Technical Avian Data Summary Revision

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: November 30, 2018

RE: Burke County Wind Energy Center – Revised Grouse Lek & Raptor Nest Survey Results for 200 MW Project Area

Burke Wind, LLC (Burke Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is developing the Burke County Wind Energy Center (Burke WEC or Project) in Burke County, North Dakota. The Burke WEC includes a wind resource Project Area (Figure 1). Burke Wind originally proposed to construct the Burke WEC to produce 300 megawatts (MW). The area evaluated for the 300 MW version of the project is referred to in this memo as the original Project Area. Burke Wind has recently reduced the Project size to 200 MW (referred to in this memo as 200 MW Project Area), which consists of an area of approximately 22,933 acres. This resulted in the elimination of 38 wind turbines and a reduced Project Area that is fully encompassed within the original Project Area. The purpose of this memorandum is to provide a summary of findings related to Grouse Lek and Raptor Nest Survey work completed for the Project as it relates to the 200 MW Project Area. This memorandum does not include discussion of the proposed overhead high-voltage transmission line infrastructure associated with the Project as that is presented under separate cover.

Site characterization review identified the potential for Sharp-tailed Grouse (*Tympanuchus phaisanellus*) to occur in the original Project Area. Surveys were conducted within a WEC Grouse Survey Study Area, which included the original Project Area and a 0.5-mile lek assessment buffer. Survey of the WEC Grouse Survey Area including the 0.5-mile 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-mile of a lek. The original WEC Grouse Survey Study Area was assessed for Sharp-tailed Grouse lekking grounds from April 10 to April 28, 2017.

Also, the WEC Raptor Nest Study Area (which included the original Project Area and a surrounding 10-mile raptor assessment buffer) 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 surveys were conducted aerial transects within the WEC Raptor Nest Study Area, in accordance with

[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.

recommendations set forth in the USFWS *Eagle Conservation Plan Guidance*[2]. These eagle nest buffer survey transects were flown only after peak grouse lekking timing in the early morning hours.

Detailed methodologies and findings as they relate to the 200 MW Project Area are discussed below.

Ground-based and Aerial Grouse Lek Survey Methodologies

On September 21, 2017, a study plan for grouse lek and raptor nest surveys was submitted to the U.S. Fish and Wildlife Service (USFWS) (Mr. Kevin Shelly) and the North Dakota Game and Fish Department (NDGFD) (Mr. Steve Dyke) in combination with other proposed avian services task methodologies. On behalf of Burke Wind, Atwell, LLC (Atwell) requested agency review of the study plan. Atwell did not receive study plan review communication from the USFWS but did receive study plan review communication from the NDGFD on November 16, 2017 (Mr. Greg Link). The NDGFD did not pose questions or suggested alterations to the raptor nest survey or grouse lek survey methodologies. In subsequent follow-up, the NDGFD upland game bird biologist did not recommend a specific lek survey approach at that time (Rodney Gross – NDGFD, pers. comm.). Atwell consequently deemed the survey protocols as sufficient and used the proposed study plan for lek surveys.

Ground-based lek surveys were conducted from April 10 to April 26, 2017 and aerial lek surveys were conducted from April 24 to April 28, 2017. These Tier 3 surveys followed pre-survey Tier 2 site characterization analysis (as defined within the USFWS's Land-based Wind Energy Guidelines)[3] that found the original Project Area to include areas of potential lekking and nesting habitat for Sharp-tailed Grouse.

Based on Sharp-tailed Grouse species biology, prior experience with lekking grouse species, and information synthesized within Johnsgard (2016),[4] confirmed leks were defined as three (3) or more birds together with at least one male displaying. 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 that intersect grassland habitat. Grassland habitat was determined with available land cover data and desktop review of sources including geographic information system (GIS) coverage of NDGFD's Micro Native Grassland

[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.

[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.

Conservation Areas[5]. Surveys were conducted within a limited window commencing 30 minutes before local sunrise and terminating between 60 and 120 minutes after sunrise, based on the suitability of survey weather conditions (e.g., wind speed, temperature,. precipitation, etc.). Biologists surveyed for lekking grouse at safe roadside pull-offs and at no greater than 0.4 mile increments[6]. Figure 2 identifies the ground based survey point locations (Sharp-tailed Grouse [STGR] Lek Survey Points).

Each ground-based survey point was surveyed for a minimum of five (5) minutes. The first round of the ground-based site visit was completed before the aerial transect survey was completed and this ground-based survey was used to help define target areas surveyed during the aerial transect surveys and second round of ground-based surveys. Ground-based surveys sites were visited twice if any of the following three criteria occurred: 1) habitat corresponded to the NDGFD macro native grassland conservation areas model (Figure 2) and habitat appeared to be consistent with 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. Each ground-survey event was separated by at least 10 days between visits.

Aerial Transect Surveys

Aerial transect surveys were conducted by Atwell biologists 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-meter [m]) visibility threshold existed on either side of the aircraft. Transect routes were oriented on a north-south axis and were flown at heights of 200 to 250 feet above the ground surface (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 transects within Lostwood National Wildlife Refuge 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. 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.

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[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

[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

Bald Eagle & Raptor Nest Survey Methodology

Pre-survey site characterization Tier 2 analysis concluded that the WEC Raptor Nest Study Area could potentially contain Bald Eagle nesting habitat[8]. As such, Tier 3 aerial raptor nest surveys were conducted. Aerial transect surveys were conducted by Atwell biologists and were flown by Double M Helicopters at low speeds (30 – 40 knots). Survey transects were conducted in 1-mile intervals across the WEC Raptor Nest Study Area as recommended by the Eagle Conservation Plan Guidance: Module 1-Land-based Wind Energy, v.2[9]. A 0.5-mile (800 m) visibility threshold existed on either side of the helicopter. Visibility constraints were minimal during surveys and deciduous leaf-out conditions never exceeded initial bud-break phase.

RESULTS

Sharp-tailed Grouse Lek Survey Results Summary

The reduced 200 MW project area now contains only six (6) confirmed leks (Figure 2). Reducing the original Project Area from the 300 MW configuration to the 200 MW Project Area resulted in six (6) leks no longer in the Project Area. Fourteen (14) confirmed leks were located outside the 200 MW Project Area but within a 0.5 mile lek assessment buffer, equaling 20 total confirmed leks found within the 200 MW Project Area and the 0.5-mile buffer. Confirmed leks found within the WEC Grouse Survey Study Area boundary averaged 12.8 individuals/lek (*Standard Deviation* = 6.7, *n* = 12).

Biologists located four (4) possible lek locations during ground-based surveys within the 200 MW Project Area. Two (2) additional possible lek locations were identified within 0.5 miles of the 200 MW Project Area. Additionally, individuals (sightings of one or two Sharp-tailed Grouse that were not linked directly to a lek) were recorded in 12 instances throughout the 200 MW Project Area and are plotted in Figure 2.

Eagle Nest Survey Results Summary

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

Other Nesting Raptor Species Results Summary

The reduced 200 MW project area now contains only six (6) active Red-tailed Hawk (*Buteo jamaicensis*) nests and five (5) active Great Horned Owl (*Bubo virginianus*) nests as located by Atwell (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. Reducing the original Project Area from the 300 MW configuration to the 200 MW Project Area resulted in eight (8) Red-tailed Hawk and two (2) Great Horned Owl nests no

[8] 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.

[9] 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.

longer in the 200 MW Project Area. All nests within one mile of the currently proposed Project Area and a 0.25-mile raptor nest buffer are shown on Figure 3.

Four (4) of the raptor nests located within the 200 MW Project Area 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, based on the condition of nesting material and nest cup structure), yet were unattended by hawks or owls at the time of observation. 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[10, 11].

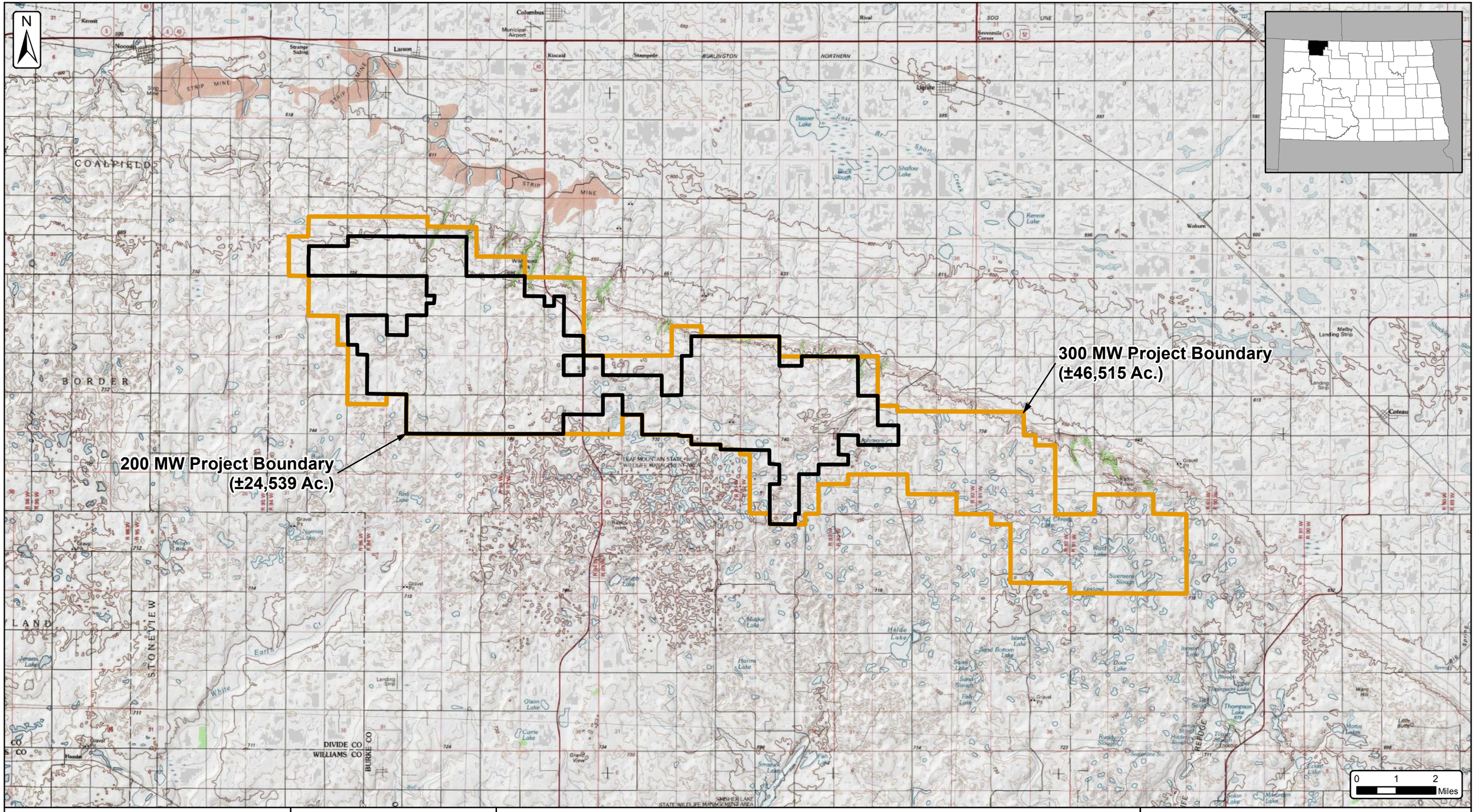
Overall nest density within the WEC Raptor Nest Study Area was approximately 9.0 nests/square-kilometer. Cursory visual assessment indicates that distribution of these nest structures was not uniform (Figure 3). Upon review of incidental raptor nest density within the 10-mile eagle nest assessment buffer, raptor nests appear to be concentrated primarily south of the 200 MW Project Area.

Large-bodied Colonial Nesting Species Results Summary

Atwell located one Double-crested Cormorant (*Phalacrocorax auritus*) rookery within the 200 MW Project Area (Figure 3). 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.

[10] Atwell unpublished data.

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



Burke County Wind Energy Center

Figure 1. Site Location Map

Burke County, North Dakota

Date: 11/30/2018

Client:

Burke Wind, LLC

Atwell, LLC Project:16000947

200 MW Project Area
10/16/2018 (± 24,539 Ac.)

300 MW Project Area
07/18/2018 (±46,515 Ac.)

SOURCE: USGS TOPOGRAPHIC QUADS

ATWELL

N

Keller Township

Fay Township

Fay Township

Vale Township

Fay Township

Vale Township

Leaf Mountain Township

Foothills Township

Burke County

Harmonious Township

Harmonious Township

Thorson Township

Leaf Mountain Township

Cleary Township

0 1 2 Miles

Burke County Wind Energy Center

Figure 2. Sharp-tailed Grouse Lek Survey

Burke County, North Dakota

Date: 11/30/2018

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

- Wetland Easement
- Grassland/Wetland Easement

- 200 MW Project Area 10/16/2018 (± 24,539 Ac.)
- Township Boundaries
- County Boundaries

SOURCE: GRASSLANDS MICRO LAYER; NDGF

ATWELL

N

40

Divide County

Burke County

0 1 2 Miles

Burke County Wind Energy Center

Figure 3. Raptor Nest Survey Map

Burke County, North Dakota

Date: 11/30/2018

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
- 200 MW Project Area 10/16/2018 (± 24,539 Ac.)
- County Boundaries

SOURCE: USDA NAIP IMAGERY, 2017

ATWELL