Technical Avian Data Summary

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: May 4, 2018 (Revision July 24, 2018)

RE: Burke County Wind Energy Center –Grouse Lek & Raptor Nest Survey Results

Burke Wind, LLC, a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is developing the Burke County Wind Energy Center (WEC) in Burke County, North Dakota includes a wind resource *Project Area* (*Figure 1*). Burke Wind, LLC conducted this study as part of a holistic natural resources review approach to assess potential adverse effects from development of this wind energy project on species of concern and their habitats. Results from this study will be combined with results from other natural resource studies and will aid in responsibly siting wind turbines, access roads, underground electric collection lines, an electric substation, overhead high-voltage transmission line, and other proposed infrastructure. To date, this thorough approach has enabled Burke Wind, LLC to adapt quickly during project design planning and has further minimized potential impacts to sensitive natural resources.

The *Project Area* (46,515 acres) and a 0.5 mile lek-assessment buffer (collectively referred to hereafter as *WEC Grouse Survey Study Area*) were assessed for Sharp-tailed Grouse (*Tympanuchus phaisanellus*) lekking grounds from April 10 to April 28, 2017. Please note that this data summary does not include grouse lek or raptor nest surveys that were conducted along any proposed overhead high-voltage transmission line infrastructure. The assessment buffer is based on the 2015 North Dakota *State Wildlife Action Plan*[1] description of Sharp-tailed Grouse hens often nesting within 0.5 mi of the lek.

Simultaneously, the *Project Area* was assessed for raptor nests, particularly for Bald Eagle (*Haliaeetus leucocephalus*) nests. Aerial lek surveys were conducted from April 24 to April 28 (2017). Eagle nests were searched for through aerial transects that extended an additional 10 miles from the *Project Area*, in accordance with recommendations set forth in the USFWS *Eagle Conservation Plan Guidance*[2]. These

[1] Dyke, S., S. Johnson, and P. Isakson (2015). North Dakota State Wildlife Action Plan 2015. [Online.] Available at http://gf.nd.gov/gnf/conservation/swap-2015/docs/swap-2015.pdf.

[2] USFWS (2013). Eagle Conservation Plan Guidance: Module 1 - Land-based Wind Energy: Version 2. [Online.] Available at http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf.

eagle nest buffer survey transects were flown only after peak grouse lekking timing in the early morning hours.

Ground-based and Aerial Grouse Lek Survey Methodologies

On September 21, 2017, raptor nest survey and grouse lek survey methodologies were submitted to the USFWS (Mr. Kevin Shelly) and NDGFD (Mr. Steve Dyke) in combination with other proposed avian services task methodologies. Atwell requested review of this larger comprehensive avian services study plan and invited both agencies to pose questions or need of clarification. Atwell did not receive study plan review communication from the USFWS. Atwell did receive study plan review communication from the NDGFD on November 16, 2017 (Mr. Greg Link). At this time, the NDGFD did not pose questions or suggested alterations to the raptor nest survey or grouse lek survey methodologies. Targeted follow-up with the NDGFD upland game bird biologist confirmed that NDGFD did not recommend a specific lek survey approach at that time (Rodney Gross – NDGFD, pers. comm.). As such, Atwell deemed defined survey protocols as sufficient and continued with the identical approach for future survey endeavors associated with the WEC.

Ground-based lek surveys were conducted from April 10 to April 26, and aerial lek surveys were conducted from April 24 to April 28 (2017). These Tier 3 surveys followed pre-survey Tier 2 analysis (as defined within the U.S. Fish & Wildlife Service's *Land-based Wind Energy Guidelines*)[3] that found the *Project Area* to hold potential lekking and nesting habitat for Sharp-tailed Grouse.

Confirmed leks were defined as three (3) or more birds together with at least one male displaying, based on Sharp-tailed Grouse species biology, prior experience with lekking grouse species, and information synthesized within Johnsgard (2016)[4]. Possible leks were defined as auditory detections of multiple grouse that could not be verified visually, after their initial detection on a ground-based survey.

Ground-based Roadside Surveys

Roadside lek surveys were conducted from the majority of available and safely accessible public roadways that traverse the *WEC Grouse Survey Study Area* and which intersected grassland habitat (grassland habitat determined with available land cover data and desktop review of sources including GIS coverage of North Dakota Game and Fish Department *Micro Native Grassland Conservation Areas*[5]). Surveys were conducted within a limited window commencing 30 minutes before local sunrise and

[3] USFWS (2012). U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines. [Online.] Available at http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

[4] Johnsgard, Paul A. *The North American Grouse: Their Biology and Behavior*. Zea Books, 2016.

[5] North Dakota Game and Fish Department (2014). North Dakota Game and Fish Department Native Grassland - Micro. *Micro Native Grassland Conservation Areas*. [Online.] Available at https://ndgov.maps.arcgis.com/home/item.html?id=fb597cc6c2154f3fbc1f52514ef92074

terminating between 60 and 120 minutes after sunrise, based on the suitability of survey weather variables (e.g., wind speed, temperature,. precipitation, etc.). Biologists surveyed for lekking grouse along safe roadside pull-offs at no greater than 0.4 mile increments[6]. Survey point locations are marked by *white circles* in *Figure 1*.

Each ground-based survey point was surveyed for a minimum of five (5) minutes. A first ground-based site visit was initiated before the aerial transect survey component was executed, and it was used to refine delineated target areas to be surveyed during aerial transect surveys and/or second ground-based visits. Ground-based surveys sites were visited twice if 1) habitat corresponded to the NDGFD macro native grassland conservation areas model (Figure 1) and appeared consistent with available undisturbed grassland with elevated flat topography that could offer ideal lekking locations , 2) audio detections were made during the first visit, or 3) only a single grouse was observed during the first visit. Ground-survey site visits were separated by at least 10 days.

Aerial Transect Surveys

Aerial transect surveys were conducted by Atwell avian specialists and were flown by *Double M Helicopters* at low speeds (i.e., 30 – 40 knots)[7]. Survey transects were flown in 0.5-mile intervals across the *WEC Grouse Survey Study Area*. A 0.25-mile (400 m) visibility threshold existed on either side of the aircraft. Transect routes were oriented on a north-south axis, and flown at heights of 200 to 250 ft. (60 – 76 m). A small number of transects were within Lostwood National Wildlife Refuge; refuge personnel and county sheriff's department personnel were contacted ahead of time to indicate that refuge airspace would be transected via helicopter. It was recommended that these transects be flown at heights of roughly 500 feet (150 m). Transects began at 5-10 minutes before sunrise and ended two hours after sunrise. Two Atwell biologists surveyed simultaneously, one from each side of the aircraft.

The large majority of lek locations were plotted to a precision of 0- 50 m, and all leks were within 100-150 m of plotted coordinates. More precise mapping of grouse lekking grounds from a moving helicopter in open grassland was occasionally difficult, as landmarks in aerial images that were used to assist mapping precision during the survey (such as hilltops, potholes, trees, rock outcrops, or roads) were in some cases lacking in grassland-dominated lek habitats.

Bald Eagle & Raptor Nest Survey Methodology

[6] Hamilton, S., D. Manzer, B. K. Sandercock, K. Martin, and G. Segelbacher (2011). Estimating lek occurrence and density for sharp-tailed grouse. Ecology, conservation, and management of grouse. Studies in Avian Biology. University of California Press, Berkeley, USA:31–49.

[7] http://www.doublemhelicopters.com

Aerial transect surveys were conducted by Atwell avian specialists and were flown by *Double M Helicopters* at low speeds (30 – 40 knots). Survey transects were conducted in 1-mile intervals across the proposed *Project Area* and a surrounding 10-mile eagle assessment buffer (together referred to as the *WEC Raptor Nest Study Area*) of an extent recommended by the *Eagle Conservation Plan Guidance: Module 1-Land-based Wind Energy, v.2*[8]. A 0.5-mile (800 m) visibility threshold existed on either side of the helicopter.

These Tier 3[9] surveys followed pre-survey Tier 2 analysis, which concluded that the *WEC Raptor Nest Study Area* could potentially contain Bald Eagle nesting habitat[10].

Visibility constraints were minimal during surveys, and deciduous leaf-out conditions never exceeded initial bud-break phase. The *WEC Raptor Nest Study Area* consists of tilled agricultural lands and associated shelter belts, grassland, numerous glacial potholes, and isolated aspen (*Populus* sp.) stands.

RESULTS

Sharp-tailed Grouse Lek Survey Results Summary

Twelve (12) confirmed leks were located within the proposed 46,515-acre *Project Area* (*Figure 1,* with 0.8 km buffers). Eleven (11) confirmed leks were located outside the proposed *Project Area* boundary but within a 0.8-km lek assessment buffer, equaling 23 total confirmed leks found within the *WEC Grouse Study Area*. Confirmed leks found within the Project Area boundary averaged 12.8 individuals/lek (*S.D.* = 6.7, *n* = 12).

In addition to 23 confirmed leks, biologists located four (4) possible lek locations during ground-based surveys. Additionally, individuals (sightings of one or two Sharp-tailed Grouse that were not linked directly to a lek) were recorded in 27 instances throughout the *WEC Grouse Study Area* and are plotted in *Figure 1*.

Eagle Nest Survey Results Summary

[8] USFWS (2012). U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines. [Online.] Available at http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

[9] USFWS (2013). Eagle Conservation Plan Guidance: Module 1 - Land-based Wind Energy: Version 2. [Online.] Available at http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf.

[10] Johnson, S. (2009). North Dakota Bald Eagle Nest Summary. [Online.] Available at https://efotg.sc.egov.usda.gov/references/public/ND/ND_Bald_Eagle_Nest_Summary_2009.pdf.

Atwell did not detect Bald Eagle nests within the *WEC Raptor Nest Study Area* during April 2017 aerial surveys. Similarly, Atwell did not detect individual eagles that were using habitats within the *WEC Raptor Nest Study Area* during these aerial surveys.

Other Nesting Raptor Species Results Summary

Atwell located 14 active Red-tailed Hawk (*Buteo jamaicensis*) nests and seven (7) active Great Horned Owl (*Bubo virginianus*) nests within the 46,515-acre Project Area (*Figure 2*). Each of these active nests was observed with either: an incubating adult, an adult defending the nest, or a nest containing eggs or nestlings. All nests within one mile of the proposed *Project Area* have been mapped with a 0.25-mile raptor nest buffer in *Figure 2*.

Atwell noted four (4) raptor nests within the proposed *Project Area* that were associated with an unknown raptor species. These nests were described as large enough to be raptor nests (though likely too small to be eagle nests), and of recent construction (2016 or 2017, as evaluated on the condition of nesting material and nest cup structure), yet unattended by hawks or owls. In addition to Red-tailed Hawks and Great Horned Owls, Ferruginous Hawks (*Buteo regalis*), Swainson's Hawks (*Buteo swainsoni*), Cooper's Hawks (*Accipiter cooperii*), and Long-eared Owls (*Asio otus*) are all potential breeders within the proposed *Project Area* and may use these structures later in the season[11] [12].

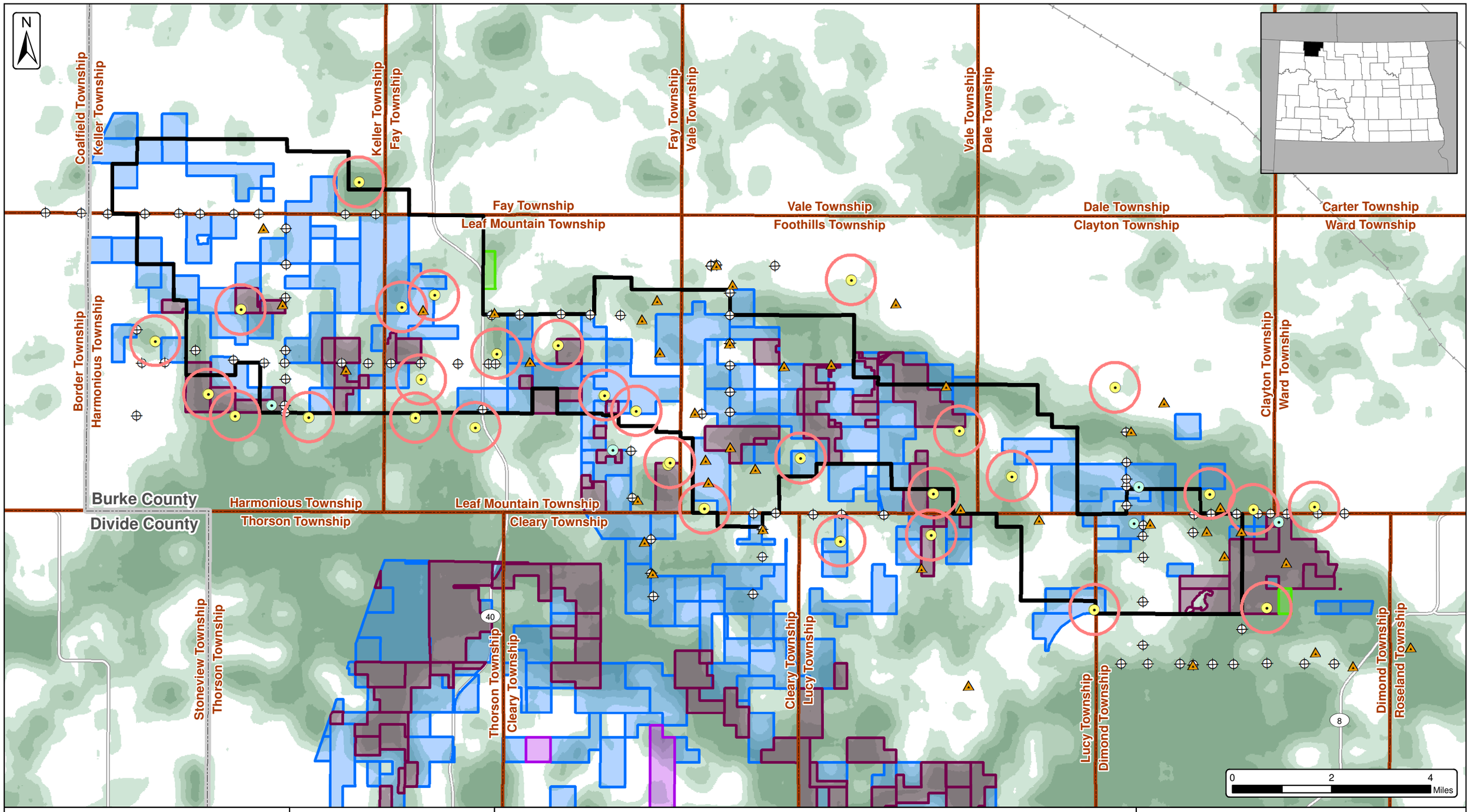
Overall nest density within the *WEC Raptor Nest Study Area* was approximately 9.0 nests/square-kilometer. Cursory visual assessment indicates that distribution of these nest structures was not uniform (Figure 2). Upon review of incidental raptor nest density within the 10-mile eagle nest assessment buffer, raptor nests appear to be concentrated primarily south of the *Project Area*.

Large-bodied Colonial Nesting Species

Atwell located one Double-crested Cormorant (*Phalacrocorax auritus*) rookery within the proposed *Project Area* (Figure 2). The rookery contained approximately 30 nests and was situated in standing snags in a glacial pothole in Harmonious Township, east of the corner of 94th St NW and 99th Ave NW.

[11] Atwell unpublished data.

[12] AKN (2017). Avian Knowledge Network (AKN). [Online.] Available at www.avianknowledge.net.



Burke County Wind Energy Center

Figure 1. Sharp-tailed Grouse Lek Survey

Burke County, North Dakota

Date: 7/19/2018

Client:

Burke Wind, LLC

Atwell, LLC Project: 16000947

STGR Lek Survey Point
Sharp Tailed Grouse
Individual
Confirmed Lek
Possible Lek
0.5 Mile Lek Constraints Buffer

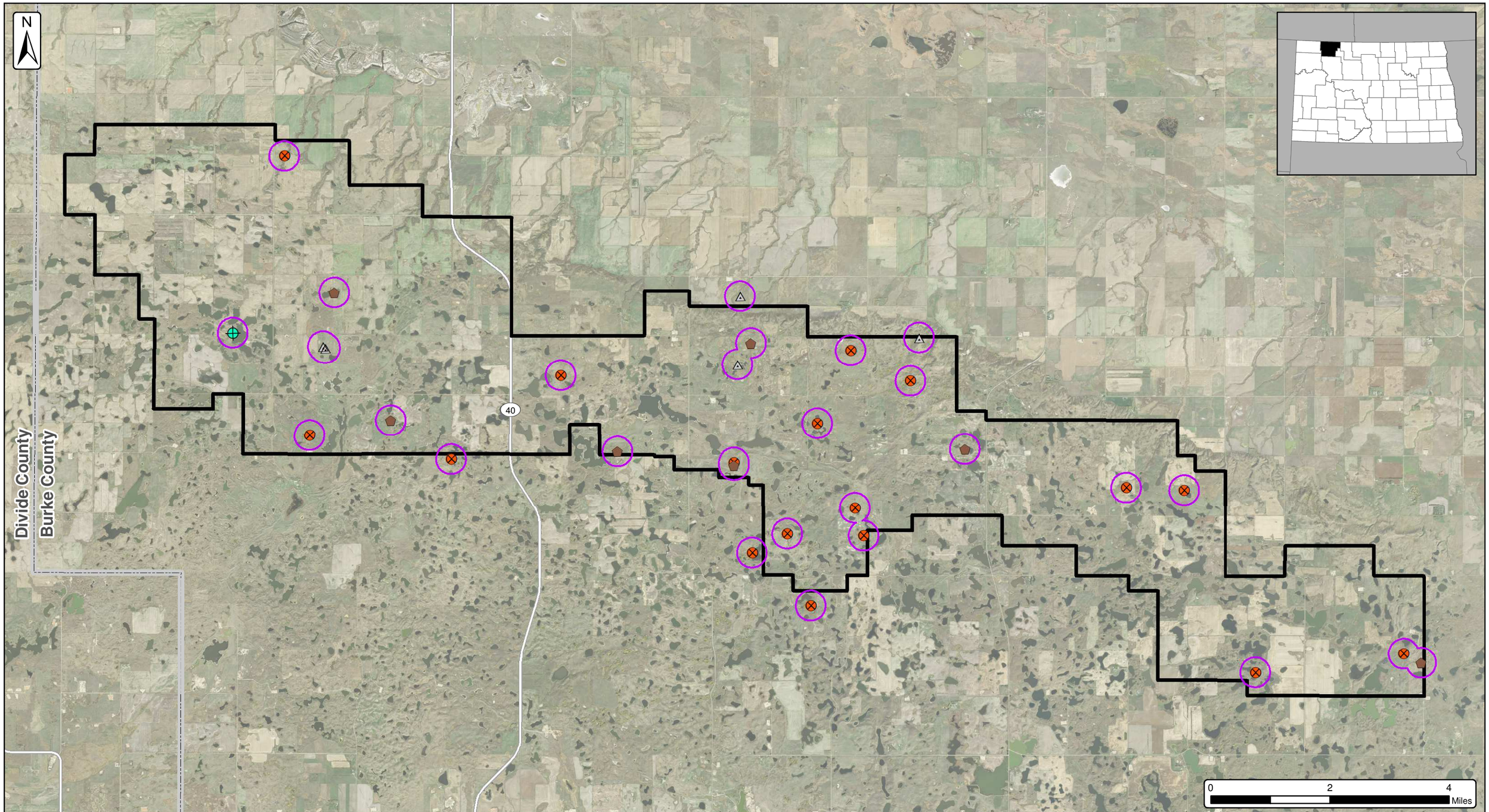
Native Grasslands-Micro
0%-20%
20%-40%
40%-60%
60%-80%
80%-100%

USFWS Easements
Grassland Easement
Wetland Easement
Grassland/Wetland Easement
FHA Easement

Project Area 07/18/2018 (±46,515 Ac.)
Township Boundaries
County Boundaries

SOURCE: GRASSLANDS MICRO LAYER; NDGF

ATWELL



Burke County Wind Energy Center

Figure 2. Raptor Nest Survey Map

Burke County, North Dakota

Date: 7/19/2018

Client:

Burke Wind, LLC

Atwell, LLC Project: 16000947

Raptor Nests (Atwell Identified 05/04/2017)

- Double-crested Cormorant
- Great Horned Owl
- Red-tailed Hawk
- Unknown

- Raptor Nest 0.25 Mile Buffer
- Project Area 07/18/2018 (±46,515 Ac.)
- County Boundaries

SOURCE: USDA NAIP IMAGERY, 2017

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