



**ADDENDUM TO THE
WETLAND DETERMINATION & DELINEATION REPORT**

for the

**Burke County Wind Energy Center
Burke County, North Dakota**

Prepared for

**Burke Wind, LLC
700 Universe Boulevard MS JES/JB
Juno Beach, FL 33408**

Project Number: 16000947

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TABLE OF CONTENTS

Section	Page
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION	2
2.1 Ecoregions	2
2.1.1 Northern Dark Brown Prairie Ecoregion	2
2.1.2 Northern Missouri Coteau Ecoregion	3
3.0 METHODS	3
3.1 Aerial Desktop Review	3
3.1.1 Aerial Photography	3
3.1.2 National Agriculture Imagery Program 1-Meter, 4-Band Aerial Infrared Imagery	3
3.1.3 USGS Topographic Map.....	4
3.1.4 LiDAR-Derived 5 ft Contours.....	4
3.1.5 National Wetland Inventory	4
3.1.6 National Hydrography Dataset	4
3.1.7 U.S. Department of Agriculture – National Cooperative Soil Survey Map	4
3.1.8 Hydrologic Unit Code 12 Dataset.....	5
3.1.9 Floodplain Map	6
3.2 On-Site Wetland Delineations	6
4.0 RESULTS, FINDINGS, AND DISCUSSION	6
5.0 CONCLUSIONS	8
6.0 REFERENCES	9
COMMON WETLAND DEFINITIONS	10

APPENDIX

- A. Site Location Map
 - Aquatic Resources Index
 - Aquatic Resources Mapbook

EXECUTIVE SUMMARY

Atwell, LLC (Atwell) was retained by Burke Wind, LLC (Burke Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC, to perform a wetland determination and delineation for the proposed Burke County Wind Energy Center (the Project) in Burke County, North Dakota. This report is an addendum to Atwell's 2017 *Wetland Determination & Delineation Report for the Proposed Burke County Wind Energy Center, Burke County, North Dakota*.

Burke Wind originally proposed to construct the Project to produce 300 megawatts (MW), but recently reduced that to 200 MW. This resulted in a smaller Project area and the elimination of 38 wind turbines. Burke Wind contracted Atwell to conduct wetland determinations within the approximately 35.8-square-mile (22,933-acre) Project area and wetland delineations within the Survey Corridor, which encompasses the Project construction easement and collection line corridor as well as additional areas that were evaluated based on various siting scenarios. The proposed Project area is larger than the Project construction easement and collection line in support of the North Dakota Public Service Commission Certificate of Site Compatibility Application. The Project is also associated with the proposed Burke County Transmission Line, which has been delineated and is being permitted separately from the Project.

As described in the 2017 *Wetland Determination & Delineation Report for the Proposed Burke County Wind Energy Center, Burke County, North Dakota*, Atwell conducted an initial desktop aerial photograph interpretation and jurisdictional review to identify potential U.S. Army Corps of Engineers (USACE) jurisdictional wetlands and watercourses, which would be considered waters of the United States (WOUS) within the Project area. A meeting was held with the USACE regulatory office in Bismarck on December 13, 2016, to discuss the results and findings of the aerial desktop review. It was determined at that meeting that the majority of wetlands in the Project area are isolated (i.e., not within the jurisdiction of USACE; non-jurisdictional).

The USACE then requested that Burke Wind conduct an in-field assessment of a representative sample of wetlands to determine WOUS jurisdictional status and verify aerial desktop review methods. Burke Wind conducted an in-field wetland boundary and watercourse determination and delineation of the Project area in June, September, and November 2017. In September 2017, Burke Wind met with USACE and conducted a site visit. Based on the 2017 evaluation, 6,307 wetland features were examined within the 300 MW Project study area at that time and approximately 4% were determined to be jurisdictional WOUS. The current (200 MW) Project contains 2,476 wetland features, approximately 6% of which were determined to be jurisdictional WOUS. A Jurisdictional Determination was issued in February 2018.

Additional WOUS fieldwork was conducted between May and November 2018 to delineate WOUS boundaries within all areas where temporary and permanent impacts could potentially occur (i.e., the Survey Corridor). WOUS delineations that occurred between May and October 2018 were conducted within the growing season. WOUS boundaries delineated in November

2018 were mapped conservatively to ensure WOUS was fully delineated despite conditions outside of the growing season. All wetlands delineated in 2018 that were not identified during the 2017 USACE evaluation of 6,307 wetland features are assumed to be jurisdictional, regardless of whether or not they appeared to be isolated.

This wetland delineation report addendum provides a summary of the wetland delineations conducted within the Survey Corridor since the Jurisdictional Determination was issued in February 2018. The identification process for WOUS features consisted of 1) an aerial desktop review of the features within the Project area, and 2) on-site wetland delineations within the proposed Survey Corridor. The results of the wetland delineations indicate the presence of 36 WOUS features, totaling approximately 9.74 acres, within the Survey Corridor.

1.0 INTRODUCTION

Burke Wind, LLC (Burke Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC, is in the process of developing the proposed Burke County Wind Energy Center (the Project) in Burke County, North Dakota. This report is an addendum to the *Wetland Determination & Delineation Report for the Proposed Burke County Wind Energy Center, Burke County, North Dakota* (Atwell 2017).

As summarized in the wetland determination and delineation report (Atwell 2017), prior to a finalized Project layout, Atwell conducted an initial desktop aerial photograph interpretation and jurisdictional review to identify potential U.S. Army Corps of Engineers (USACE) jurisdictional wetlands and watercourses, which would be considered waters of the United States (WOUS) within the Project area. The USACE regulates the discharge of dredged or fill material into all WOUS, which includes navigable waters, perennial and intermittent tributaries (watercourses), and wetlands (jurisdictional wetlands) that have a continuous surface connection or unbroken hydrological connection to navigable waters or watercourses.

A meeting was held with the USACE regulatory office in Bismarck on December 13, 2016, to discuss the results and findings of the aerial desktop review. It was determined at that meeting that the majority of wetlands in the Project area are isolated (i.e., not within the jurisdiction of USACE; non-jurisdictional). Based on Burke Wind's standard approach of impact avoidance, all jurisdictional wetland and non-wetland WOUS will be avoided by Project design and the Project does not anticipate a Section 404 permit.

The USACE then requested that Burke Wind conduct an in-field assessment of a representative sample of wetlands to determine WOUS jurisdictional status and verify aerial desktop review methods. Burke Wind conducted an in-field wetland and watercourse determination and delineation of the Project area in June, September, and November 2017. During the September 2017 delineation, Burke Wind met with USACE and conducted a site visit. Based on the 2017 evaluation, 6,307 wetland features were examined within the 300 MW Project study area at that time and approximately 4% were determined to be jurisdictional WOUS. The currently proposed 200-megawatt (MW) Project contains 2,476 wetland features, approximately 6% of which were determined to be jurisdictional WOUS. A Jurisdictional Determination was issued in February 2018.

Additional WOUS fieldwork was conducted between May and November 2018 to delineate WOUS boundaries within all additional areas where temporary and permanent impacts could potentially occur (i.e., the Survey Corridor). This wetland delineation report addendum provides a summary of the wetland delineations conducted within the Survey Corridor since the Jurisdictional Determination was issued in February 2018. WOUS delineations that occurred between May and October 2018 were conducted within the growing season. WOUS boundaries delineated in November 2018 were mapped conservatively to ensure WOUS were fully delineated despite being conducted outside of the growing season. All WOUS delineated in

2018 that were not identified during the 2017 USACE evaluation of 6,307 wetland features are assumed to be jurisdictional, regardless of whether or not they appear to be isolated.

Burke Wind originally proposed to construct the Project to produce 300 MW, but recently reduced the Project size to 200 MW. This resulted in a smaller Project area and the elimination of 38 wind turbines. Burke Wind contracted Atwell to conduct wetland determinations within the approximately 35.8-square-mile (22,933-acre) Project area and wetland delineations within the Survey Corridor, which encompasses the Project construction easement and collection line as well as additional areas that were evaluated based on various siting scenarios. The proposed Project area is larger than the Project construction easement and collection line in support of the North Dakota Public Service Commission Certificate of Site Compatibility Application. The Project area was analyzed to assist in Project design to minimize potential impacts to sensitive natural features.

The proposed Project consists of a wind energy facility with the potential to produce up to 200 MW of energy by constructing up to 76 wind turbine generators (WTGs). An additional five alternate WTG locations are proposed, but only 76 WTGs will ultimately be constructed. The Project also includes associated service roads, buried underground electrical collection lines, a batch plant, temporary construction laydown area, substation, and an operations and maintenance building. The Project is associated with the proposed Burke County Transmission Line, which has been delineated and is being permitted separately from the Project.

2.0 SITE DESCRIPTION

The Project is located within Burke County in northwestern North Dakota, approximately 1.5 miles north of White Earth, 11 miles southwest of Bowbells, 20 miles west of Kenmare, and 36 miles northeast of Williston, North Dakota. The Project area and surrounding vicinities are sparsely populated, with land use primarily dedicated to agricultural activities (cultivated crops, hayfields, and pasturelands). The southern portion of the Project area is located within an extensive prairie pothole wetland system that begins to diminish south of the White Earth River and Powers Lake. Forested habitats and riparian corridors are limited and are concentrated along streams and rivers within the Project vicinity. Refer to **Appendix A – Site Location Map** for site location.

2.1 Ecoregions

The Project area is located primarily within the Northern Dark Brown Prairie section of the Northern Glaciated Plains ecoregion. A smaller portion of the Project area is located within the Northern Missouri Coteau section of the Northwestern Glaciated Plains ecoregion.

2.1.1 Northern Dark Brown Prairie Ecoregion

This region was carved by receding glaciers leaving behind glacial till and outwash within a relatively level to gently rolling landscape. The climate allows for mixed-grass prairies

composed of tall and shortgrass species. This ecoregion generally has less precipitation and less organic matter in the soil than ecoregions to the east, which results in lower biomass production (Bryce et al. 1996).

2.1.2 Northern Missouri Coteau Ecoregion

This region was the westernmost extent of glaciation, which resulted in accumulations of glacial till marked by significant microtopography. The microtopography has resulted in large concentrations of prairie potholes. Wetlands typically dry out earlier in the summer than ecoregions located to the south and east. This region is transitional between the northern boreal climate and the western arid climate (Bryce et al. 1996).

3.0 METHODS

This section describes the methodology employed for the 2018 wetland determination and delineation effort.

3.1 Aerial Desktop Review

An aerial desktop review was conducted to identify potential WOUS within the Project area. The desktop review involved a geographic information system interpretation of landscape position, vegetative cover, hydrology signatures in aerial photographs (current and historical), U.S. Geological Survey (USGS) topographic maps, and the following geospatial datasets: National Wetland Inventory (NWI), National Hydrography Dataset (NHD), Soil Survey Geographic Database (SSURGO), Hydrologic Unit Code 12 (HUC-12) subwatershed boundaries, and Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs). The *Aquatic Resources Mapbook* depicting WOUS within the Project area is in **Appendix A**.

3.1.1 Aerial Photography

Various online resources were accessed to review current and historical aerial imagery. Aerial photography datasets from the USGS (1995), National Aeronautics and Space Administration (1995), and the U.S. Department of Agriculture (USDA) Farm Services Agency (2003, 2005, 2006, 2009, 2010, 2013, and 2016) were interpreted to identify potentially jurisdictional wetlands, watercourses, and other significant natural features within the Project area. Visible landscape types observed included agricultural fields, undeveloped grassland, pasture/rangeland, wetlands, and watercourses.

3.1.2 National Agriculture Imagery Program 1-Meter, 4-Band Aerial Infrared Imagery

This particular multispectral imagery refers to images that contain color bands beyond the normal red, green, and blue values. Infrared aerial imagery is most useful for interpreting wetland hydrology in agricultural areas. In general, review of infrared aerial imagery for assessing wetland hydrology is more accurate in agricultural fields, as the “moisture signature” is visibly apparent. Atwell reviewed National Aeronautical Imagery Program infrared imagery

(Aerial Photography Field Office 2018) to determine possible wetland feature connection to an NHD watercourse.

3.1.3 USGS Topographic Map

The USGS 7.5 Minute Topographic Quadrangles indicate that elevations within the Project area range between approximately 2,159 and 2,502 ft above mean sea level. A coteau ridgeline extends across the northern portion of the Project area, with slopes that drain either in a northwesterly or southeasterly direction. The topographic maps depict numerous buildings, structures, public roads, and water features within the Project area. Watercourses are also depicted but are limited to the northern boundary of the Project area.

3.1.4 LiDAR-Derived 5 ft Contours

One application of LiDAR is for terrestrial laser scanning. Terrestrial scanning is most common as a topographic survey method and is highly accurate. Atwell obtained publicly available LiDAR-derived 5 ft contours and produced topographic maps. When coupled with aerial imagery and the NHD dataset, Atwell was able to accurately and effectively determine potentially jurisdictional features exhibiting a defined bed and bank.

3.1.5 National Wetland Inventory

Atwell reviewed NWI maps to determine the likely presence, location, size, and type of wetlands that may be located in the Project area. The U.S. Fish and Wildlife Service (USFWS) maintains and generates NWI maps through aerial photograph interpretation (USFWS 2018). Atwell generally notes that NWI maps may not accurately depict the extent or existence of wetland systems in a specific area, nor do the maps always correctly identify the wetlands present. Atwell's aerial interpretation was supplemented with an NWI map review, and USFWS NWI features were used for preliminary analysis only.

3.1.6 National Hydrography Dataset

The NHD is a digital dataset that contains features such as lakes, ponds, streams, rivers, canals, dams and stream gages. The data provided are designed for use in general mapping and in the analysis of surface water systems. NHD flowlines are important features in the NHD, as they maintain flow direction and form a network of watercourses that share a common drainage point. Atwell relied predominantly on NHD features to determine a significant nexus to a potential WOUS.

3.1.7 U.S. Department of Agriculture – National Cooperative Soil Survey Map

The USDA Natural Resources Conservation Service SSURGO for Burke County was reviewed to determine the extent of hydric soils within the Project area. Soil map units are made up of consociations, complexes, associations, or undifferentiated groups; these mapping units may be entirely hydric, entirely non-hydric, or partially hydric. Hydric soils are conducive to the growth and regeneration of hydrophytic (i.e., wetland) vegetation because of their tendency to remain saturated for extended periods of time (NRCS 2018).

3.1.8 Hydrologic Unit Code 12 Dataset

Watershed boundaries define the aerial extent of surface water drainage to a particular location. HUC-12 datasets identify boundaries to the subwatershed level, which typically ranges from 10,000 to 40,000 acres in size. Atwell evaluated whether wetland features drain/flow to a potential WOUS or if they drain/flow to a glaciated lake at a low area on the regional landscape.

Five of the 11 HUCs located within the Project area (Headwaters West Branch Short Creek, Headwaters East Branch Short Creek, City of Columbus, Black Slough, and 090100071101) contain potentially jurisdictional waters. Numerous unnamed tributaries are located within the aforementioned HUCs and generally flow in a north-northeasterly direction approximately 14 miles into East Branch Short Creek (relatively permanent water). Multiple wetlands within these HUCs are potentially jurisdictional because of potential hydrologic connectivity to WOUS. Results from the aerial desktop review indicated that six HUCs flow into non-jurisdictional waters. These six HUCs are discussed below.

The Headwaters White Earth Creek HUC comprises 33,661 acres in the southwesternmost portion of the Project area. In this HUC, water flows from the Project area in a southwesterly direction into an unidentified waterbody in the southwestern portion of the Project area. This waterbody is not hydrologically connected to waters that could be construed as WOUS and is therefore isolated. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

The Red Lake HUC comprises 23,129 acres in the southern portion of the Project area. All water flowing from this area generally flows to Red Lake, located south of the Project area in the central portion of the HUC. This waterbody is not hydrologically connected to waters that could be construed as WOUS. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

The Smishek Lake HUC comprises 41,424 acres in the south-central portion of the Project area. Water flowing from this HUC generally flows south into Smishek Lake, approximately six miles south of the Project area. Wetlands within this portion of the Project area are located at the top of the HUC watershed and have frequent breaks and loss of connectivity. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

The Elbow Lake HUC comprises 37,205 acres directly east of the Smishek Lake HUC. Water flowing from this HUC generally flows south towards Elbow Lake. Like the Smishek Lake HUC, wetlands within this portion of the Project area are located at the top of the watershed and have frequent breaks and loss of connectivity. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

The Ward Lake HUC comprises 9,317 acres in the southeastern portion of the Project area. Water in this HUC flows into five main catchment areas with no outflow of water: Johnsons Lake, Jud Chrests Lake, Kirkland Lake, Ward Lake, and an unnamed waterbody in the southern

portion of the watershed. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

The 090100060606 HUC comprises 19,137 acres within the far western portion of the Project area. Water associated with the Project area in this HUC generally flows to the southwest but does not follow any specific drainage way, and there are no channels with defined bed and bank features. Therefore, waterbodies within this watershed should be considered isolated and non-jurisdictional.

3.1.9 Floodplain Map

FEMA FIRMs are maps that show floodplain areas along rivers and their tributaries. The maps record the following data: 100-year floodplains (1% chance of annual flooding) and 500-year floodplains (0.2% annual chance of flooding), the height of the base flood elevation, and the risk to premium areas developed across a floodplain. A review of FEMA FIRM (FEMA 2017) floodplain data was conducted to determine the presence, extent, location, and zone of floodplains that may be located within the Project area.

3.2 On-Site Wetland Delineations

On-site wetland delineations were conducted between May 1 and November 9, 2018, within the Survey Corridor. The purpose of this effort was to delineate WOUS so that these features could be avoided by Project design. Jurisdictional wetlands were delineated utilizing methods prescribed by the 1987 USACE wetland delineation manual (Environmental Laboratory 1987) and the Great Plains regional supplement (Version 2.0; USACE 2010). The determination of wetland presence depends on three interrelated parameters: 1) presence of hydrophytic vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. On-site wetland delineation boundaries were recorded using a Trimble® Geo 7X handheld GPS unit, which provides a spatial error of less than 1 m (with overall accuracy being within 1 m). Wetland data points were mapped with the GPS unit within each wetland area identified, along with corresponding upland data points outside the wetland boundary. USACE wetland determination data forms were completed for each wetland and upland data point. Wetland boundaries are depicted on the *Aquatic Resource Mapbook* included in **Appendix A**.

4.0 RESULTS, FINDINGS, AND DISCUSSION

Atwell conducted the on-site WOUS determinations and delineations within the Survey Corridor between May 17 and November 9, 2018. Atwell's biologists delineated approximately 9.74 acres of wetlands (**Table 1**) within the Survey Corridor. Three watercourses, associated with Wetland-21, Wetland-26, and Wetland-29, were also identified and are included with associated wetlands in **Table 1**. All wetlands delineated in 2018 that were not identified during the 2017 USACE evaluation of 6,307 wetland features are assumed to be jurisdictional, regardless of whether or not they appeared to be isolated. The delineated boundaries of WOUS within the Survey Corridor are depicted in the *Aquatic Resources Mapbook* (**Appendix A**).

Table 1. Additional WOUS delineations were conducted from May 17 through November 9, 2018. Thirty-six jurisdictional wetlands were identified and delineated within the Survey Corridor.

Wetland #	Public Land Survey System (PLSS) Location	Latitude (Dec. Deg.)	Longitude (Dec. Deg.)	Cowardin Classification	Area of Delineated Wetlands within Survey Corridor (acres)
Wetland-3	Sec. 2 T.161N R.94W	48.807159	-102.839070	PEMC	1.24
Wetland-10	Sec. 25 T.161N R.93W	48.748400	-102.690412	PEMC	0.15
Wetland-11	Sec. 34 T.162N R.94W	48.808190	-102.852858	PEMC	0.26
Wetland-12	Sec. 35 T.162N R.94W	48.807810	-102.851847	PEMC	0.24
Wetland-13	Sec. 35 T.162N R.94W	48.811896	-102.840578	PEMC	0.09
Wetland-15	Sec. 34 T.162N R.94W	48.810117	-102.853185	PEMC	0.60
Wetland-16	Sec. 2 T.161N R.94W	48.806116	-102.844121	PEMA	0.08
Wetland-17	Sec. 7 T.161N R.92W	48.778371	-102.668744	PEMC	0.04
Wetland-18	Sec. 2 T.161N R.94W	48.805033	-102.846296	PEMC	0.30
Wetland-19	Sec. 35 T.162N R.94W	48.814001	-102.841047	PEMC	0.34
Wetland-20	Sec. 1 T.161N R.94W	48.803299	-102.808976	PEMB	0.04
Wetland-21	Sec. 35 T.162N R.94W	48.817753	-102.850866	R4SB3	0.01
Wetland-22	Sec. 35 T.162N R.94W	48.817256	-102.845535	PEMC	0.10
Wetland-26	Sec. 1 T.161N R.94W	48.803292	-102.809013	R6	0.01
Wetland-27	Sec. 5, 8 T.161N R.93W	48.792877	-102.780635	PEMC	0.71
Wetland-28	Sec. 2 T.161N R.94W	48.801411	-102.839734	PEMC	0.41
Wetland-29	Sec. 6 T.161N R.93W	48.803031	-102.807608	PEMB	0.03
Wetland-31	Sec. 5 T.161N R.93W	48.794567	-102.779251	PEMC	0.63
Wetland-32	Sec. 8 T.161N R.93W	48.790181	-102.780549	PEMC	0.23
Wetland-33	Sec. 26 T.161N R.93W	48.749149	-102.709299	PEMC	0.75
Wetland-34	Sec. 7 T.161N R.92W	48.777798	-102.667708	PEMC	0.35
Wetland-35	Sec. 35 T.162N R.94W	48.808831	-102.843007	PEMA	0.05

Table 1. Additional WOUS delineations were conducted from May 17 through November 9, 2018. Thirty-six jurisdictional wetlands were identified and delineated within the Survey Corridor.

Wetland #	Public Land Survey System (PLSS) Location	Latitude (Dec. Deg.)	Longitude (Dec. Deg.)	Cowardin Classification	Area of Delineated Wetlands within Survey Corridor (acres)
Wetland-39	Sec. 25 T.161N R.93W	48.752368	-102.693939	PEMC	0.34
Wetland-40	Sec. 20 T.161N R.92W	48.763265	-102.646430	PEMA	0.03
Wetland-41	Sec. 16 T.161N R.93W	48.771128	-102.758353	PEMA	0.13
Wetland-43	Sec. 18 T.161N R.92W	48.806481	-102.848928	PEMA	0.25
Wetland-44	Sec. 12 T.161N R.93W	48.783107	-102.683385	PEMA	0.30
Wetland-45	Sec. 1 T.161N R.94W	48.793267	-102.819026	PEMA	0.02
Wetland-46	Sec. 2 T.161N R.94W	48.805185	-102.847125	PEMC	0.07
Wetland-47	Sec. 2 T.161N R.94W	48.801347	-102.835761	PEMC	0.10
Wetland-48	Sec. 25 T.161N R.93W	48.747403	-102.688117	PEMC	0.07
Wetland-49	Sec. 8 T.161N R.93W	48.790461	-102.782245	PEMC	0.29
Wetland-50	Sec. 2 T.161N R.94W	48.802779	-102.842117	PEMC	0.24
Wetland-51	Sec. 1 T.161N R.94W	48.795047	-102.82089	PEMC	0.54
Wetland-52	Sec. 35 T.162N R.94W	48.810661	-102.846438	PEMC	0.47
Wetland-53	Sec. 25 T.161N R.93W	48.748362	-102.696946	PEMC	0.19
				Total	9.74

5.0 CONCLUSIONS

Atwell’s biologists identified and delineated 36 jurisdictional wetlands, totaling approximately 9.74 acres, within the Survey Corridor. All WOUS field-delineated in 2017 and 2018 are presented in **Appendix A - Aquatic Resources Mapbook**.

6.0 REFERENCES

- Aerial Photography Field Office. 2018. "NAIP Imagery." USDA, Farm Service Agency, Aerial Photography Field Office. Imagery Programs. 2018.
<http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai>.
- Atwell. 2017. "Wetland Determination & Delineation Report for the Proposed Burke County Wind Energy Center, Burke County, North Dakota."
- Bryce, S.A., J.M. Omernik, D.A. Pater, M. Ulmer, J. Schaar, J. Freeouf, P. Johnson, P. Kuck, and S.H. Azevedo. 1996. "Ecoregions of North Dakota and South Dakota." Reston, Virginia: U.S. Geological Survey.
- Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual." Technical Report Y-87-1 (online edition). <http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf>.
- FEMA. 2017. "Floodplain Insurance Rate Maps (FIRM)." Federal Emergency Management Agency. <https://msc.fema.gov/portal>.
- NRCS. 2018. "Hydric Soils - Overview." USDA Natural Resources Conservation Service. 2018.
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053985.
- USACE. 2010. "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)." ERDC/EL TR-10-1.
http://www.usace.army.mil/missions/civilworks/regulatoryprogramandpermits/reg_supp.aspx.
- USFWS. 2018. "National Wetlands Inventory [NWI]." U.S. Fish and Wildlife Service - NWI Wetland Mapper. 2018. <http://www.fws.gov/wetlands/Data/Mapper.html>.

COMMON WETLAND DEFINITIONS

Atypical wetland: Areas in which one or more parameters (vegetation, soil and/or hydrology) have been sufficiently altered by human activities or natural events to preclude the presence of wetland indicators of the parameter.

Emergent wetland: Vegetative classification of a wetland system based on the dominant vegetation, consisting of rooted herbaceous plant species that have parts extending above a water surface.

100-year flood: A flood with a magnitude that has a 1% chance of occurring or being exceeded in any given year.

Floodplain: The area of land adjoining a river or stream that will be inundated by a 100-year flood.

Floodway: The channel of a river or stream and the portions of the floodplain adjoining the channel that is reasonably required to carry and discharge a 100-year flood.

Hydric soil: Soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (1991 National Technical Committee on Hydric Soils definition).

Hydrophytes: Plant species that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats.

Scrub-shrub wetland: Vegetative classification of a wetland system based on the dominant vegetation consisting of woody plants less than 3 inches in diameter but greater than 3 ft in height.

Typical situation: That which normally, usually, or commonly occurs.

Vernal pool: Shallow, intermittently flooded forested wetland, generally dry for most of the summer and fall.

Wooded (forested) wetland: Vegetative classification of a wetland system based on the dominant vegetation consisting of woody plants 3 inches in diameter or greater regardless of height.

Wetland hydrology: Hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season.

Wetland indicator status:

OBL: Obligate wetland plant that occurs almost always, 99% of the time, in wetlands under natural conditions, but which rarely occur in non-wetlands.

FACW: Facultative wetland plant that occurs usually, 67% to 99% of the time, in wetlands, but also occurs 1% to 33% of the time in non-wetlands.

FAC: Facultative plant that occurs in both wetlands and non-wetlands 33% to 67% of the time.

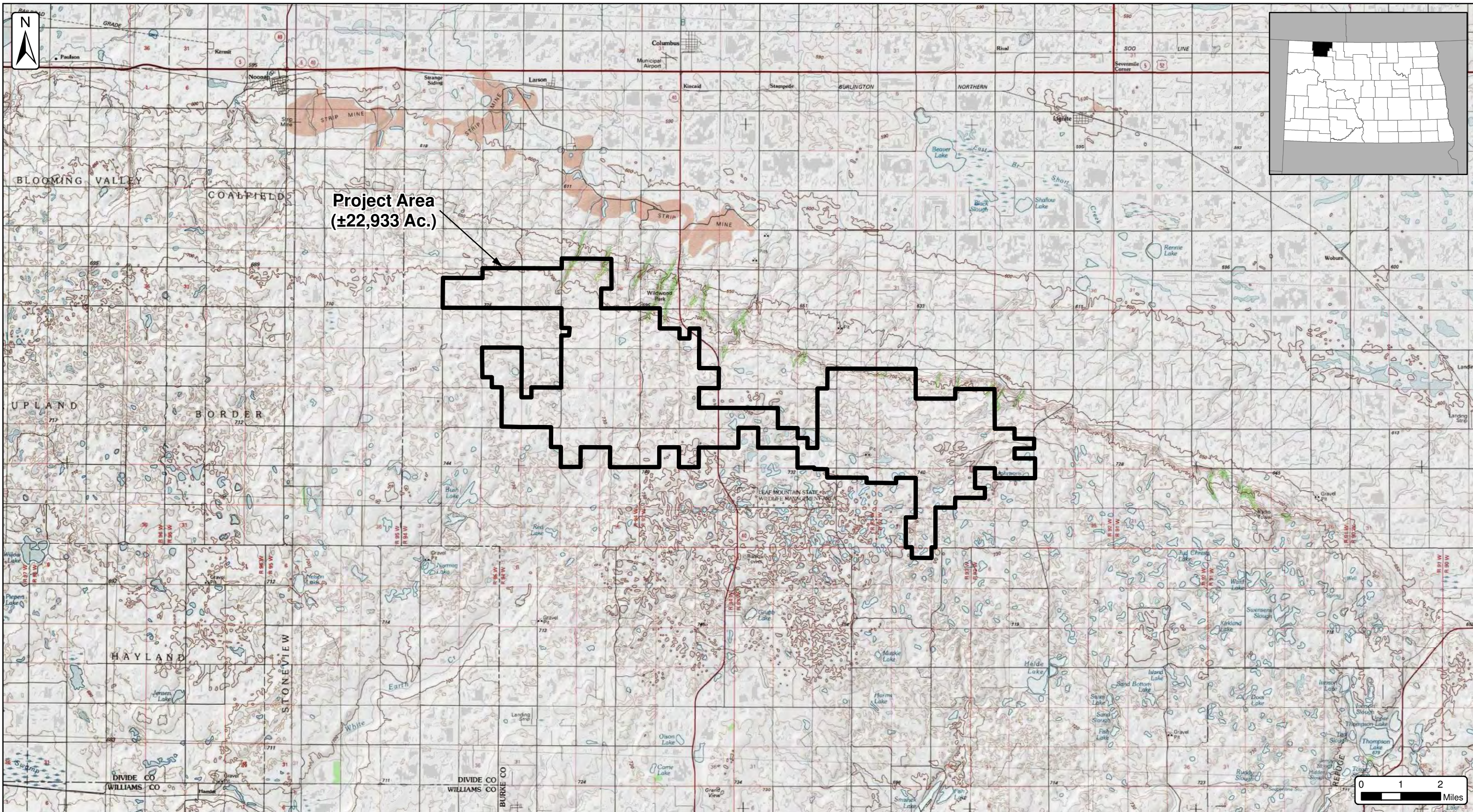
FACU: Plant that occurs sometimes, 1% to 33% of the time, in wetlands but occurs more often, 67% to 99% of the time, in non-wetlands.

APPENDIX A

Site Location Map

Aquatic Resources Index


Aquatic Resources Mapbook



Project Area
(±22,933 Ac.)

Burke County Wind Energy Center
Site Location Map
 Burke County, North Dakota
 Date: 1/22/2019

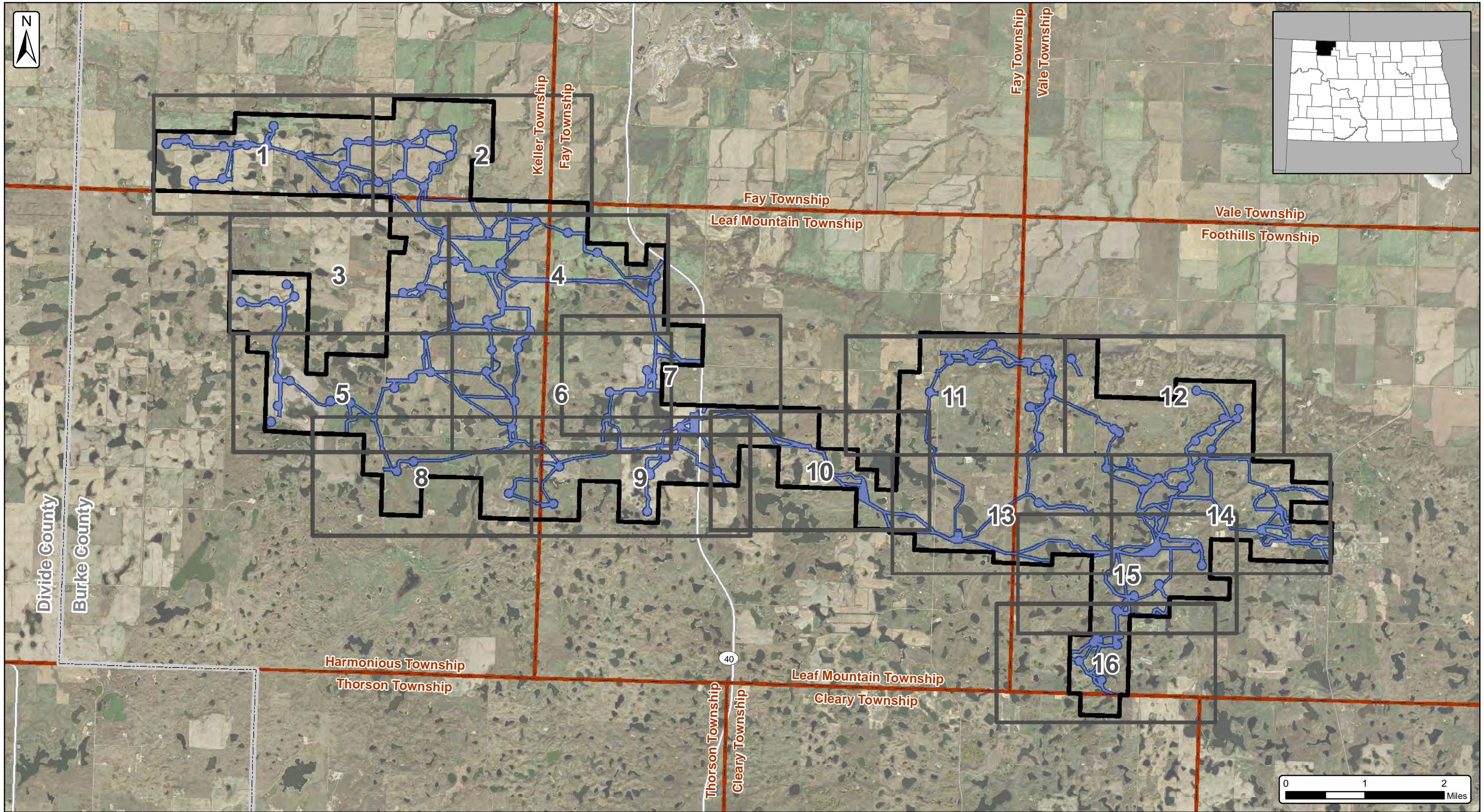
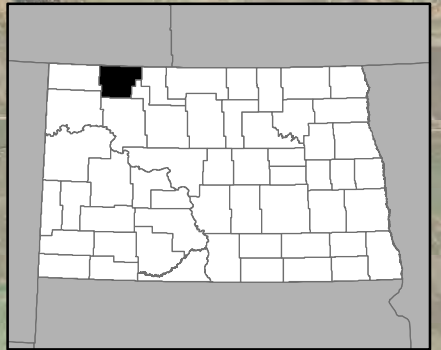
Client:
Burke Wind, LLC
Atwell, LLC Project: 16000947

 Project Area 10/23/2018
(±22,933 Ac.)



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SOURCE: USGS TOPOGRAPHIC QUADS



Burke County Wind Energy Center
 Aquatic Resources Index Map
 Burke County, North Dakota
 Date: 1/30/2019

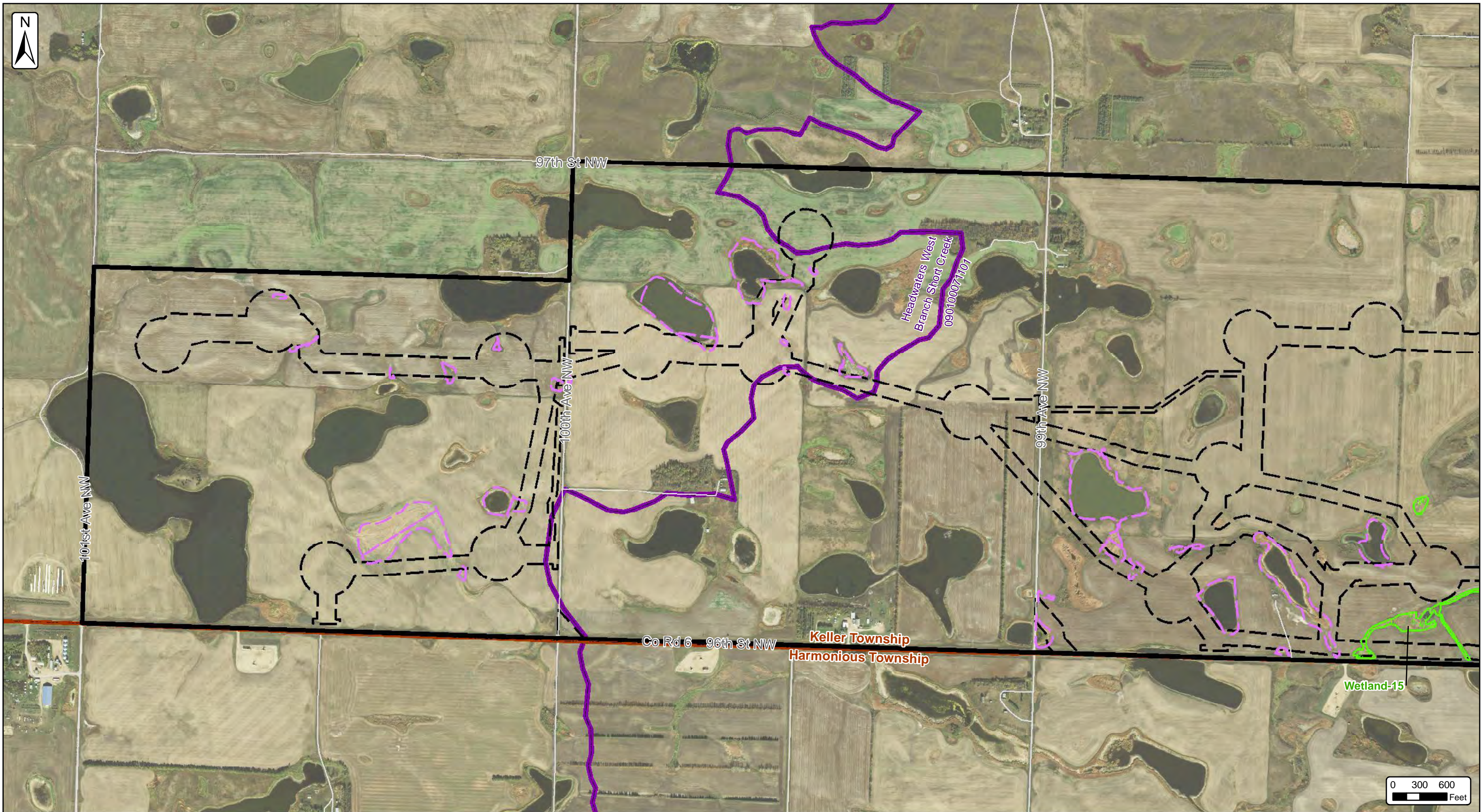
Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

- Survey Corridor
- Project Area 10/23/2018 (±22,933 Ac.)
- Townships
- Counties
- Mapbook Pages











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SOURCE: USDA NAIP 2017 IMAGERY

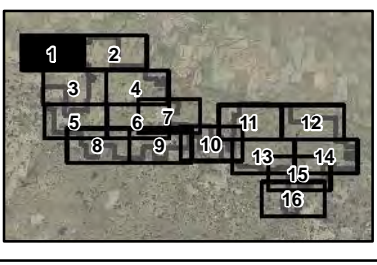



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 1 of 16
 Burke County, North Dakota
 Date: 1/30/2019

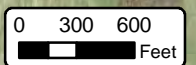
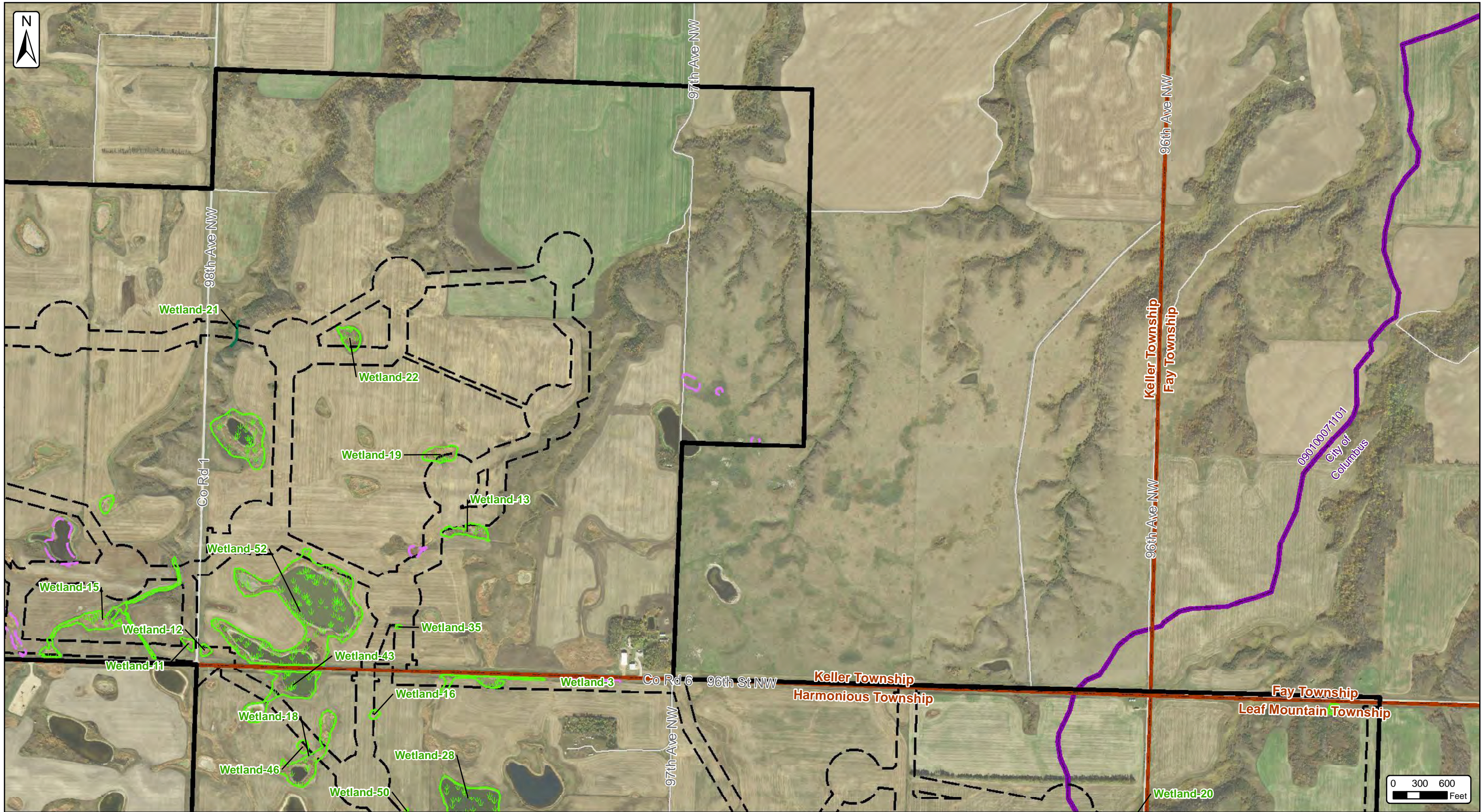
Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

-  Field Delineated Isolated Wetlands
- Waters of the United States:**
-  Field Delineated Jurisdictional Watercourses
-  Field Delineated Jurisdictional Wetlands
-  Survey Corridor
-  Project Area 10/23/2018 (±22,933 Ac.)
-  HUC12 Watersheds
-  Townships
-  Counties

SOURCE: USDA NAIP 2017 IMAGERY

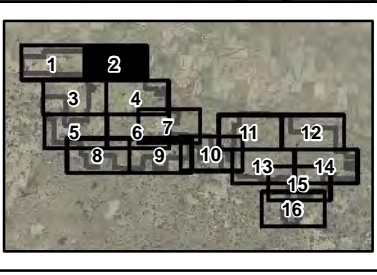
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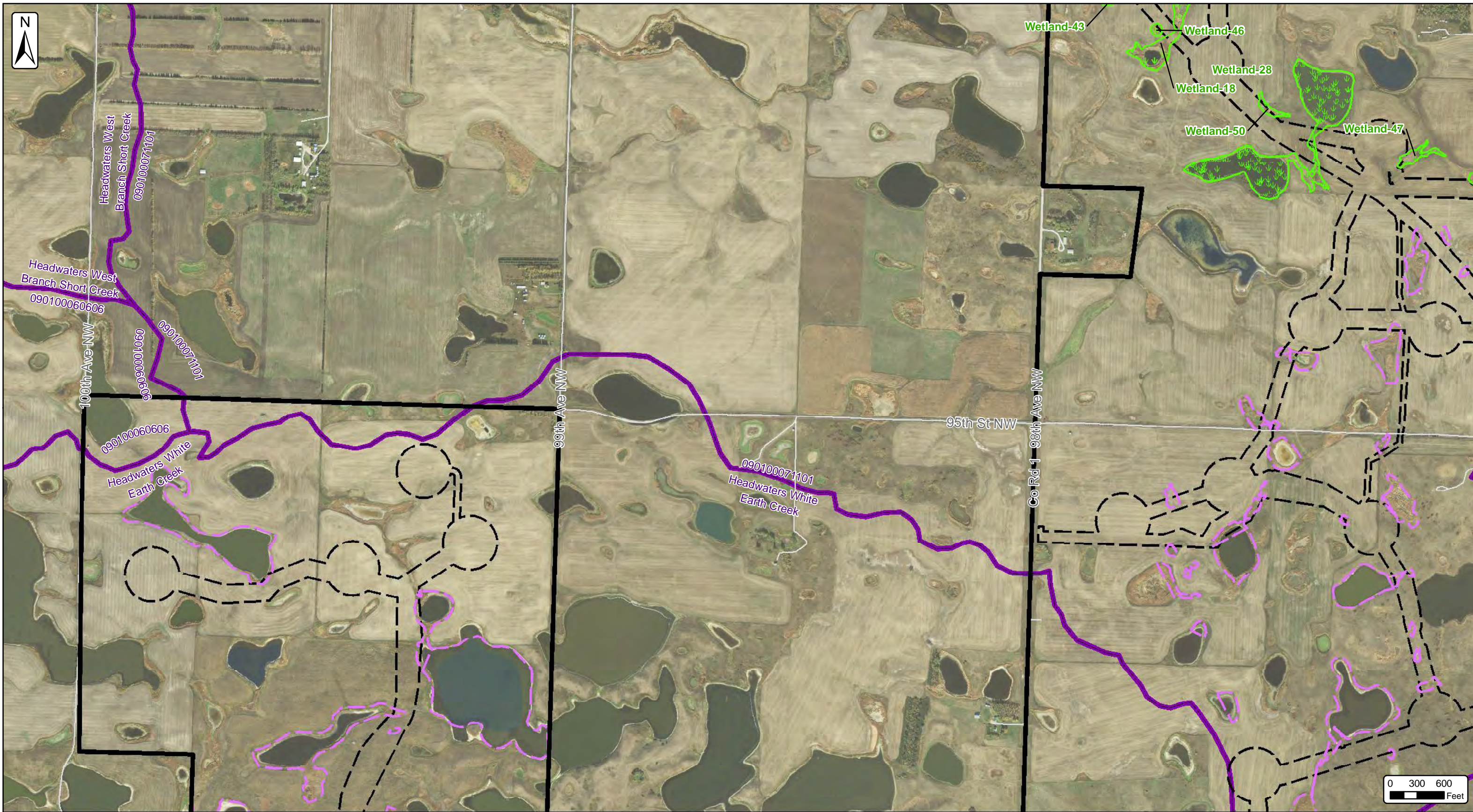
Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 2 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

- Field Delineated Isolated Wetlands
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 - Counties
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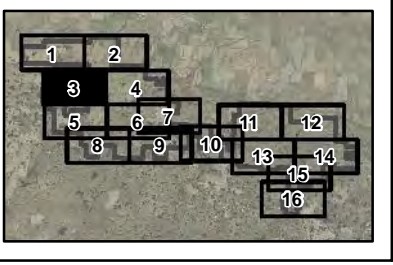

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Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 3 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

-  Field Delineated Isolated Wetlands
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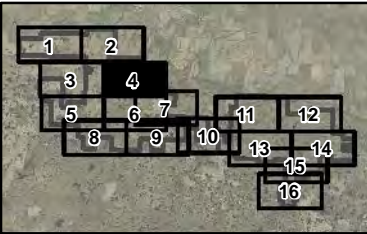


Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 4 of 16
 Burke County, North Dakota
 Date: 1/30/2019

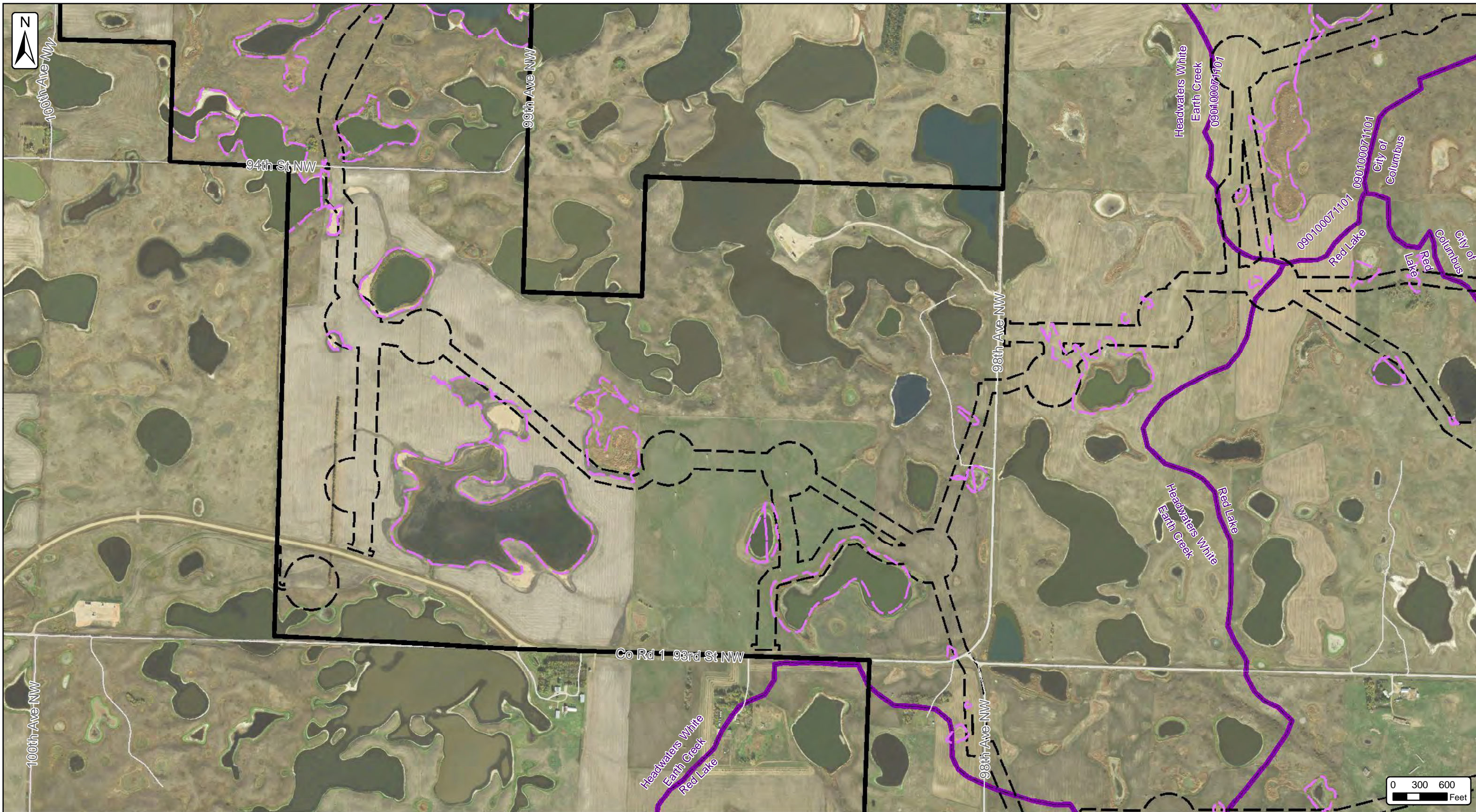
Client:
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 Atwell, LLC Project:16000947

- Field Delineated Isolated Wetlands
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SOURCE: USDA NAIP 2017 IMAGERY











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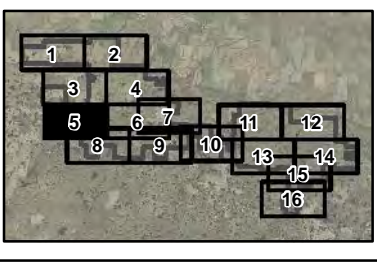



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 5 of 16
 Burke County, North Dakota
 Date: 1/30/2019

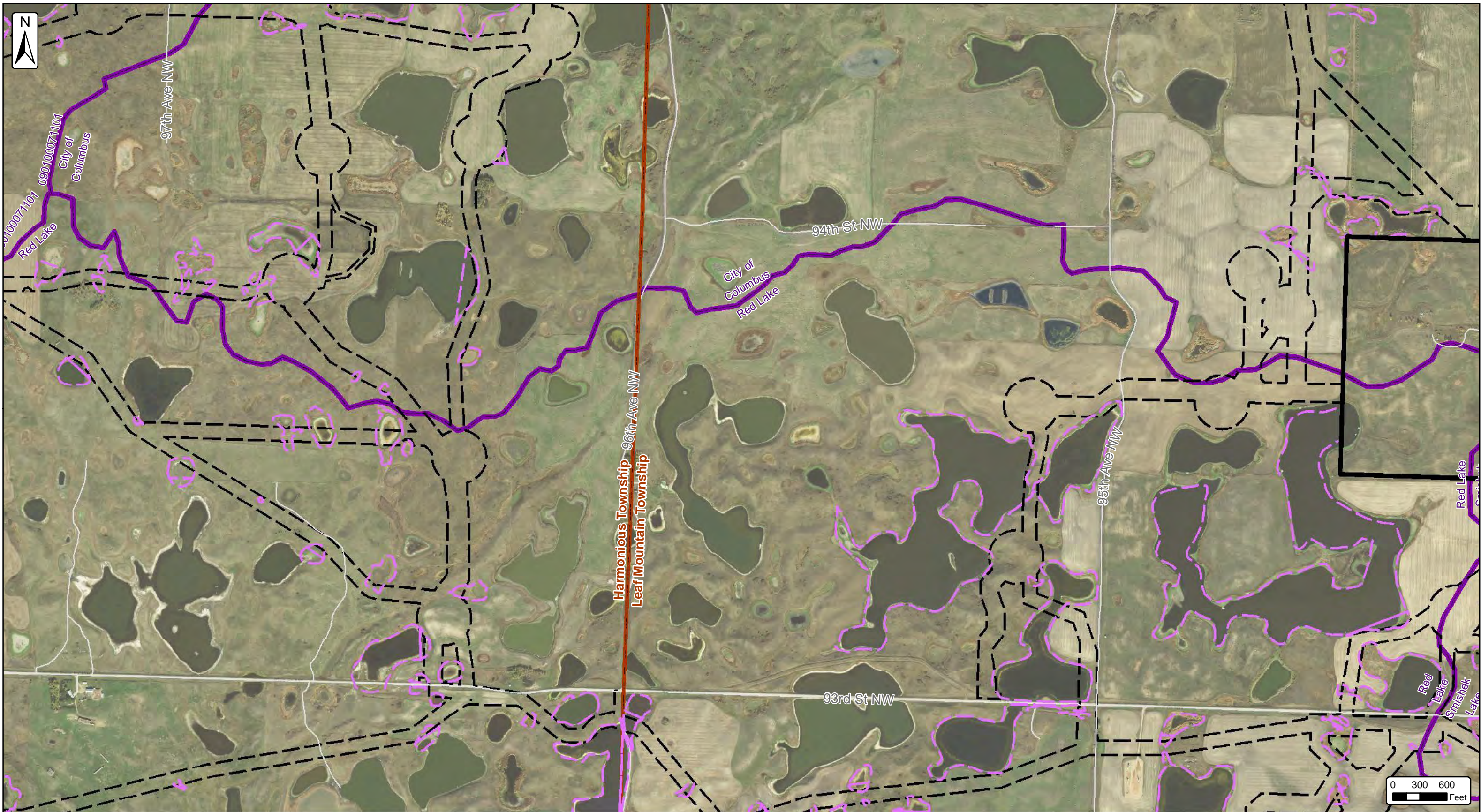
Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

-  Field Delineated Isolated Wetlands
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SOURCE: USDA NAIP 2017 IMAGERY












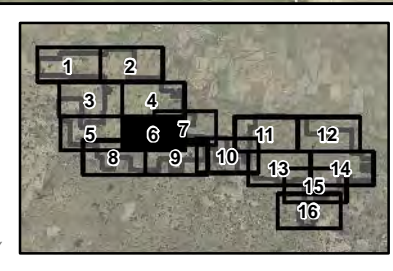

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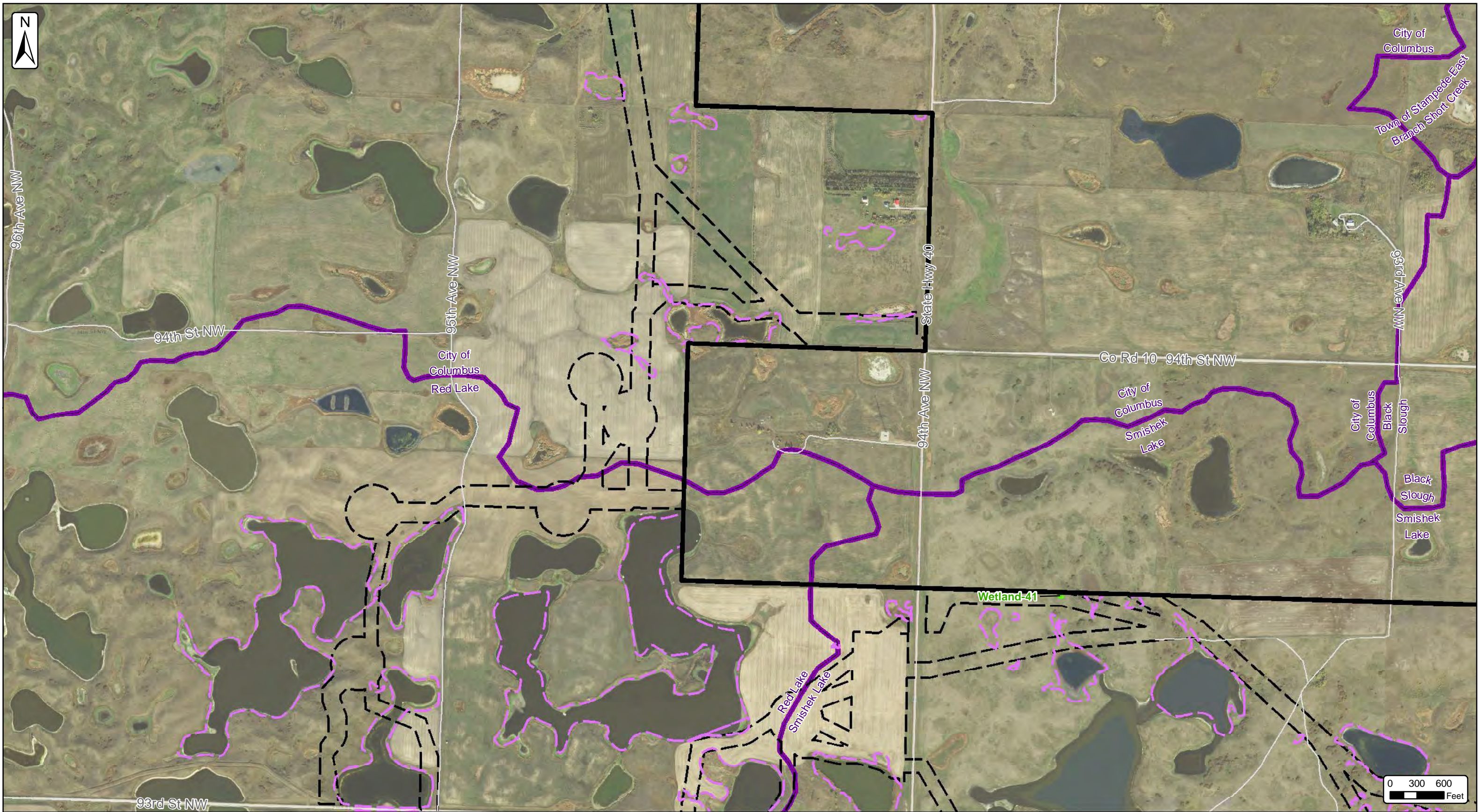
Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 6 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

-  Field Delineated Isolated Wetlands
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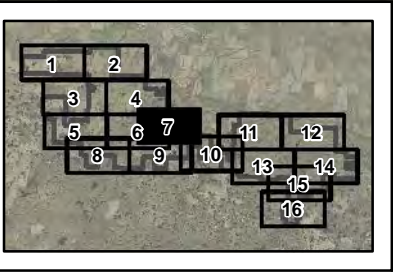
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Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 7 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

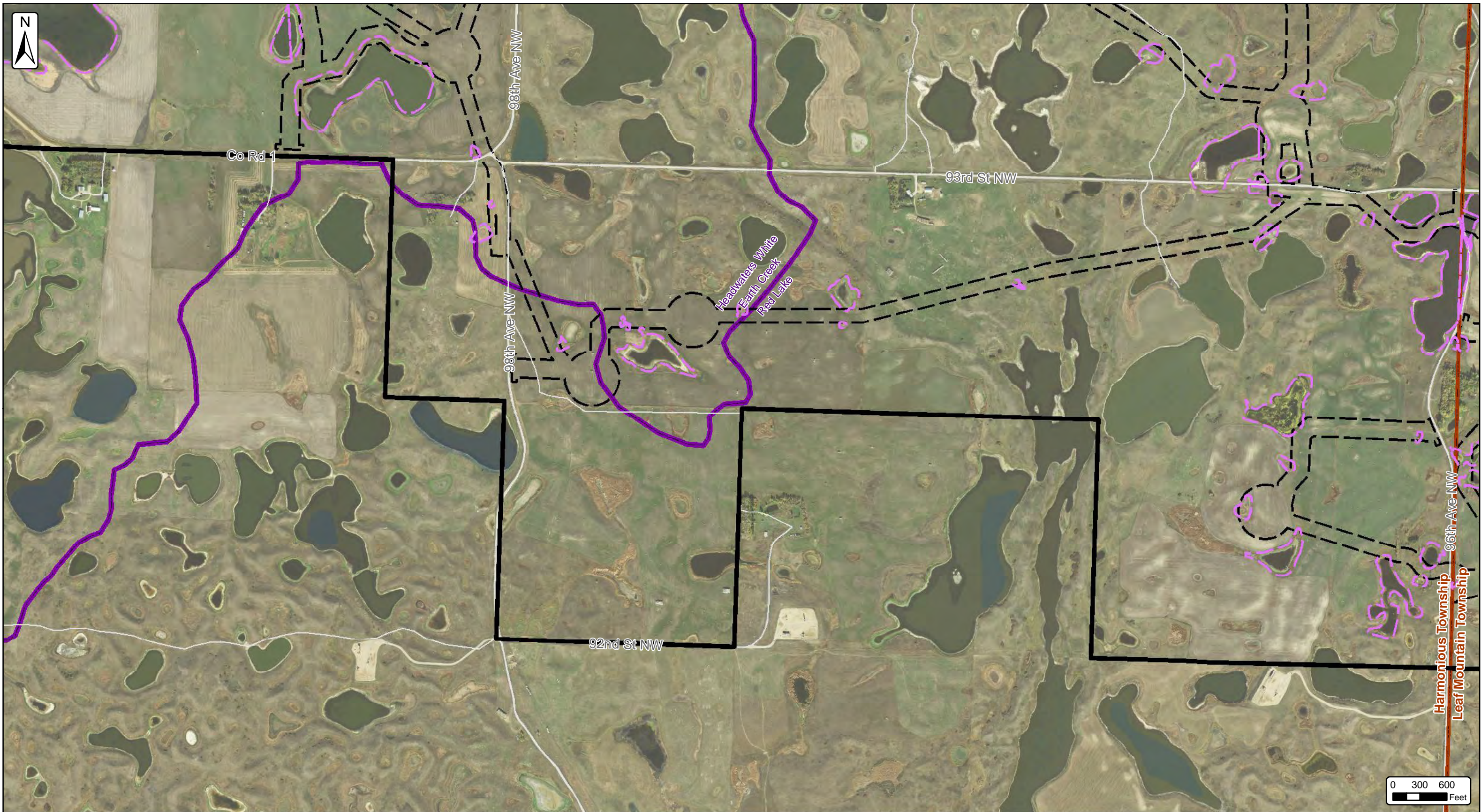
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 -  Counties
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ATWELL

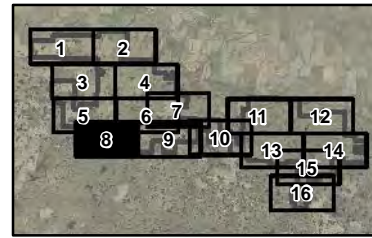

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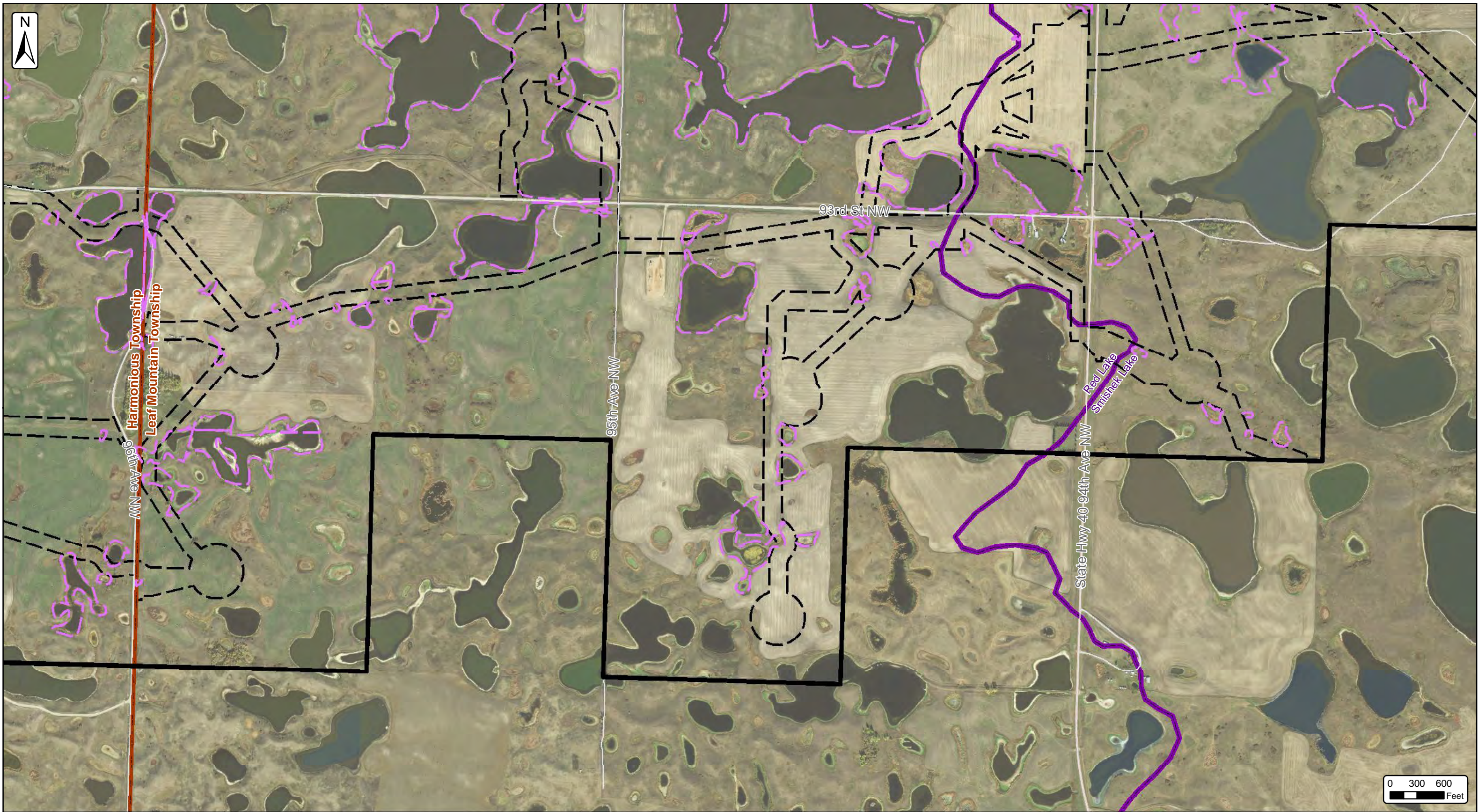
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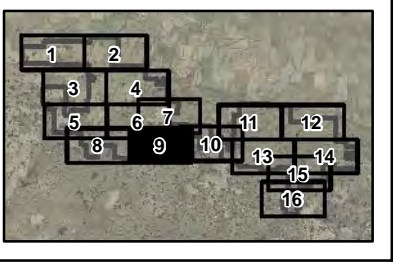



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 9 of 16
 Burke County, North Dakota
 Date: 1/30/2019

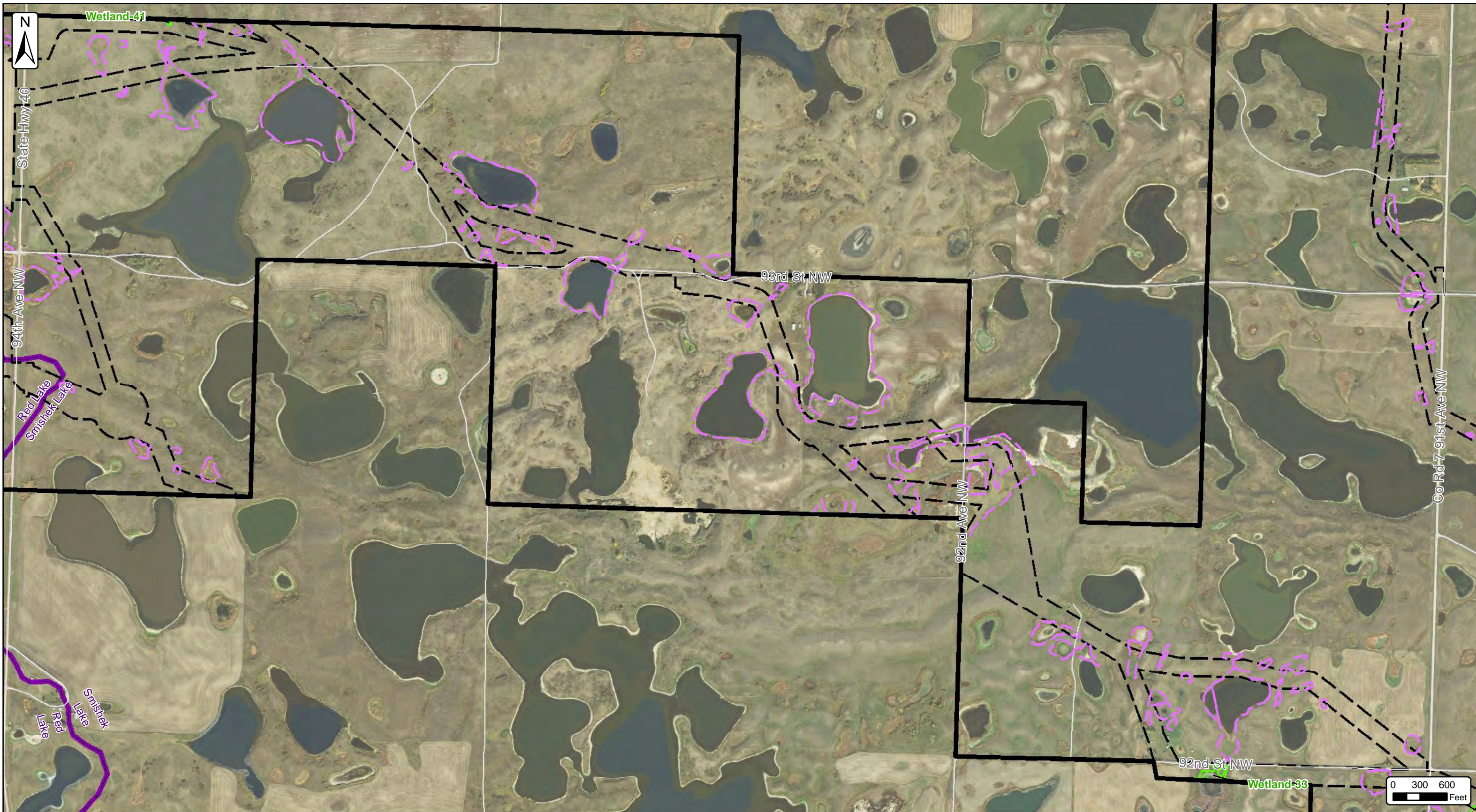
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



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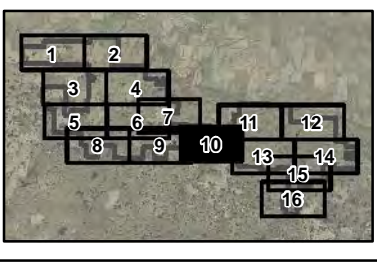



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 10 of 16
 Burke County, North Dakota
 Date: 1/30/2019

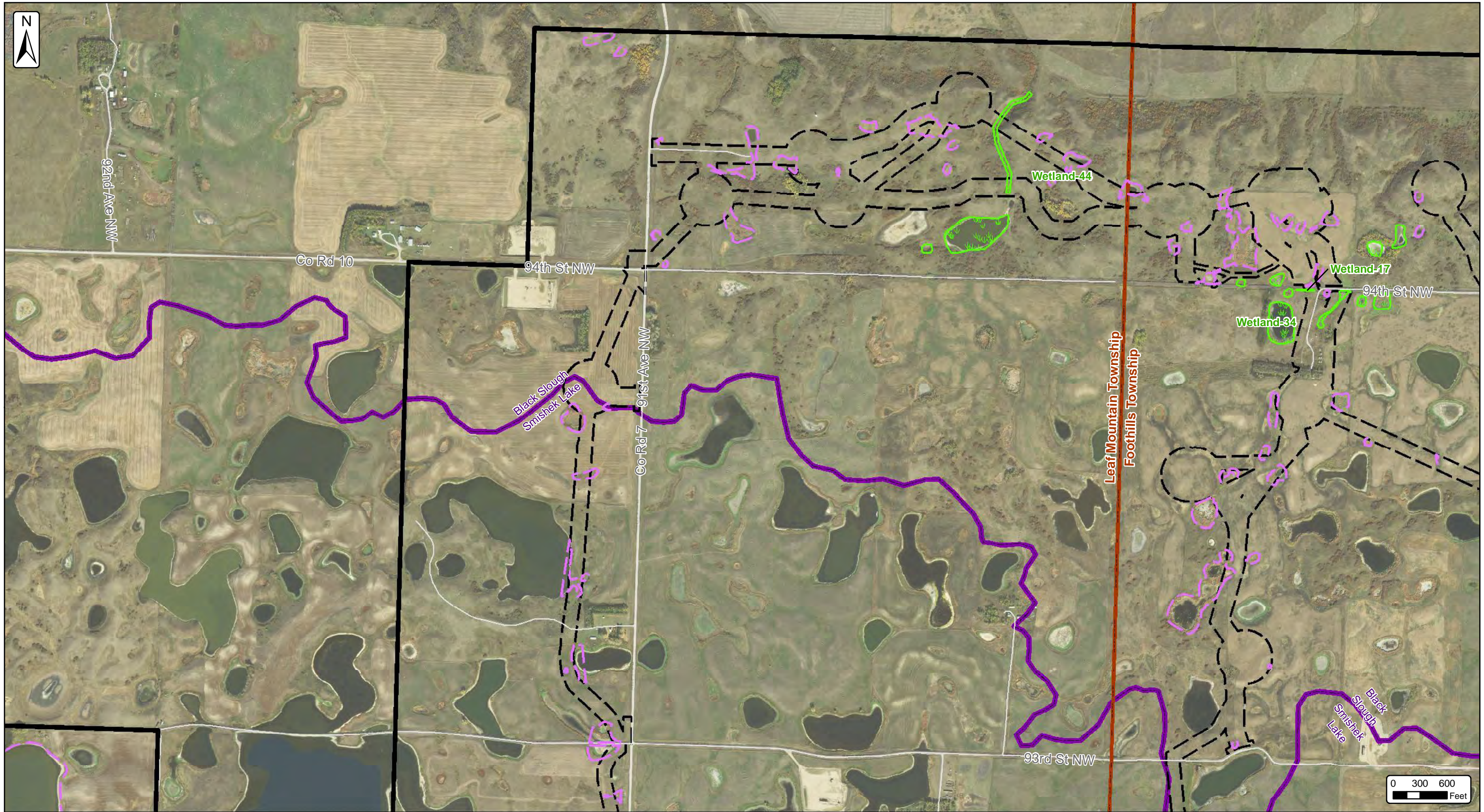
Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

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SOURCE: USDA NAIP 2017 IMAGERY

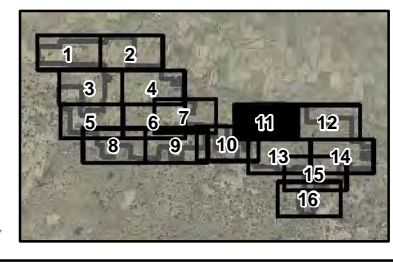
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Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 11 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

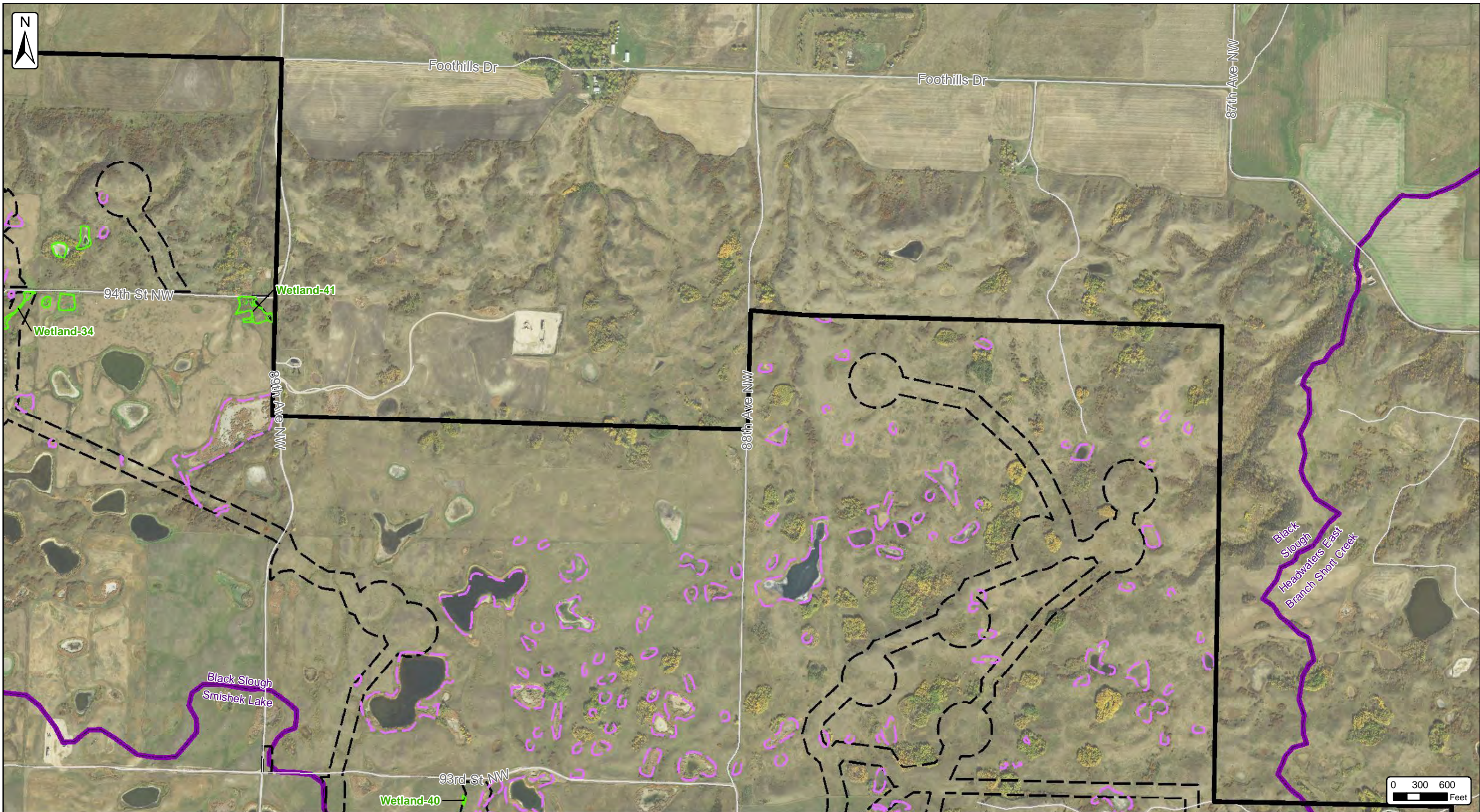
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SOURCE: USDA NAIP 2017 IMAGERY











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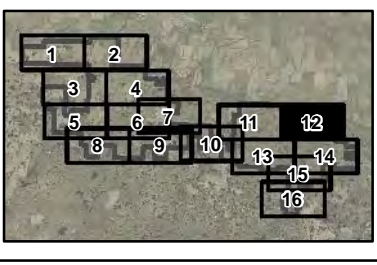



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 12 of 16
 Burke County, North Dakota
 Date: 1/30/2019

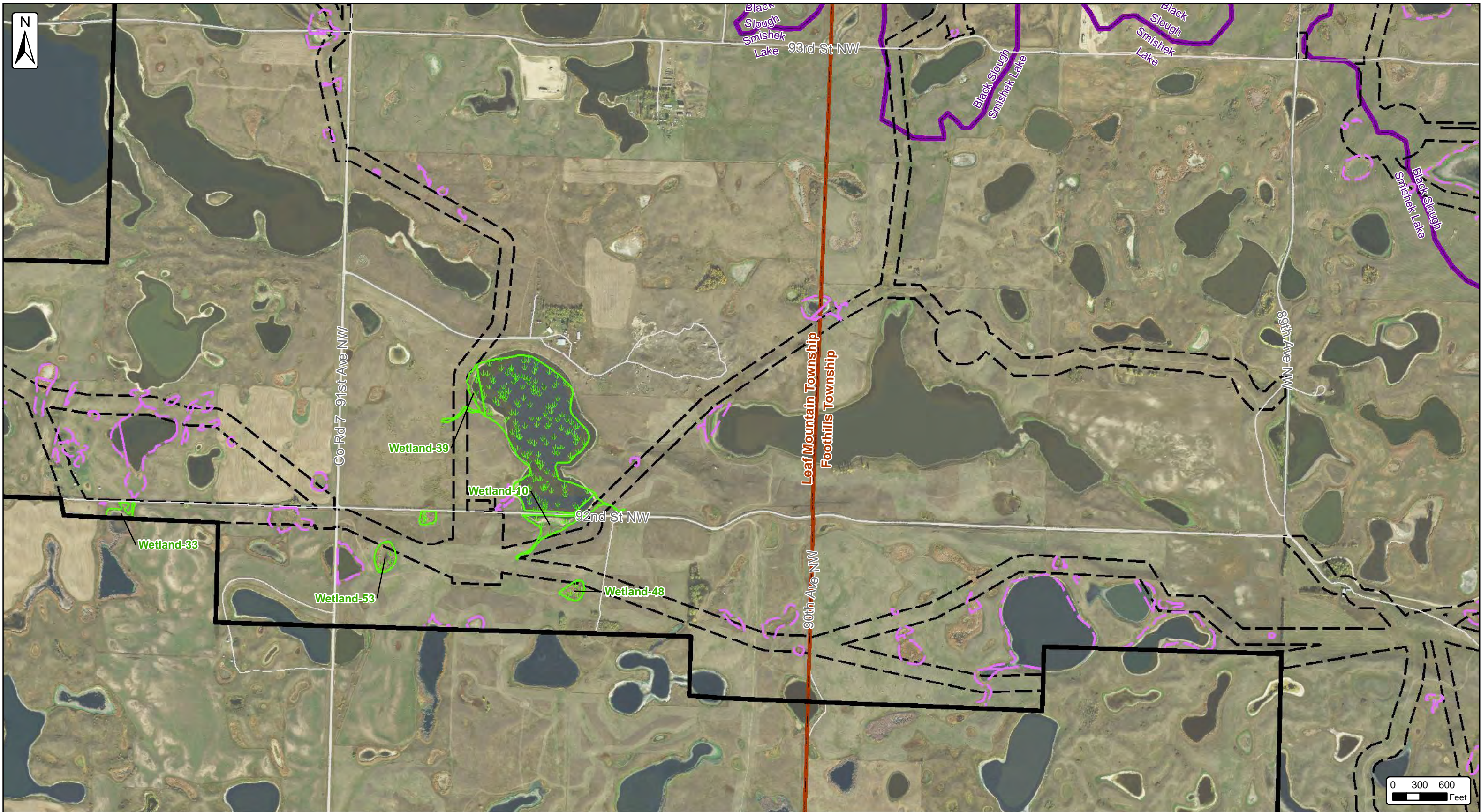
Client:
Burke Wind, LLC
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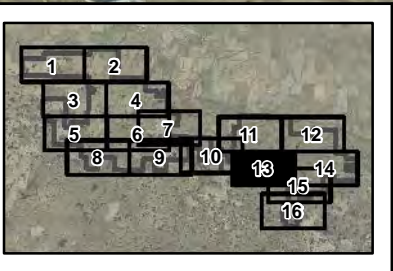




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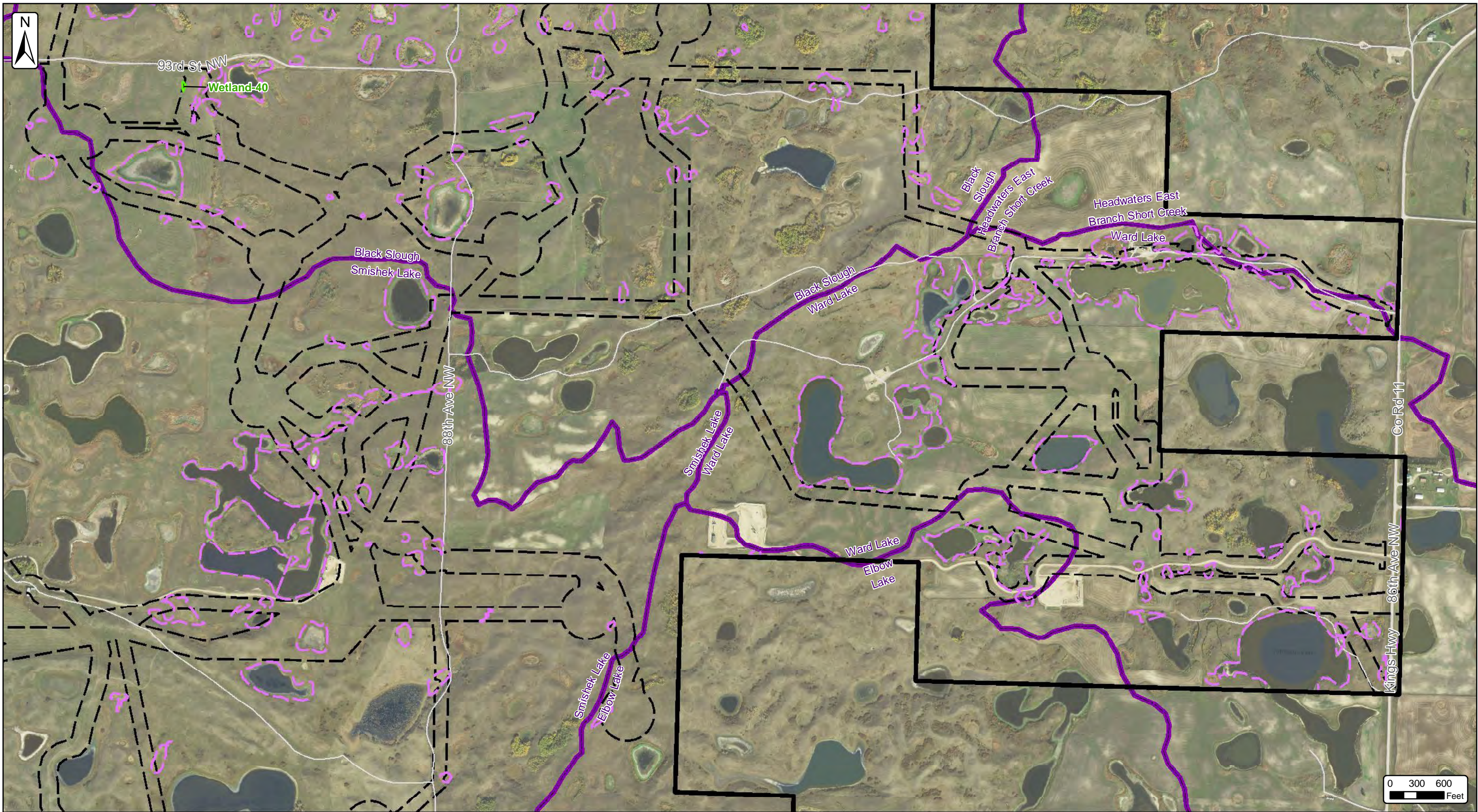
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ATWELL

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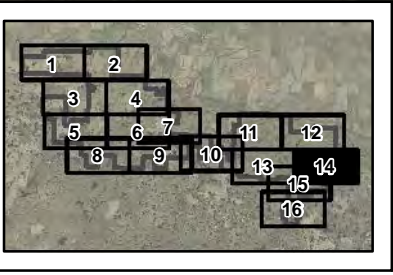



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 14 of 16
 Burke County, North Dakota
 Date: 1/30/2019

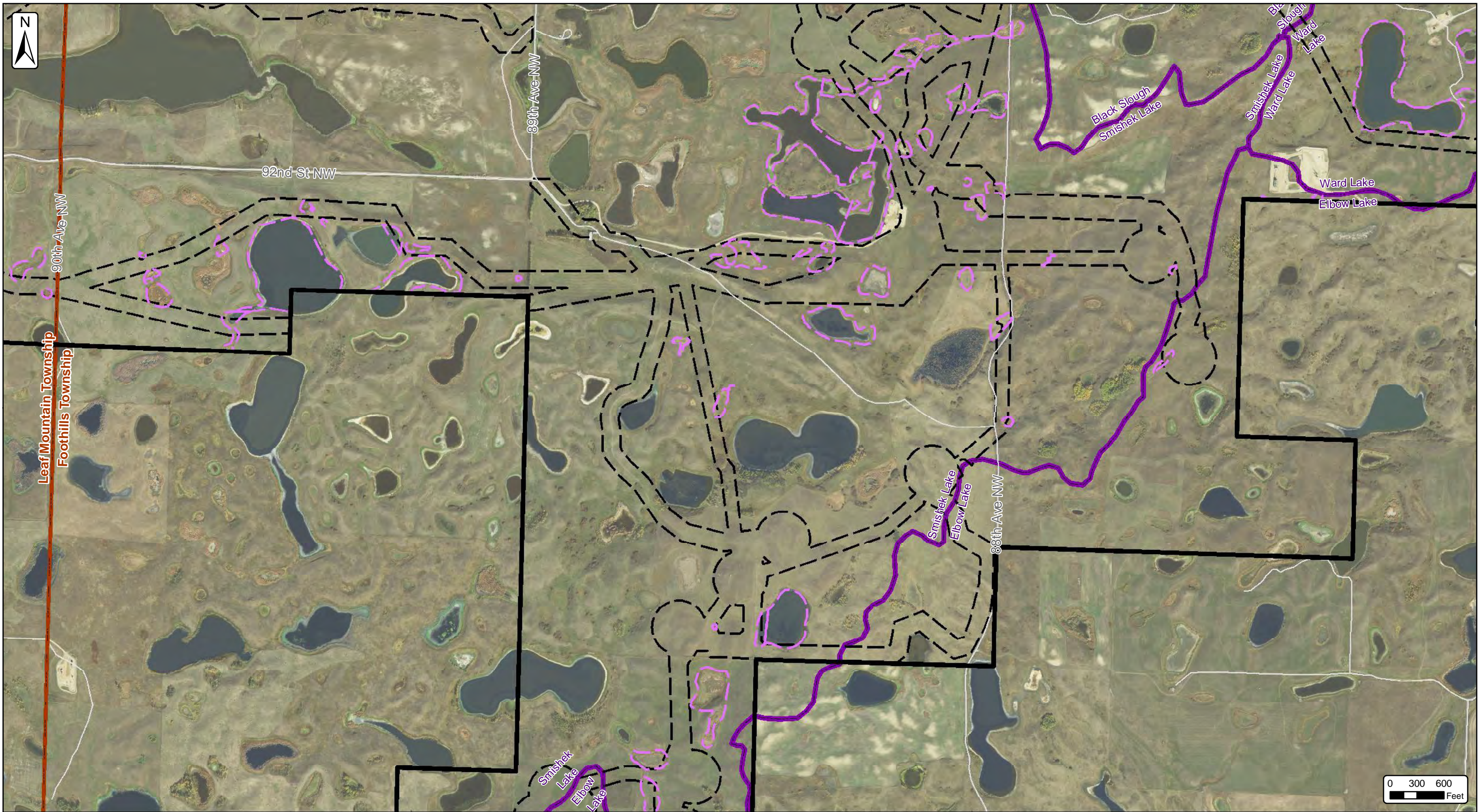
Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

Field Delineated Isolated Wetlands	Survey Corridor
Waters of the United States:	Project Area 10/23/2018 (±22,933 Ac.)
Field Delineated Jurisdictional Watercourses	HUC12 Watersheds
Field Delineated Jurisdictional Wetlands	Townships
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SOURCE: USDA NAIP 2017 IMAGERY












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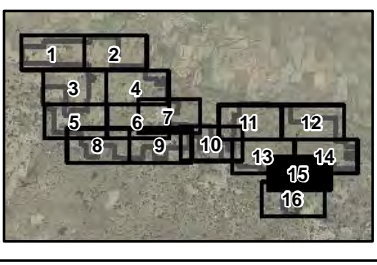



Burke County Wind Energy Center
Aquatic Resources Mapbook
 Page 15 of 16
 Burke County, North Dakota
 Date: 1/30/2019

Client:
Burke Wind, LLC
 Atwell, LLC Project:16000947

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SOURCE: USDA NAIP 2017 IMAGERY

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Leaf Mountain Township
Foothills Township

Leaf Mountain Township
Cleary Township

90th St NW

Foothills Township
Cleary Township

88th Ave NW

90th St NW

Foothills Township
Lucy Township

92nd Ave NW

Elbow Lake
Smishek Lake

91st Ave NW

90th Ave NW

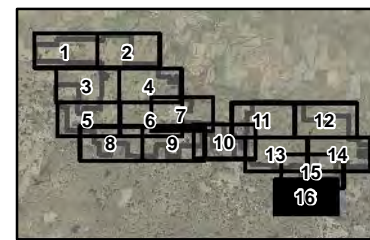
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Feet

**Burke County Wind
Energy Center**
Aquatic Resources Mapbook
Page 16 of 16
Burke County, North Dakota
Date: 1/30/2019

Client:
Burke Wind, LLC
Atwell, LLC Project:16000947

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