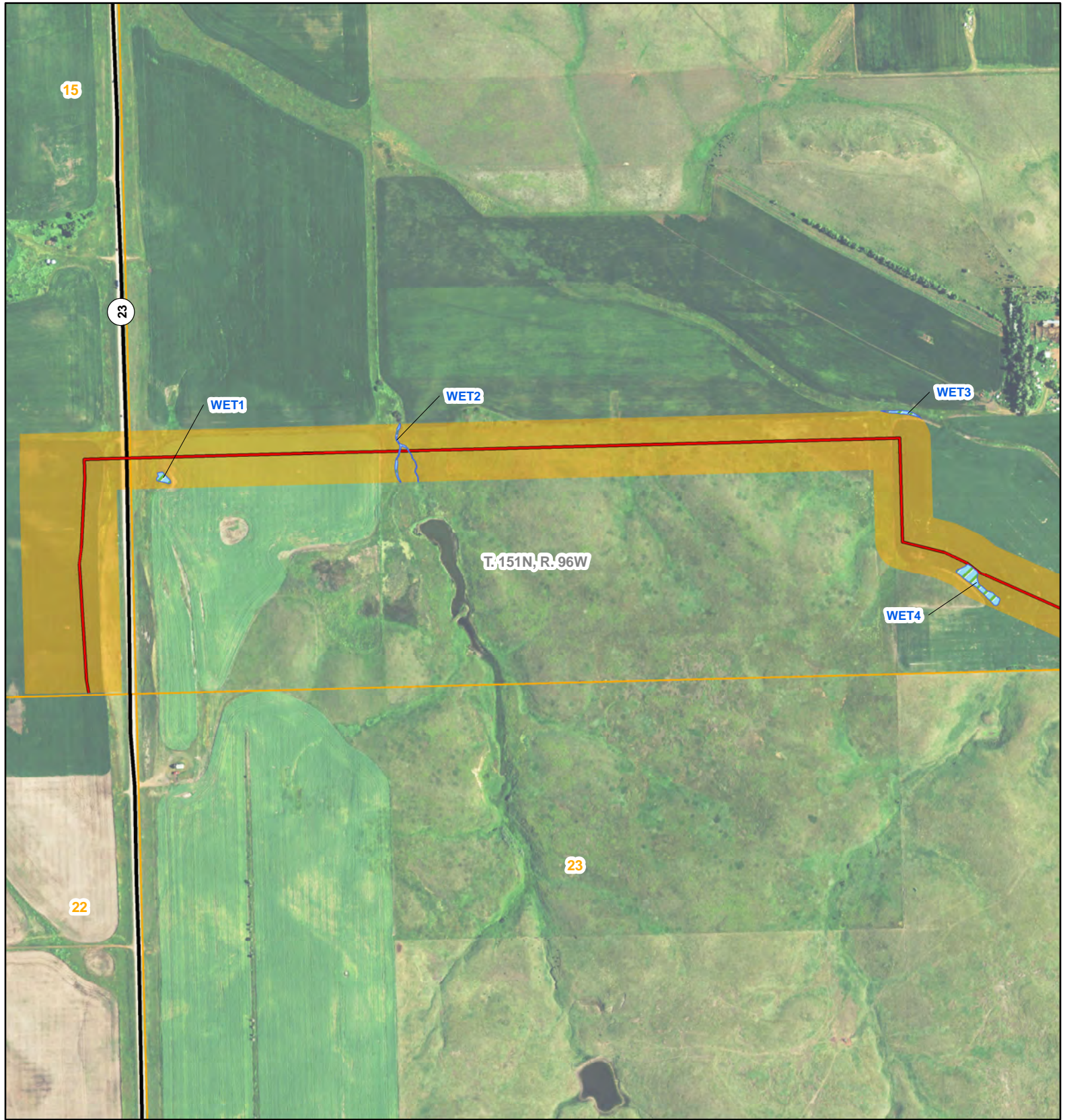


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






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 Projection: NAD 1983 UTM Zone 13N





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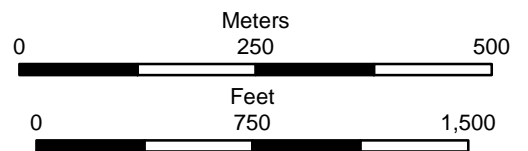
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|  | Stream |  | Previously Inventoried Area |
|  | Waterbody |  | Township/Range Boundary |
|  | Wetland |  | Section Boundary |
|  | Woody Vegetation | | |



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




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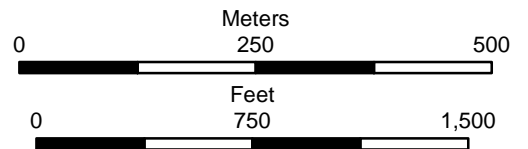
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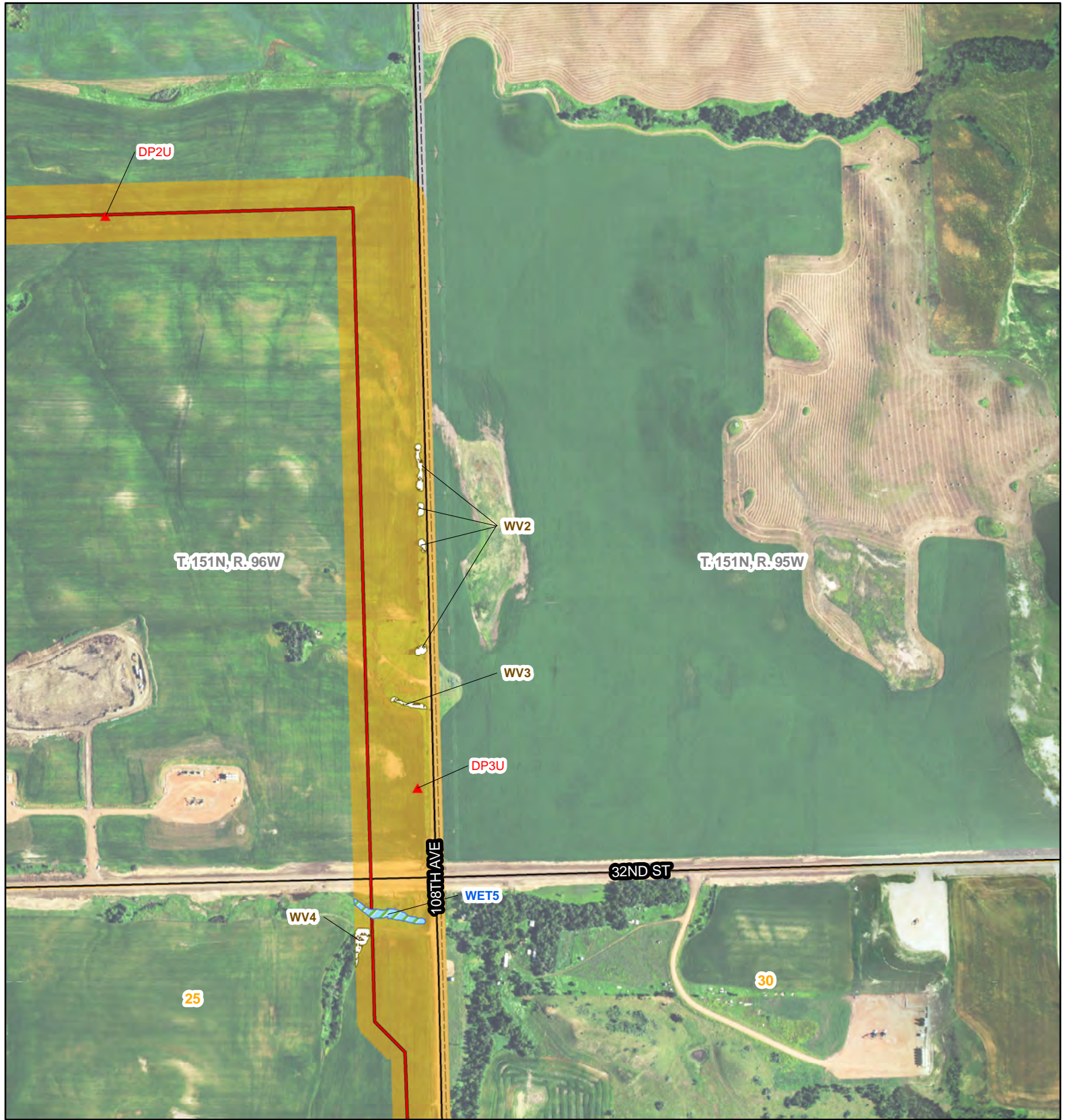
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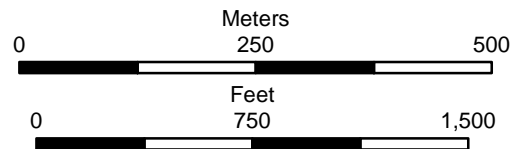
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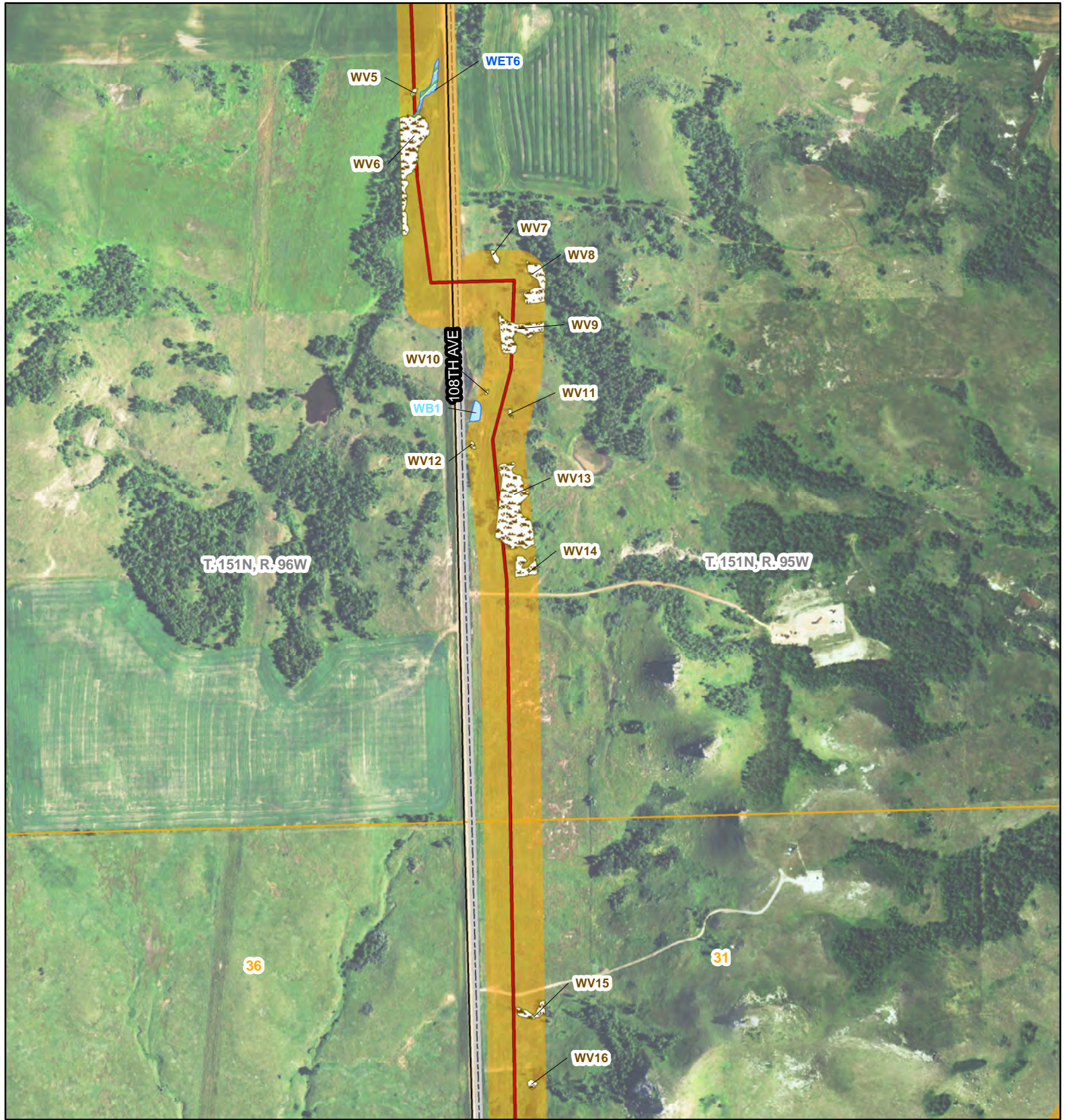
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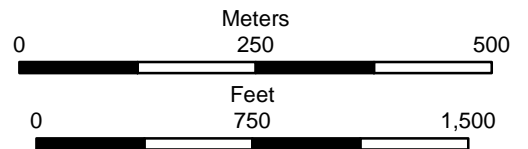
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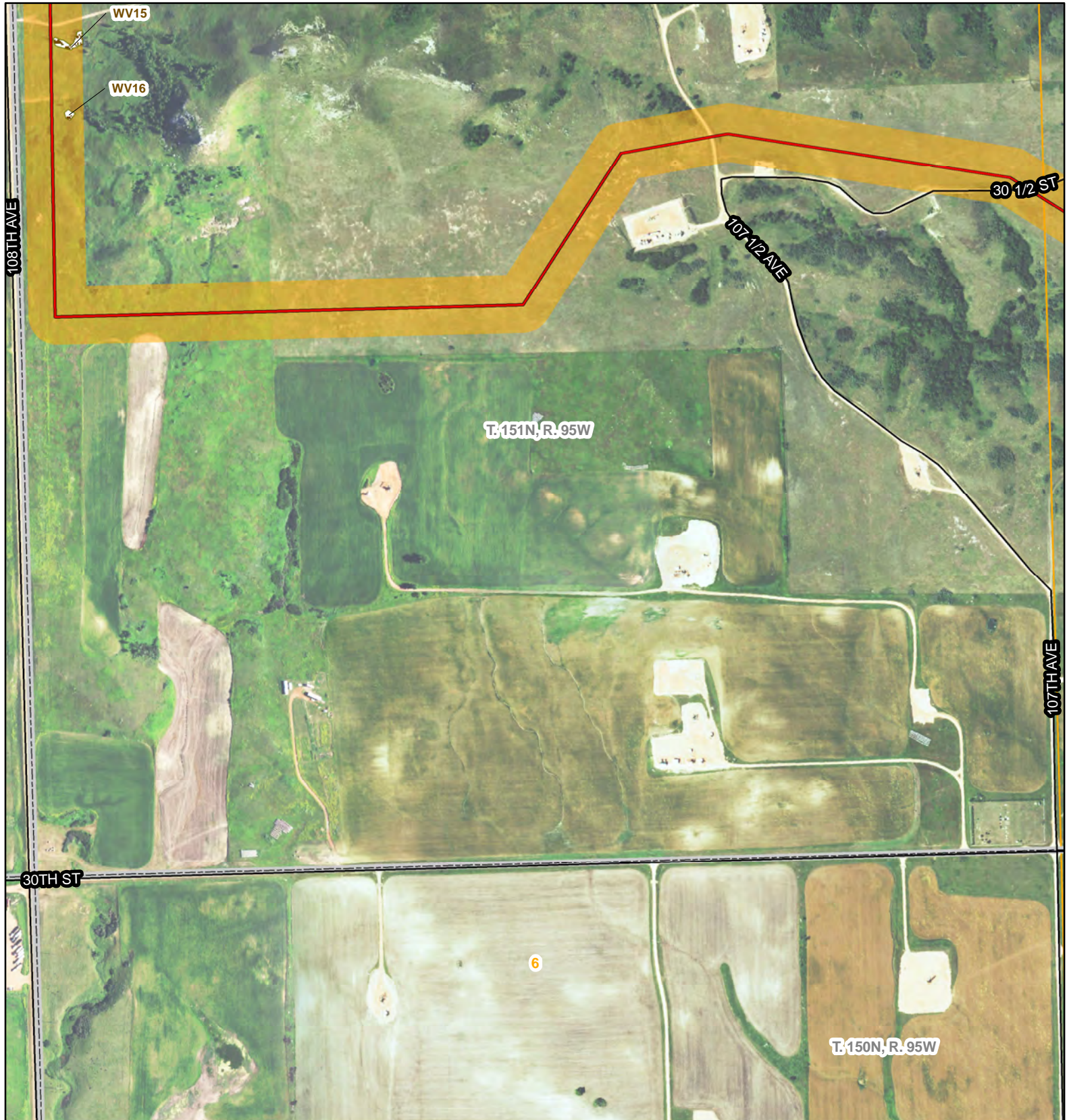
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McKenzie County, North Dakota



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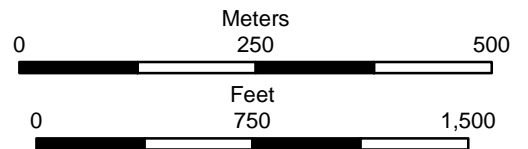
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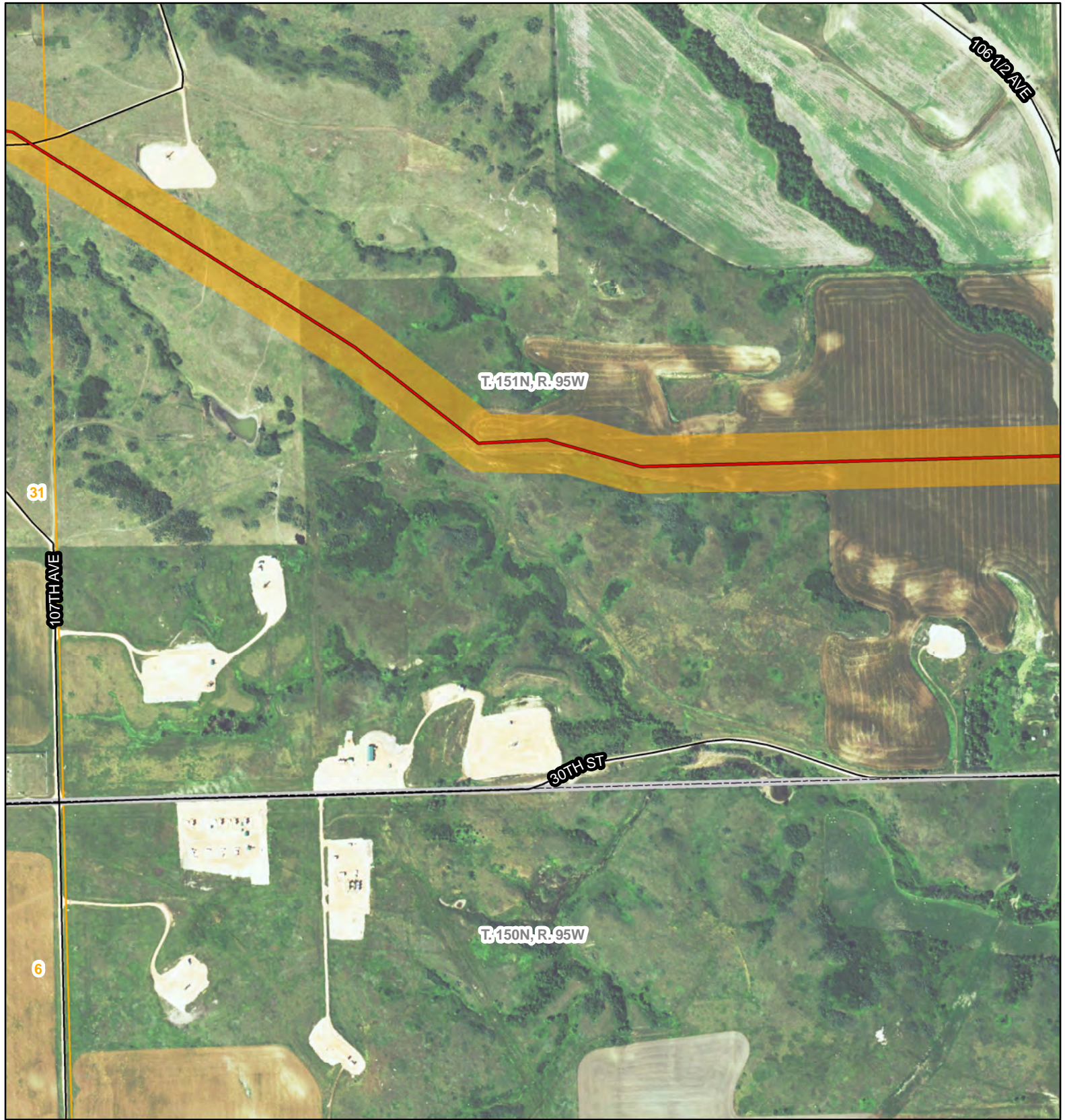
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McKenzie County, North Dakota

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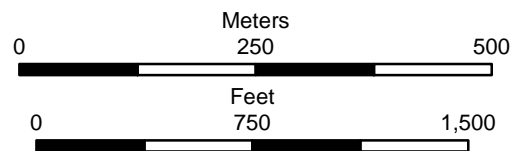
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Johnsons Corner (1995) and Blue Butte SE (1996)
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McKenzie County, North Dakota



Projection: NAD 1983 UTM Zone 13N



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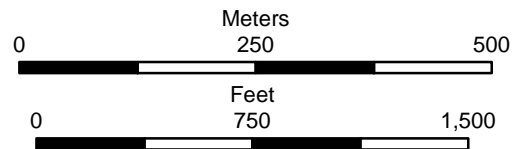
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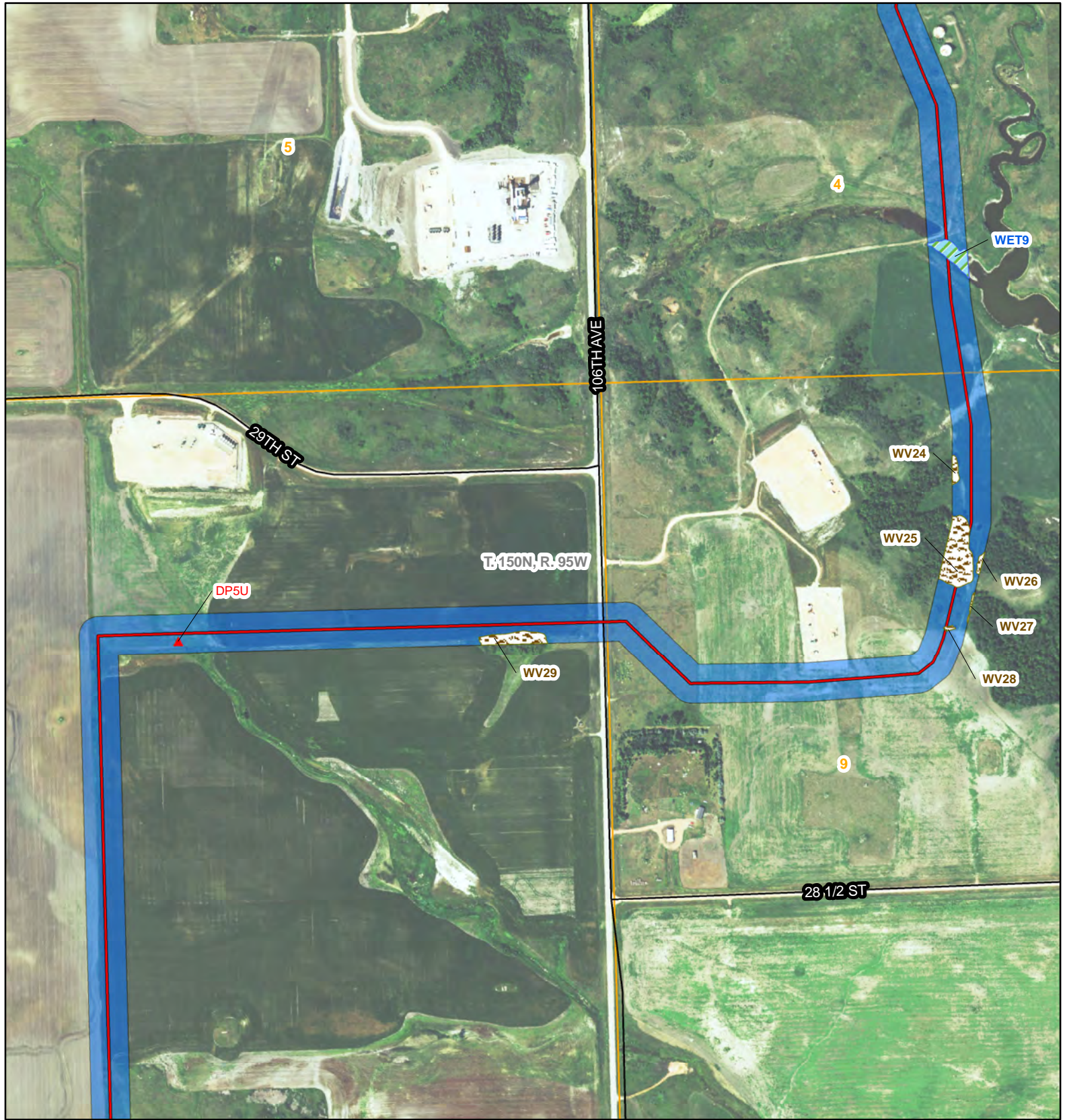
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Projection: NAD 1983 UTM Zone 13N





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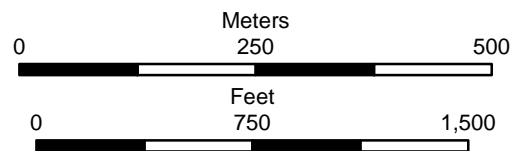
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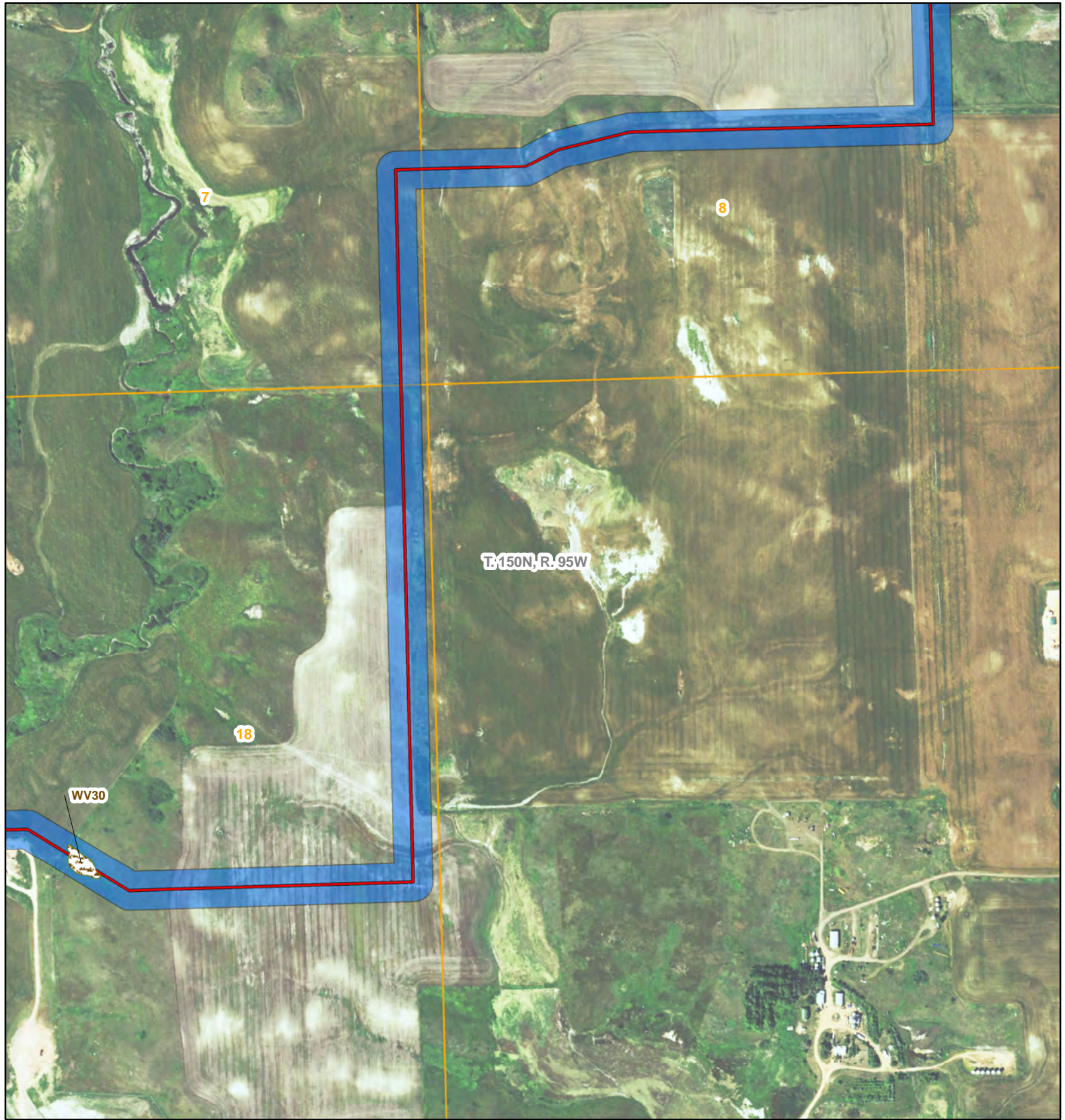
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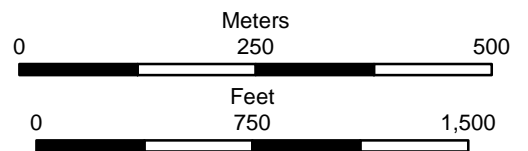
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| | Proposed Pipeline | | Existing County Roads |
| | Upland Data Point | | State Highway |
| | Wetland Data Point | | Survey Area |
| | Stream | | Previously Inventoired Area |
| | Waterbody | | Township/Range Boundary |
| | Wetland | | Section Boundary |
| | Woody Vegetation | | |



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Blue Butte SE (1996) and Johnsons Corner (1995)
T. 150N, R. 95W
McKenzie County, North Dakota



Projection: NAD 1983 UTM Zone 13N



Johnsons Corner Connector

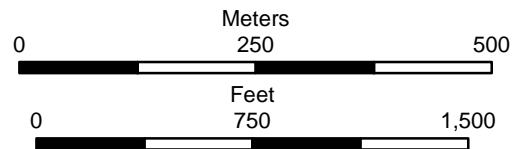
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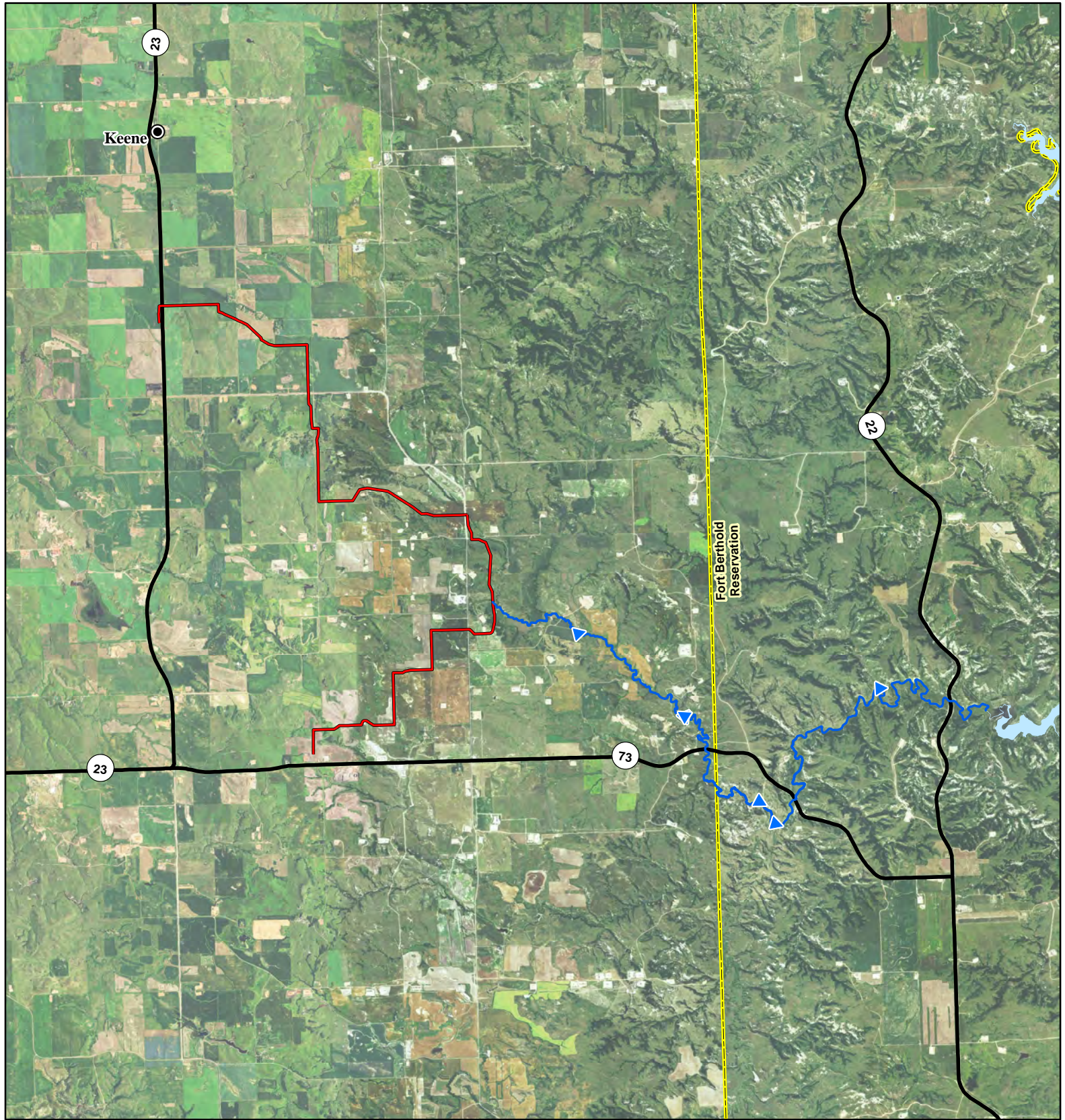
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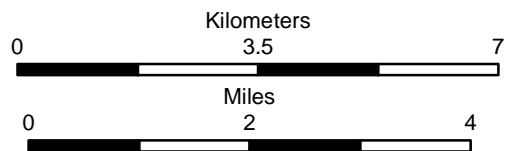
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- Lake Sakakawea
- Proposed Pipeline
- Reservation Boundary
- Flow Direction
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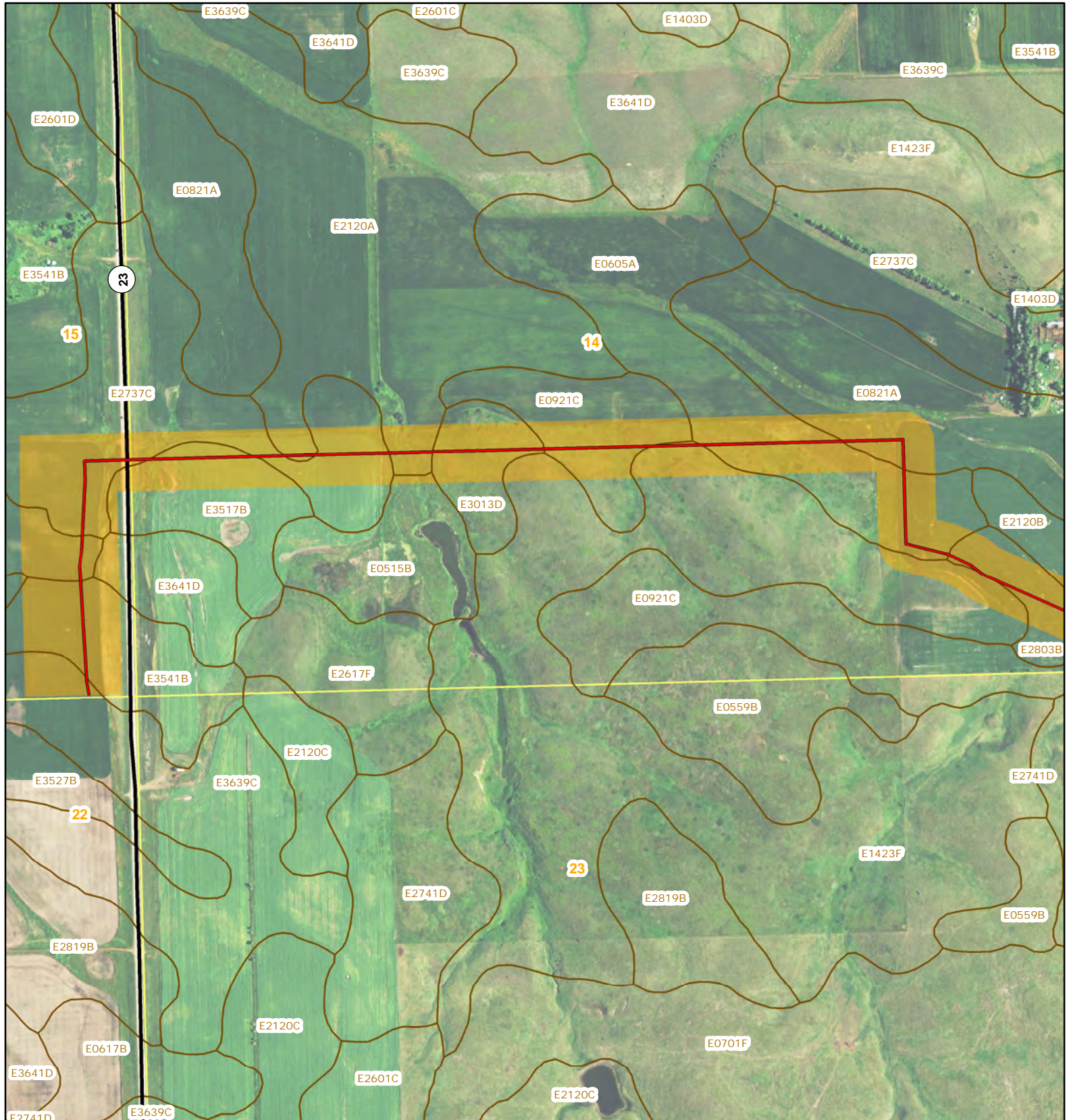


Base Map: 2014 Aerial Imagery
Source: USDA/FSA -
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Projection: NAD 1983 UTM Zone 13N

APPENDIX B
Survey Area Soil Series Map



Johnsons Corner Connector

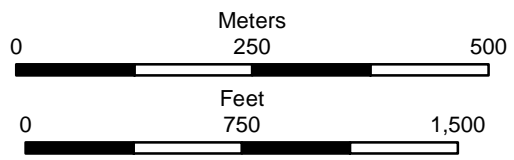
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- State Highway
- McKenzie County Soils Unit
- Previously Inventoried Area
- Survey Area
- Township/Range Boundary
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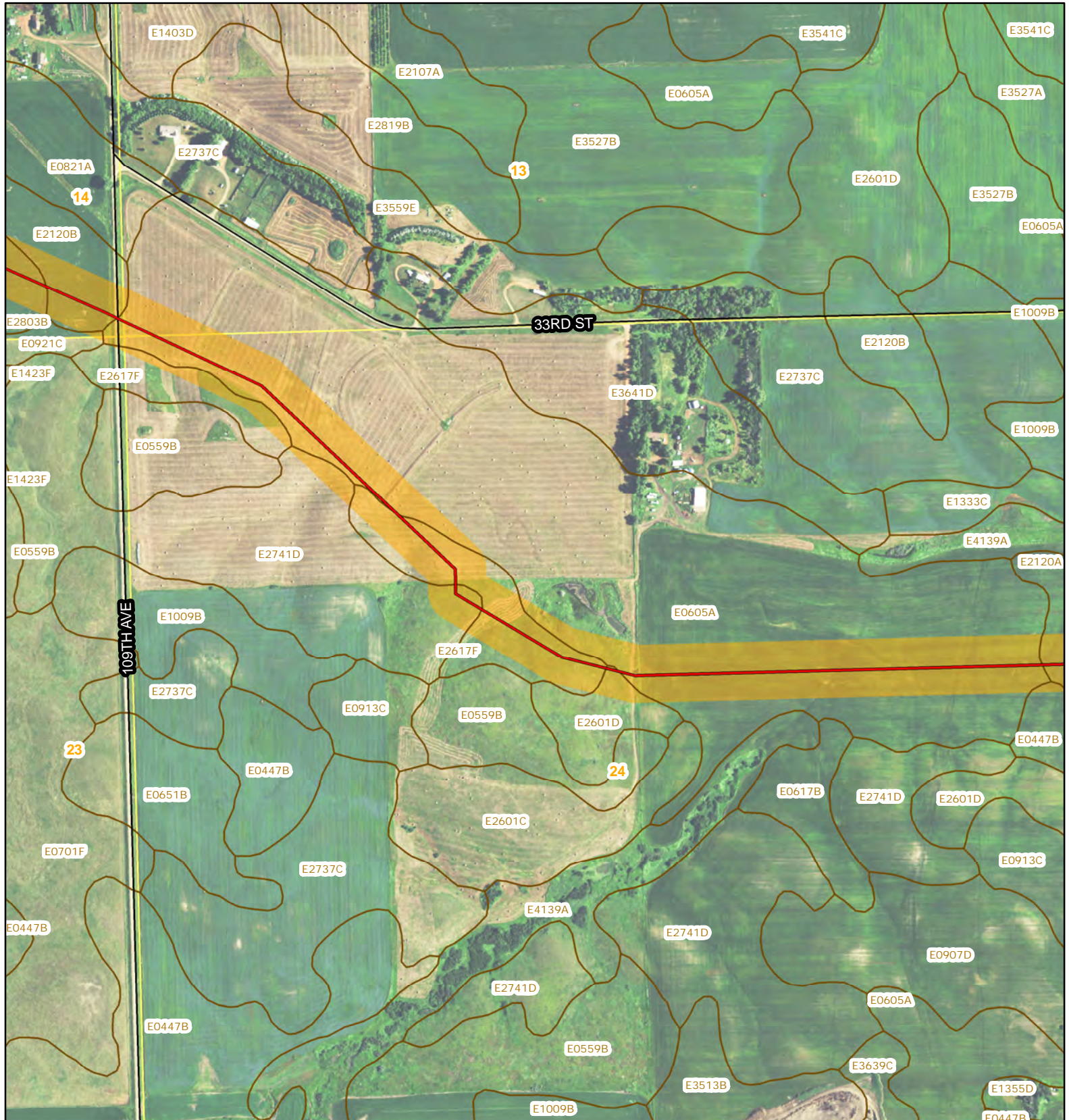
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Base Map: 2014 Aerial Imagery
Source: USDA/FSA -
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Keene (1995)
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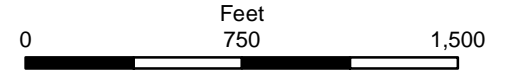
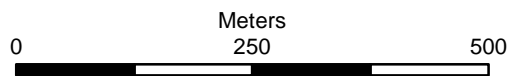
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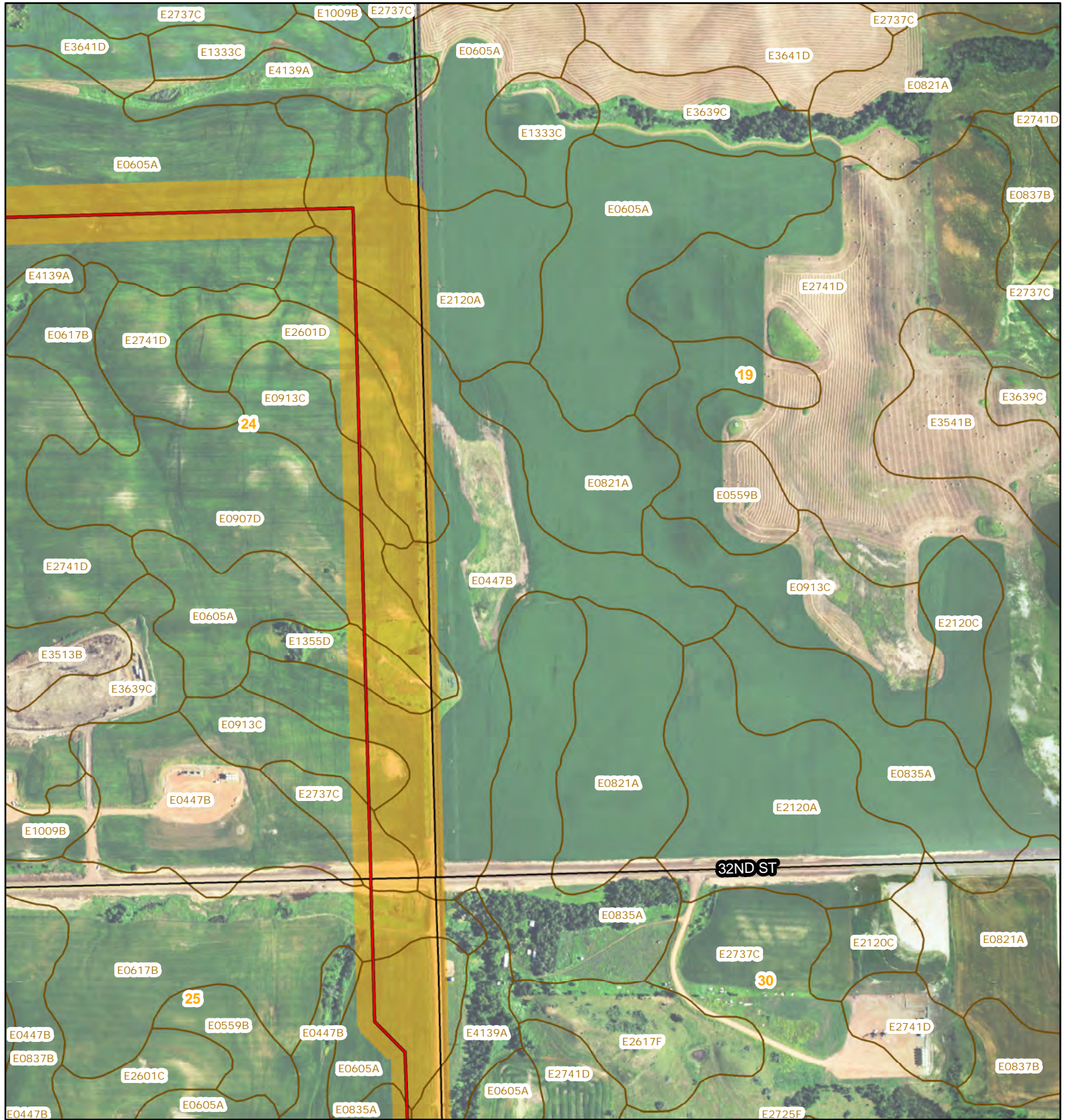
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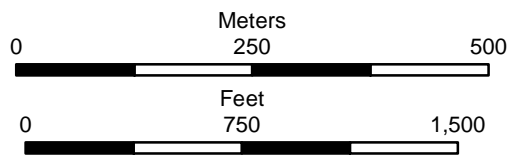
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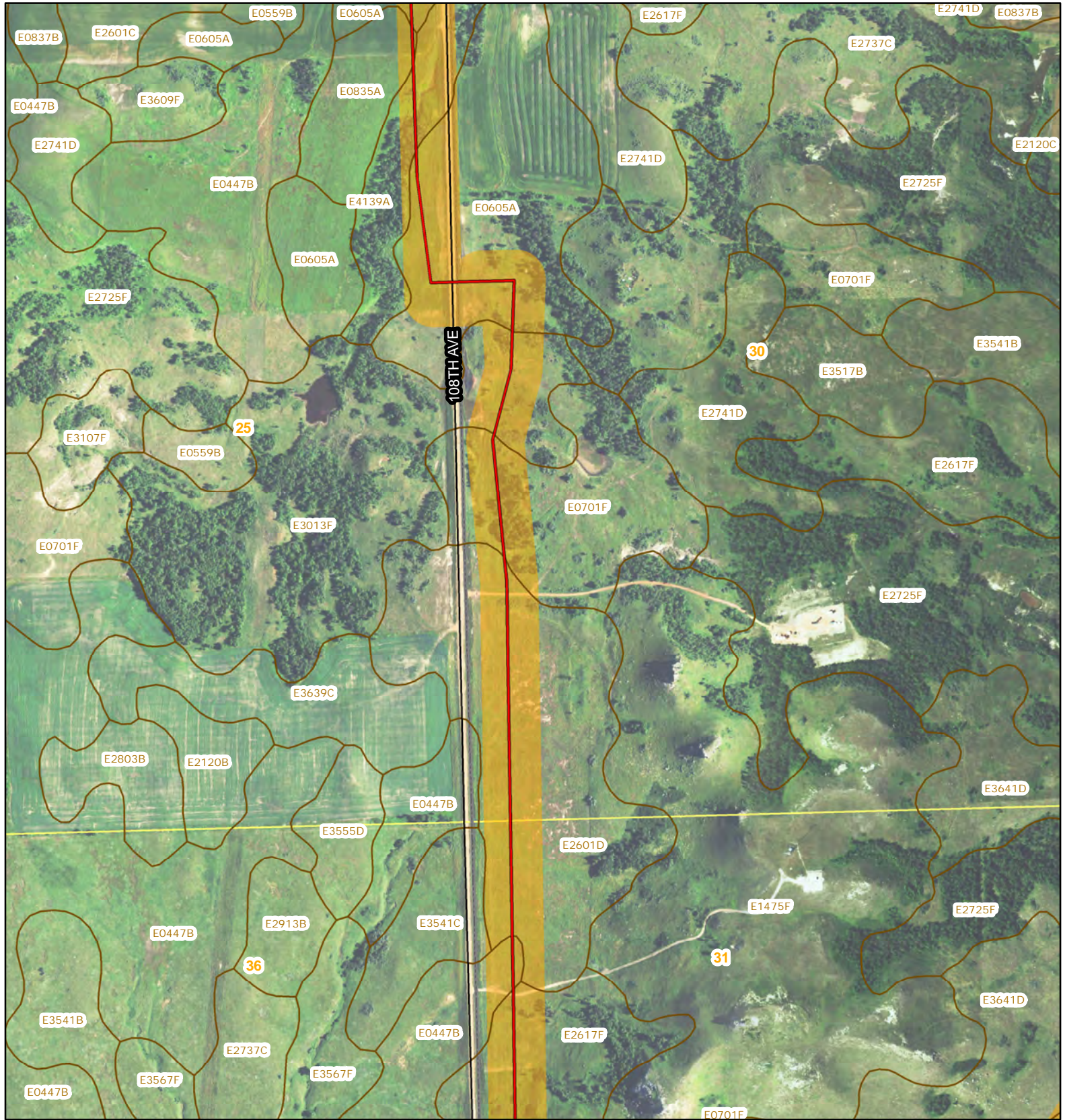
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T. 151N, R. 96W and T. 151N, R. 95W
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Projection: NAD 1983 UTM Zone 13N



Johnsons Corner Connector

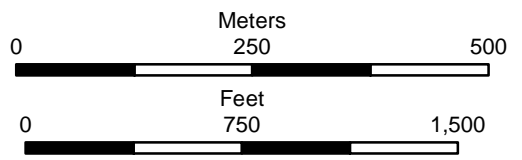
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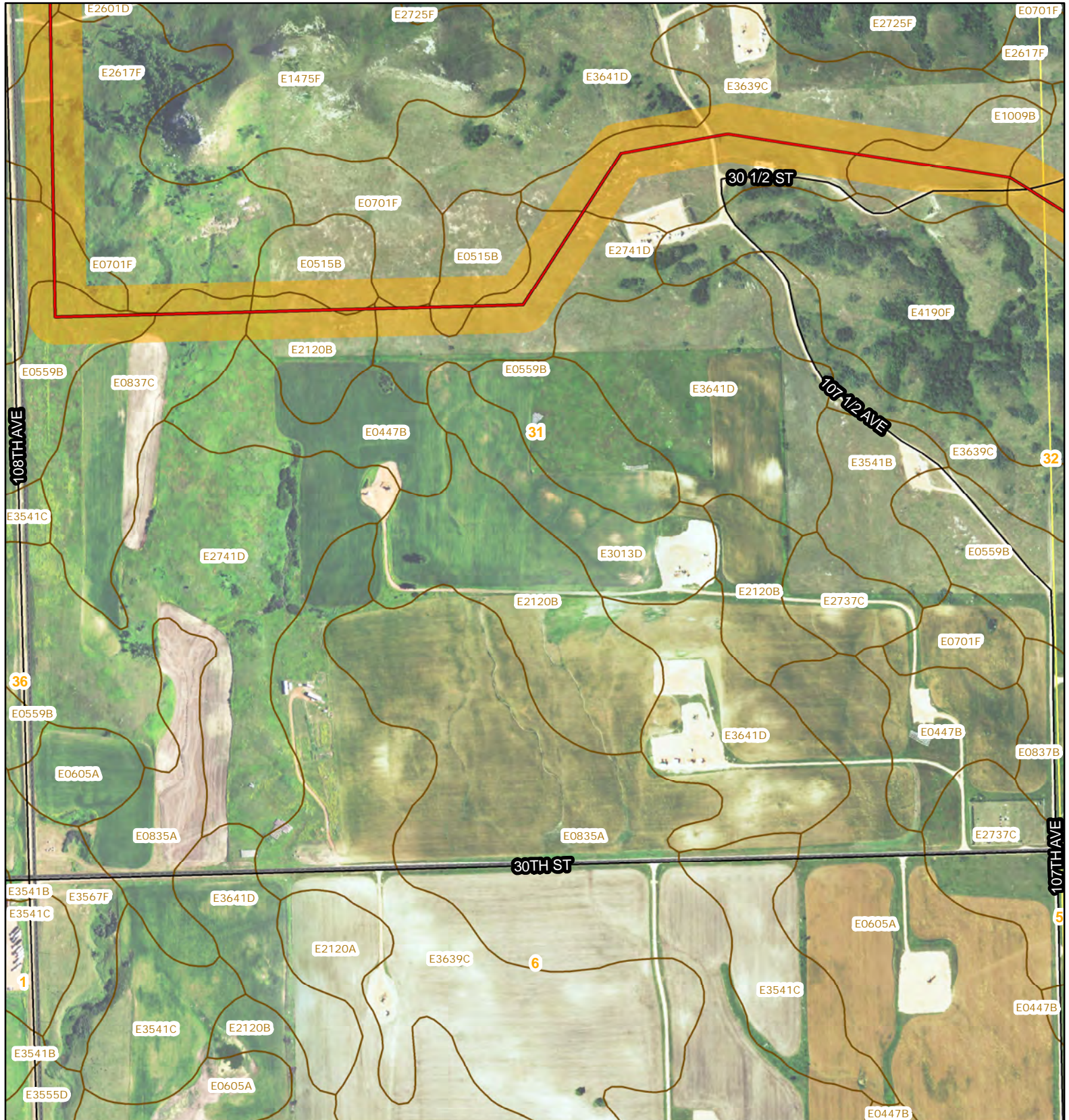
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


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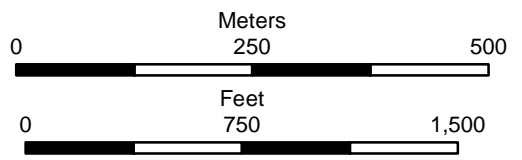
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-  State Highway
-  McKenzie County Soils Unit
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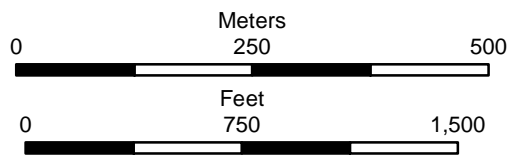
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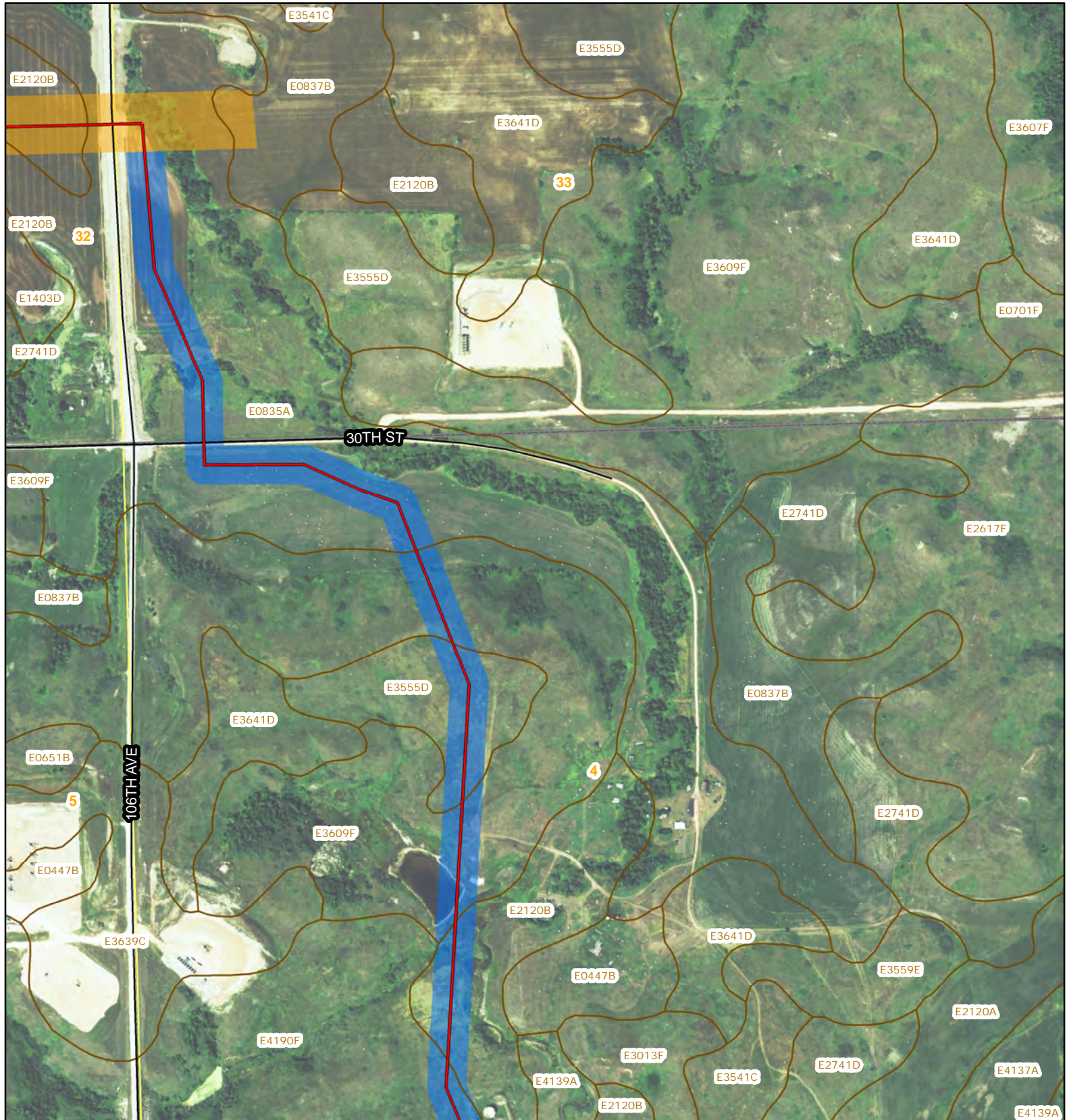
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Projection: NAD 1983 UTM Zone 13N



Johnsons Corner Connector

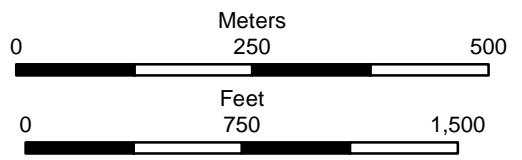
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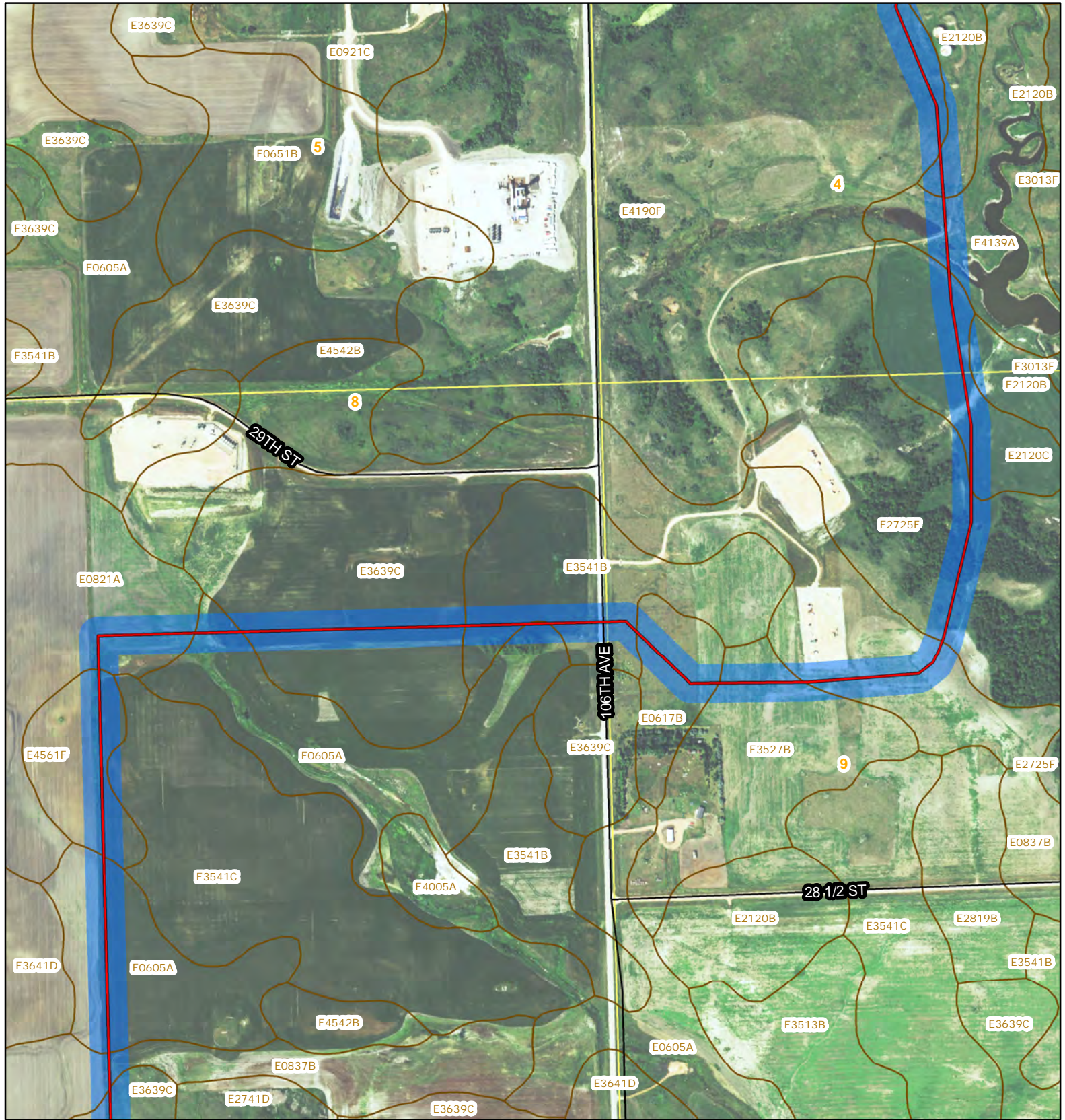
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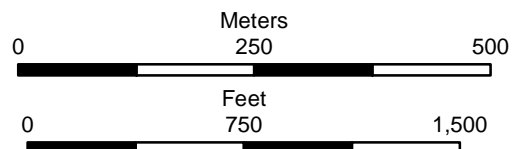
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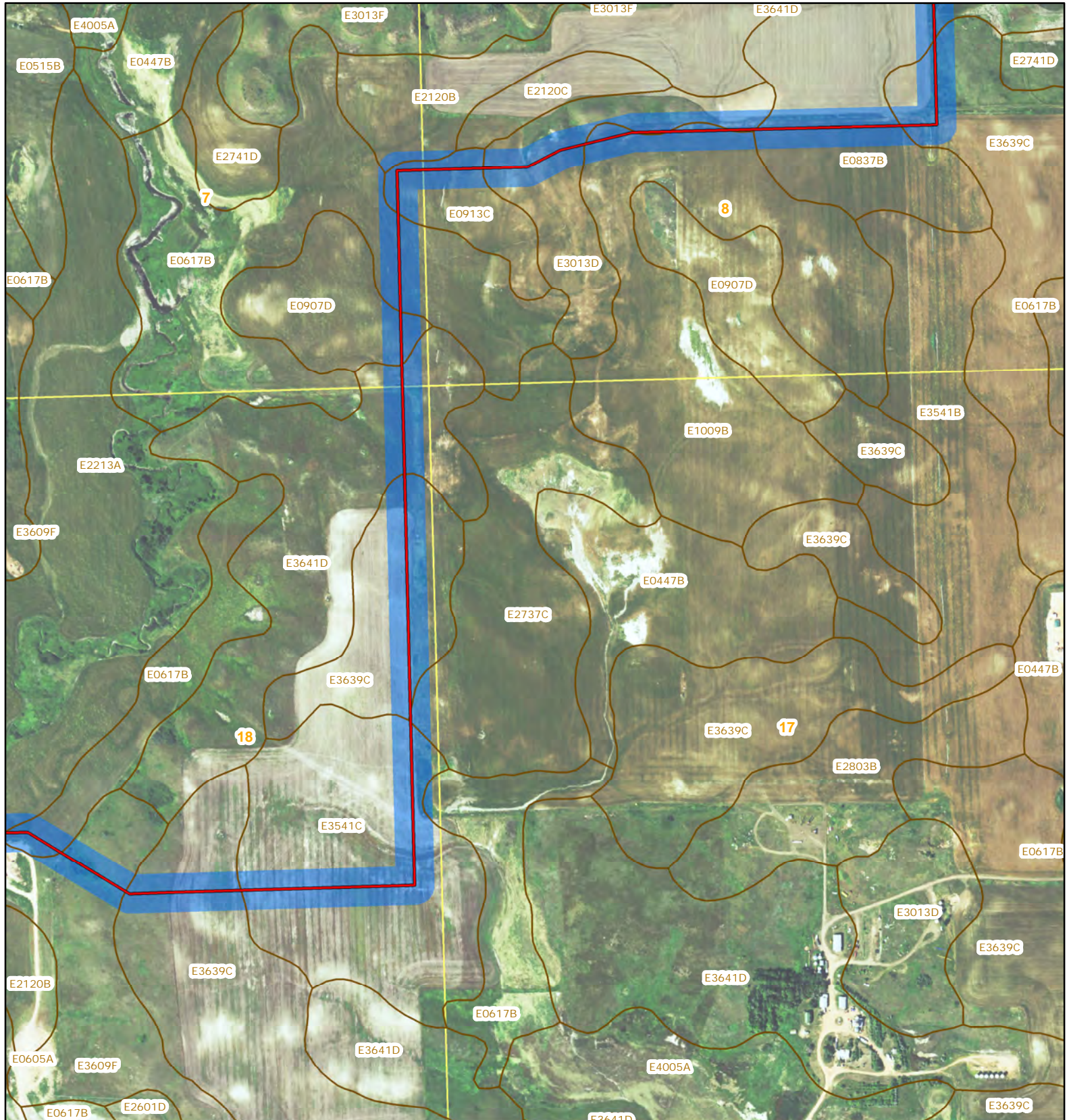
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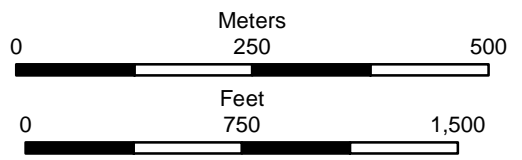
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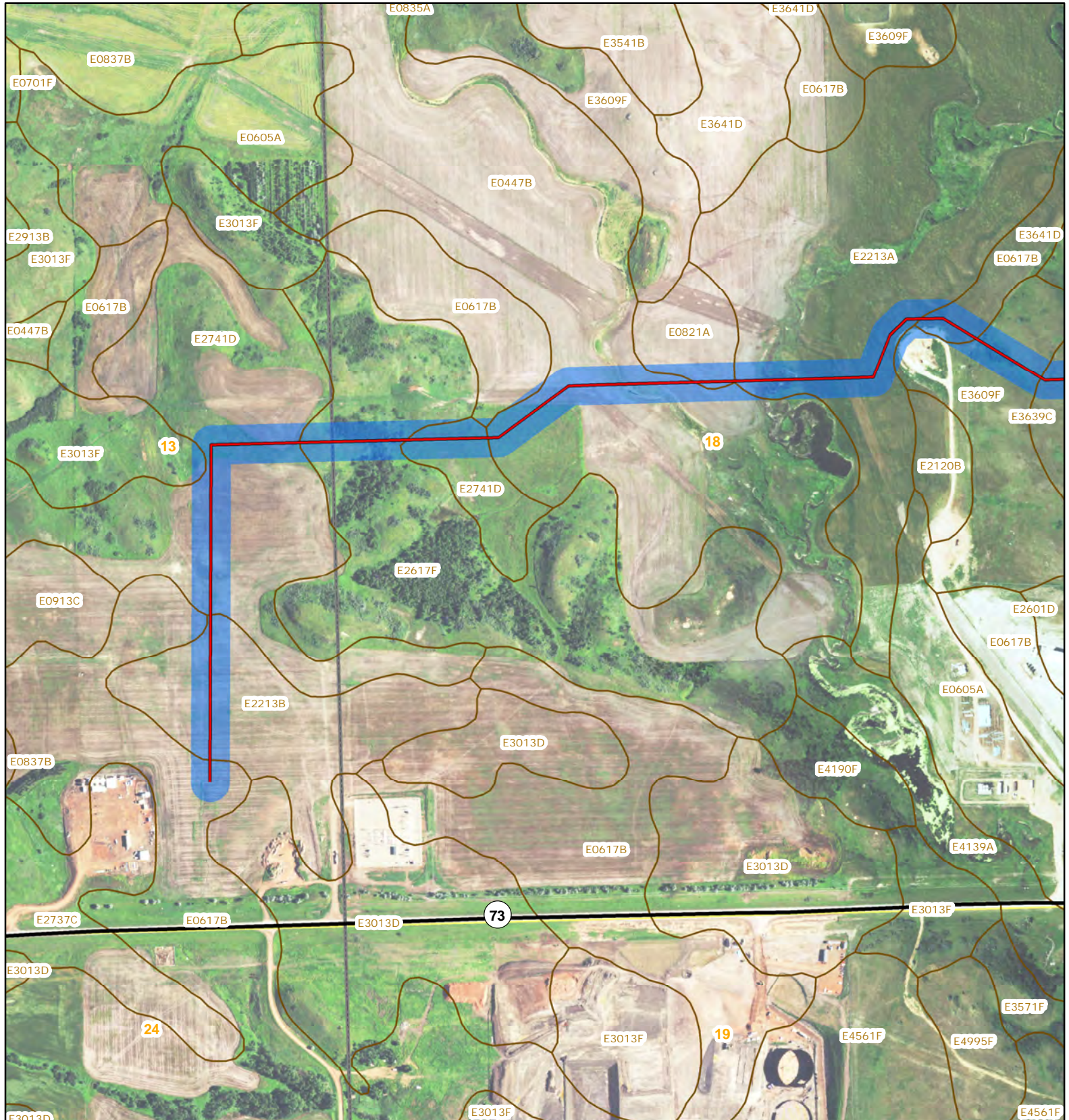
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


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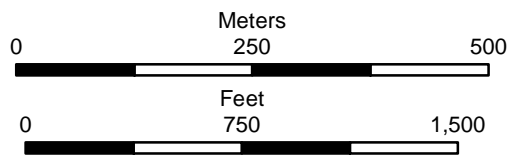
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McKenzie County, North Dakota



Projection: NAD 1983 UTM Zone 13N

APPENDIX C
Photographs of Project Area



Figure C.1. Green ash (WV18), facing southwest (photo taken August 10, 2015).



Figure C.2. Chokecherry and silver buffalo berry (WV20), facing northwest (photo taken August 10, 2015).



Figure C.3. Wooded draw (WV24), facing north (photo taken August 10, 2015).



Figure C.4. Wooded draw (WV25), facing northwest (photo taken August 10, 2015).



Figure C.5. Planted Shelter belt (WV29), facing northwest (photo taken August 10, 2015).



Figure C.6. Wooded hillside (WV31), facing south (photo taken August 11, 2015).



Figure C.7. Intermittent stream (STR1), facing northwest (photo taken August 11, 2015).



Figure C.8. Ephemeral stream (STR2), facing south (photo taken August 11, 2015).



Figure C.9. Manmade stock pond (WET1), facing northwest (photo taken August 10, 2015).



Figure C.10. Semi permanent wetland (WET2), facing southeast (photo taken August 10, 2015).



Figure C.11. Semi-permanent (WET3), facing northeast (photo taken August 10, 2015).



Figure C.12. Seasonal wetland associated with STR2 (WET4), facing south (photo taken August 11, 2015).



Figure C.13. Dakota skipper vegetation point (VP1), facing east (photo taken August 10, 2015).



Figure C.14. Dakota skipper vegetation point (VP2), facing west (photo taken August 10, 2015).

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**A Class I and Class III Cultural
Resource Inventory of the Paradigm
Johnsons Corner Connector Pipeline,
McKenzie County, North Dakota**

Prepared for

Paradigm Midstream, LLC

Prepared by

SWCA Environmental Consultants

September 2015

MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:
2. SHPO Reference #:
3. Author(s): Carolyn Riordan
4. Title: A Class I and Class III Cultural Resource Inventory of the Paradigm Johnsons Corner Connector Pipeline, McKenzie County, North Dakota
5. Report Date: September 18, 2015
6. Number of Pages: 62
7. Type – I, T, E, O: I
8. Acres: 141.4
9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s): Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2008; available at <http://history.nd.gov/hp/hpforms.html>) for Study Unit assignments.
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

<u>COUNTY</u>	<u>TWP</u>	<u>RNG</u>	<u>SEC</u>	<u>SU</u>
McKenzie	151N	95W	33	GA
	150N	95W	4, 7, 8, 9, 18	GA
	150N	96W	13	LM

**A Class I and Class III Cultural Resource Inventory of the
Paradigm Johnsons Corner Connector Pipeline,
McKenzie County, North Dakota**

Submitted to:

State Historical Society of North Dakota

Prepared for:

**Paradigm Midstream, LLC
5949 Sherry Lane
Dallas, Texas 75225**

Prepared by:

Carolyn Riordan

Principal Investigator:

William Harding

**SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501**

SWCA Cultural Resource Report Number 15-495

September 18, 2015

ABSTRACT

SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory on behalf of Paradigm Midstream, LLC (Paradigm) in support of the Paradigm Johnson's Corner Connector pipeline project. Paradigm proposes to construct and install a 12.71-mile-long pipeline to transport crude oil. The proposed pipeline would cross privately owned lands in McKenzie County, North Dakota, and the northern portion of the pipeline would be collocated with the previously proposed Paradigm Sacagawea pipeline, documented in McCarty and Riordan (2015).

Paradigm retained SWCA to complete a Class I and Class III inventory in support of the proposed project, and to assist Paradigm in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application, required under the North Dakota Energy Conversion and Transmission Facility Siting Act (excluding any applicable county or local requirements).

As proposed, part of the pipeline would be contained within areas (271.4 acres) previously inventoried by SWCA (McCarty and Riordan 2015; Picka and Cox 2014). The current Class I inventory was conducted on August 7, 2015, and the Class III inventory was conducted on August 10 and 11, 2015. The survey area consisted of a 200-foot-wide survey corridor centered on the proposed pipeline centerline. In total, 141.4 acres were currently surveyed.

The Class I file search did not identify any cultural resources within the current survey area, and did not identify any additional cultural resources within the previously inventoried areas beyond those already documented (32MZX97 and 32MZX1185) in McCarty and Riordan (2015). 32MZX1185 is an isolated find not eligible for inclusion on the National Register of Historic Places (NRHP) and no further work is recommended. McCarty and Riordan (2015) recommended monitoring of 32MZX97, a site lead left unevaluated for the NRHP. However, the site lead is for the Berg Post Office, and no buildings or structures, or remnants thereof, were observed within the survey area (McCarty and Riordan 2015). Therefore, in communication with the North Dakota State Historic Preservation Office, SWCA recommends no further work for this resource. With this stipulation, it is recommended that a determination of *No Significant Sites Affected* be granted for the project to proceed as planned.