

Wetland and Other Waters Delineation Report

Langdon Wind Energy Center Expansion Langdon, North Dakota

**Prepared for FPL Energy
Juno Beach, FL**

Prepared by



Tetra Tech EC, Inc.

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1.0 INTRODUCTION

Tetra Tech was retained by FPL Energy to perform routine wetland delineations (RWD) at the Langdon Wind Energy Center Phase II (project), located near the towns of Langdon and Nekoma in Cavalier County, North Dakota. The project area is shown on **Figure 1**. Project facility location data as shown on the report figures is based on XMap.an1 files received from FPL Energy dated 01/03/08. The proposed wind farm would consist of approximately 27 GE 1.5 megawatt (MW) turbines with a designed nameplate generating capacity totaling 40.5 MW. Other facilities related to construction and operation of the project include:

- in-plant turbine access roads;
- above- and below- ground electrical collection system cabling;
- junction boxes; and
- construction laydown area.

The purpose of the site visit was to determine if any jurisdictional wetlands or other waters of the United States (WUS) exist within the boundaries of the project site. Potential permanent impacts to these wetlands or WUS by the construction of the project facilities were also examined.

This report provides a description of wetlands and surface waterbodies identified within the project. Included is a description of the project area, methods used to delineate wetlands, field survey results, and references used to support the conclusions. Appendices include detailed aerial views, field data forms and site photographs, in addition to terminology and definitions.

1.1 Federal Regulatory Framework Related to Wetlands

Wetlands with "jurisdictional status" are WUS as defined by Section 404 of the Clean Water Act or the Swampbuster Provision under the Food Security Act. These types of wetlands are regulated by the United States Army Corps of Engineers (USACE). Only the USACE can make a final wetland determination at a site. If development is to occur, the USACE also determines the type of permit, if any, that may be required under the Clean Water Act.

Federal regulations state that wetlands adjacent to other WUS, other than waters which are themselves wetlands, are to be considered jurisdictional waters. The regulations define adjacent as "bordering, contiguous, or neighboring," and that wetlands separated from other WUS by barriers such as natural river berms, man-made dikes, and beach dunes may be considered adjacent wetlands. The regulations and subsequent national guidance do not fully define the circumstances under which wetlands that do not touch WUS may be considered jurisdictional waters, leaving some flexibility in interpretation by USACE districts as to the definition of adjacency.

The regulations specify that tributaries to WUS should be considered WUS. In the absence of adjacent wetlands, jurisdiction over nontidal waters extends laterally to the ordinary high water mark. The definition of the ordinary high water mark is "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." (65 *Fed. Reg.* 12823, 2000)

Generally, the ordinary high water mark is used in the identification of the upstream limits of

jurisdiction for tributary waters. Federal jurisdiction generally extends up stream banks and upstream within a tributary to the point where the ordinary high water mark is no longer discernible. Additionally, ephemeral tributaries (tributaries which have flowing water only at certain times of year or only after certain storm events in a typical year) are considered jurisdictional, provided that an ordinary high water mark is discernible and a significant nexus to navigable water can be established. Thus, tributary waters considered WUS can range from substantial rivers and streams with definite ordinary high water marks to channels that are dry, and may have faint or ill-defined ordinary high water marks.

The regulatory definition of WUS does not specifically address the jurisdictional status of ditches and other man-made conveyances, and guidance issued by the USACE and the United States Environmental Protection Agency (EPA) leaves room for interpretation. The USACE has stated that certain man-made conveyances, such as nontidal drainage and irrigation ditches excavated on dry land, are generally not considered WUS; however, USACE districts have determined that other man-made conveyances such as natural streams which have been diverted into man-made channels and ditches that extend the ordinary high water mark of a WUS (connected to a WUS) are jurisdictional waters.

Recent United States Supreme Court decisions have limited federal jurisdiction of ephemeral and intermittent tributaries, and require the EPA and the USACE to determine jurisdiction over the certain types of waters based on a fact-specific analysis as to whether they have a significant nexus with a traditional navigable water. These types of waters include:

- Non-navigable tributaries that are relatively non-permanent.
- Wetlands adjacent to non-navigable tributaries that are relatively non-permanent.
- Wetlands adjacent to, but not directly abutting, a relatively permanent non-navigable tributary.

The ruling also requires that the agencies not generally assert jurisdiction over the following features:

- Swales or erosional features (e.g. gullies, small washes characterized by low volume, infrequent, or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

Recent guidance issued jointly by the EPA and the USACE states that the agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.
- Significant nexus includes consideration of hydrologic and ecologic factors.

2.0 SITE DESCRIPTIONS AND LOCATION

The facilities for the proposed project are located on 20 sections of land near the towns of Langdon and Nekoma in Cavalier County, North Dakota as shown on **Figure 1** and as described in **Table 1**.

Table 1 Township, Range and Sections Within Project Area			
Township	Range	Township Name	Sections
160N	60W	Perry	13 and 14
160N	59W	Easby	7, 8, 28, 29, 32, 33 and 34
159N	60W	Nekoma	1, 2, 10 and 11
159N	59W	Osnabrock	2, 3, 4, 5, 6, 10 and 11

The project is located in the Dakota Minnesota Drift and Lake Bed Flats Physiographic Region (Hammond, 1970). Elevations within the project area range from approximately 1,600 to 1,700 feet above mean sea level (amsl).

Land in the project area is used primarily for agricultural production and is comprised almost entirely of cultivated farm fields interspersed with small scattered woodlots, narrow grassed or vegetated drainages, and fallow areas. Cultivated fields are almost exclusively planted in oil seed and cereal crops. Receiving drainages have been channelized or contoured to accommodate drainage system flows and to facilitate agricultural equipment crossing. Contoured drainage areas were typically grassed and planted with a mix of native and non-native grasses and forbs. Similar buffers exist along low-lying creeks and drainage ditches in the farm fields.

Land in the project area is primarily privately owned. Some land is under easement to the United States Fish and Wildlife Service (USFWS) as Waterfowl Production Areas (WPA) and the Natural Resource Conservation Service (NRCS) under the Conservation Reserve and Wetland Reserve Programs (CRP and WRP). These areas are managed for nesting waterfowl, wildlife habitat, and to restore wetlands to their former functions and values. Private lands in the project area are also used for hunting. Industrial developments in the project area are limited to pipelines, power lines, communication towers and one former military installation. Several transportation corridors occur within the project area, including state highways, and county and township roads.

Improvements within the project area include asphalt-paved county and township roads, gravel surfaced roads and two-track farm access roads and trails. Overhead and/or underground transmission lines and primary and secondary highways and roads pass through the property.

3.0 METHODS

Wetlands within the project area were delineated using the methods described in the 1987 USACE Wetland Delineation Manual (Environmental Laboratory, 1987). Delineation activities followed supplemental delineation guidance by the USACE, contained in the field memoranda dated February 20, 1992 and March 6, 1992, as well as the Questions and Answer memoranda dated October 7, 1991. These methods incorporate a three-parameter approach using vegetation, soils, and hydrology to identify the presence of a freshwater wetland. Off-site (desktop) determination methods were first used to identify probable locations of wetlands and waterbodies, while on-site (field) methods were used to verify wetland identifications and gather information to support Tetra Tech's assessment of probable jurisdictional determinations.

3.1 Data Review

Prior to and during the field reconnaissance, available information was reviewed to identify areas that may exhibit characteristics of jurisdictional wetlands. Tetra Tech evaluated these data as a whole to make probable wetland determinations. This included review of aerial photographs, topographic map(s) and the Cavalier County Soil Survey. Many areas which were identified as potential wetland areas appeared to be vegetated and farmed-through swales constructed to aid in drainage of land under agricultural production. These swales may or may not be considered jurisdictional based on the presence of the three positive indicators of wetlands: wetland vegetation, wetland hydrology and hydric soils, and/or the presence of positive indicators of an ordinary high water mark as described in Section 1.0. The following sections discuss the data used in this review.

3.2 Aerial Photograph/National Wetlands Inventory Review

Sites of proposed wind farm facilities with the potential to impact wetland areas were identified based on a review of general and site-specific aerial photography obtained from the United States Geological Survey (USGS). The proposed wind farm facility layout was overlain onto digital versions of aerial photographs using Geographic Information System (GIS) software. Areas of potential wetlands were identified for evaluation. The National Wetlands Inventory (NWI) map for the project area was downloaded from the North Dakota Natural Resources Geospatial Data Clearinghouse (2006). According to this map, areas identified as wetlands and WUS appeared to be present within the project area. Numerous farm or stock ponds also appeared to be present within the project vicinity, but appeared to generally support limited amounts of wetland vegetation. The NWI map data on an aerial photographic background is presented on **Figure 2**.

3.3 Topographic Map Review

The proposed wind farm facilities layout was overlain onto digital versions of the USGS 7.5-minute topographic maps which make up the proposed project area using GIS software. Perennial, intermittent and ephemeral streams and drainages which could be permanently impacted by the proposed wind farm facilities were identified and investigated during the field delineation portion of the project. A copy of the USGS topographic map showing proposed project facilities locations is presented on **Figure 3**.

3.4 USACE Jurisdictional Determination

Prior to the site visits, Tetra Tech requested a jurisdictional determination of aquatic resources in

the project area from the Bismarck, North Dakota office of the USACE – Omaha District. Tetra Tech provided the USACE with a figure depicting the project area with a preliminary turbine array, and requested that all jurisdictional areas within that project boundary be identified to aid FPL Energy in avoiding and minimizing impacts to aquatic resources. The USACE identified several drainages and tributaries to the Park River and the Nekoma Coulee as jurisdictional WUS within the site boundaries. The areas marked on the figure do not define actual wetland boundaries, but rather only identify features which the USACE – Omaha District claimed as jurisdictional.

In their response to our request, the USACE also indicated that joint EPA and USACE guidance based on the recent United States Supreme Court decisions (*Rapanos vs. the U.S.* and *Carabell vs. the U.S.*) would soon be issued and this guidance may affect the jurisdictional status of some of these areas. Copies of agency correspondence are included in **Appendix A**.

3.5 Soil Survey Review

Soil survey data for Cavalier County, North Dakota was obtained from the Cavalier County NRCS office in both printed and digital formats. These maps depict the distribution of soil series and mapping units. This information was used to study the distribution of hydric soils on the site.

Numerous soil types are present within the project area as represented in Figure 4. Soil, as it relates to wetlands delineations, must be a hydric soil for the area to qualify as a wetland in accordance with the 1987 USACE manual. Some of these mapping units have been designated "hydric soils", defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, July 13, 1994). Soil types identified as hydric soils within the project area include: Parnell mucky loam; Roliss silt loam; Vallers-Hamerly loams, saline; Barnes-Svea loams; Tonka mucky loam; Vallers mucky loam; and Vallers mucky loam, saline.

3.6 On-Site Reconnaissance and Delineation

A Tetra Tech biologist visited the site on October 10 and 11, 2007 to verify and supplement the findings of the off-site investigations. During this reconnaissance, all sites showing wetland characteristics, in terms of vegetation, soils or hydrology, which would potentially be affected by project construction or operation were examined in the field using aerial photographs, topographic maps, soils maps, NWI maps, and maps of the proposed wind farm array. A Tetra Tech biologist inspected these locations for the presence of wetland vegetation and hydrology and mapped the boundaries of those determined to be wetlands as defined by the 1987 USACE Wetland Delineation Manual and subsequent Regulatory Guidance Letters (RGLs). Subsequent efforts carried out during October 2007 by a North Dakota Professional Soil Classifier characterized soils in order to determine if hydric soils were present as required by North Dakota regulations.

This study was based on the current federal regulatory definition of wetlands as generally defined in, and regulated under Chapter 33 of the Code of Federal Regulations (33 CFR; USACE) and 40 CFR Part 230 (EPA). Procedures used in this study followed the wetland identification methodologies in the most recent version of the 1987 USACE Wetlands Delineation Manual (Environmental Laboratory, 1987). For an area to be classified as a jurisdictional wetland, the area must have positive wetland indicators for hydrophytic vegetation, hydric soil, and wetland hydrology and be connected or immediately adjacent to a WUS.

Sites of proposed wind farm facilities with the potential to impact wetland areas were identified based on a review of aerial photography obtained from the USGS. Areas of potential wetlands

identified during the off-site data review process were also investigated.

All sites related to wind farm facilities were examined through interpretation of aerial photography, study of soils maps and hydric soil lists, study of NWI maps, and field reconnaissance. At most sites, point-specific field data on soils, vegetation, and hydrology were collected and documented during the subsequent field visits. Point-specific data were not collected at sites whose proposed activities were limited to those which would result in temporary impacts.

Generally, if a linear feature such as a drainage or grass swale was being investigated, a transect was established perpendicular to the feature at the location of the proposed potential impact. Sampling plots were then placed along each transect. These plots were the points in the field at which wetlands characteristics were studied in accordance with the USACE 1987 Wetlands Delineation Manual. Typically, sampling plot A was oriented within the feature being investigated at a location determined to have the highest potential to exhibit wetland characteristics. This determination was based on local topography, presence of defined bed and bank, undercutting, sediment deposition, presence of standing or flowing water, or vegetation.

At each sampling plot, information was collected on soil, vegetation, and hydrologic characteristics. Soils were characterized to a depth of at least 18 inches, and a Munsell Soil Color Chart, visual observation and standard soil texture methodology were employed to identify hydric or non-hydric soil characteristics as defined in the Field Indicators of Hydric Soils in the United States, A Guide for Identifying and Delineating Hydric Soils, Version 6.0, (USDA, 2006). Soil logs and photographs were recorded on each data form.

Vegetation within each sample plot was characterized to determine dominance of either hydrophytic or non-hydrophytic vegetation. Dominance was estimated based on percent areal coverage within sampling plots with a five-foot radius for herbaceous vegetation and a 30-foot radius for trees and shrubs. Wetland indicator status for all plant species follows the USFWS Region 3 National List of Plant Species That Occur in Wetlands (Reed, 1988). Hydrology was assessed by evaluating each sampling plot for field indicators of wetland hydrology such as inundation, depth to free water in soil pits, soil saturation, water marks, drift lines, oxidized root channels, drainage patterns, and topographic position.

If positive indicators of wetland vegetation, hydrology, and hydric soils as defined by the USACE manual were present at plot A, data were collected from additional sampling plots placed to delineate the transition from wetland to non-wetland habitats. The boundary of each wetland was determined as the location where at least one of the above three parameters failed to meet wetland criteria.

Plot location data were collected using a Trimble©, GeoXH™ Global Positioning System (GPS) surveying unit equipped with Terra Sync, Version 3.10 software. The locations were collected in Universal Trans Mercator (UTM) coordinates referenced to the North American Datum (NAD, 1983).

4.0 RESULTS

The following sections describe conditions at the site based on data collected at the plots described above. Due to the extremely large project area, the results of the wetland delineations are discussed by township name and section number. Site names for those areas which had potential impacts from wind farm facilities are identified with a crossing identification number (ID) consisting of a township letter (N for Nekoma; E for Easby, etc.), the section number in which the specific site is located and a site number. Following this nomenclature system, a crossing location with the ID of N13-1, for example, would be Location 1 in Section 13 of Nekoma Township.

Aerial views, field data sheets, North Dakota Professional Soil Classifier data sheets, and site photographs of the areas determined to be jurisdictional areas were obtained to document delineation activities, and are organized by township and section number in **Appendix A**. A summary of areas determined to be jurisdictional crossings, which includes site ID, width, and temporary and permanent impacts which may result from the construction of the proposed facilities, is presented in **Table 2**.

4.1 Site Vegetation

Much of the vegetation encountered in the project area consisted of crops or herbaceous species typical of fallow fields and pastures. Dominant vegetation identified at each plot is presented on the field data sheets contained in **Appendix B**. The riparian corridor in most reaches of the major drainages within the project area consisted of narrow buffers vegetated with native and non-native grasses and limited woody vegetation comprised primarily of willows and cottonwoods.

4.2 Project Soils

Five hydric soils were identified during field surveys and were consistent with soil series descriptions. These soils included Parnell, Tonka, Vallery, and Vallery, saline. Hydric soils identified at locations investigated during the site visit are listed on the wetland delineation data forms presented in **Appendix B**. Soils at the site were characterized by a North Dakota Professional Soil Classifier.

4.3 Site Hydrology

The major hydrologic feature of the eastern portion of the site is the South Branch of the Park River, which flows from northwest to southeast across the project area. Tributary systems which were identified in the western portion of the project area include the East Branch of Nekoma Coulee and its tributaries. Most streams and drainages within the project area have been subjected to some form of modification to facilitate drainage for agricultural production. This modification ranges from deepening and channelizing to completely re-contouring and re-locating drainages.

4.4 Wetlands

Field reconnaissance confirmed the presence of numerous isolated wetlands and WUS. Figure 3 presents isolated wetlands and WUS observed during field reconnaissance. Areas identified as non-jurisdictional areas based on their isolated nature or the USACE JD (Appendix A) are presented in Table 3.

Table 3 Non- Jurisdictional Wetland Crossing Locations	
Crossing Location ID	Jurisdictional Status
E34-1	Isolated Wetland
O3-1	Isolated Linear Wetland
O11-1	Isolated Seep Wetland
N2-1	Isolated Farmed Wetland
N2-2	Isolated Wetland
N2-3	Isolated Farmed Wetland

Jurisdictional features that occur within project facilities consist entirely of streams with narrow bands of wetland vegetation within the banks or larger connected and adjacent wetland areas. A summary of these jurisdictional areas is presented in **Table 2**. No wild and scenic rivers or other designated special waters are present within the project area.

Detailed information about each area of investigation is described in the remainder of this section. Supporting documentation for information described below is presented in **Appendix B**.

Township 160N, Range 59W (Easby Township)

Crossing E8-1

This is the proposed location of a WTG access road and underground electrical (UE) collector line which crosses an unvegetated drainage swale approximately 13 feet in width. Evidence of a defined bed and bank were noted. The soil at this location exhibited characteristics of hydric soils. The soil at this location is mapped as Vallery-Hamerly loams, saline, 0 to 3 percent slopes. The drainage was identified as jurisdictional by the USACE – Omaha District.

Crossing E17-1

This location will be potentially impacted by the installation of a UE collector circuit. The area is a drainage ditch which has been modified to optimize drainage and receives inputs from surrounding croplands. The drainage was identified as jurisdictional by the USACE – Omaha District. The jurisdictional area was determined to be approximately 52 feet in width at the proposed UE collector crossing location. Wetland vegetation, hydric soils and wetland hydrology were confirmed at this location during the on-site investigations. The soil at this location was confirmed to be Vallery, mucky loam, poorly drained hydric soil.

Crossing E29-1

This is the proposed location of a UE collector circuit which crosses a drainage approximately 49 feet in width. The area identified as a wetland exhibited wetland vegetation, hydrology and hydric soils. The soil at this location was confirmed to be Parnell, mucky loam, very poorly drained hydric soil. The drainage was identified as jurisdictional by the USACE – Omaha District. This area was delineated during the first phase of the Langdon Wind Energy Center project.

Crossing E32-1

This is the proposed location of a UE collector circuit which cross a farmed-through swale approximately 28 feet in width. Evidence of wetland vegetation was not present due to the farmed condition of the drainage. The location did exhibit evidence of a defined bed and bank. The soil at this location was confirmed to be Parnell, mucky loam, very poorly drained, a hydric

soil, and the drainage was identified as jurisdictional by the USACE – Omaha District. This area was delineated during the first phase of the Langdon Wind Energy project.

Township 159N, Range 60W (Nekoma Township)

Crossing N1-1

This is the proposed location of two UE collector circuits which cross a farmed-through swale approximately 82 feet in width. Wetland vegetation was not observed during the site visit due to farming of the area. The soil at this location is mapped as Vallery saline loams, 0 to 3 percent slopes and evidence of wetland hydrology was noted. The drainage was identified as jurisdictional by the USACE – Omaha District.

Township 159N, Range 59W (Osnabrock Township)

Crossing O4-1

This is the proposed location of a UE collector circuit which crosses a channelized and straightened drainage approximately 10 feet in width. The location exhibited wetland vegetation and wetland hydrology, but evidence of a defined bed and bank was not noted. The soil at this location is mapped as Parnell mucky loam and the drainage was identified as jurisdictional by the USACE – Omaha District.

Crossing O4-2

This is the proposed location of a UE collector circuit which crosses a channelized and straightened drainage approximately 13 feet in width. The location exhibited wetland vegetation and wetland hydrology, but evidence of a defined bed and bank was not noted. The soil at this location is mapped as Parnell mucky loam and the drainage was identified as jurisdictional by the USACE – Omaha District.

5.0 CONCLUSIONS

During this investigation Tetra Tech identified seven locations at which proposed project facilities or activities are in proximity to areas which are confirmed to be jurisdictional WUS. The site has been subjected to historic modifications of landform and hydrology, the majority of which were conducted to improve local drainage to facilitate agricultural commodity production. Distinct areas that meet the definition of wetlands were delineated at the site.

Impacts to these areas will result from the construction of the second phase of the Langdon Wind Energy Center project. Based on the most recent array and estimate of disturbance to jurisdictional wetlands, the temporary impacts resulting from construction activities are approximately **8690** square feet with an estimated **590** square feet of permanent impacts following completion of site restoration activities. The estimate includes the underground installation of approximately **992** linear feet of buried cable within jurisdictional wetlands. The impact estimate exceeds the **one tenth of an acre** (4,356 square feet) notification and mitigation threshold and the **500** linear foot notification threshold for buried utility line in jurisdictional waters under United States Department of the Army Nationwide Permit 12. The exceedence of either the 500 linear feet or the tenth of an acre threshold requires the applicant to notify the USACE - Omaha District of the proposed activities prior to impacting these areas.

Permanent impacts to jurisdictional WUS are estimated to be approximately **590** square feet. Based on these impacts, the project is below the **half-acre** threshold for permanent impacts and would be

eligible for authorization by NWP 12 following notification to the USACE – Omaha District.

Based on the above impacts estimate, Tetra Tech recommends that UE collector crossings of jurisdictional waters be underbored or relocated to reduce impacts to less than 500 linear feet or one tenth of an acre. Once the proposed temporary impacts have be reduced to less than 500 linear feet or one tenth of an acre, this project will not require notification to the USACE-Omaha District or mitigation of the proposed permanent impacts, provided the Langdon Expansion is considered to be a separate project from the Langdon Phase I Wind Farm Project.

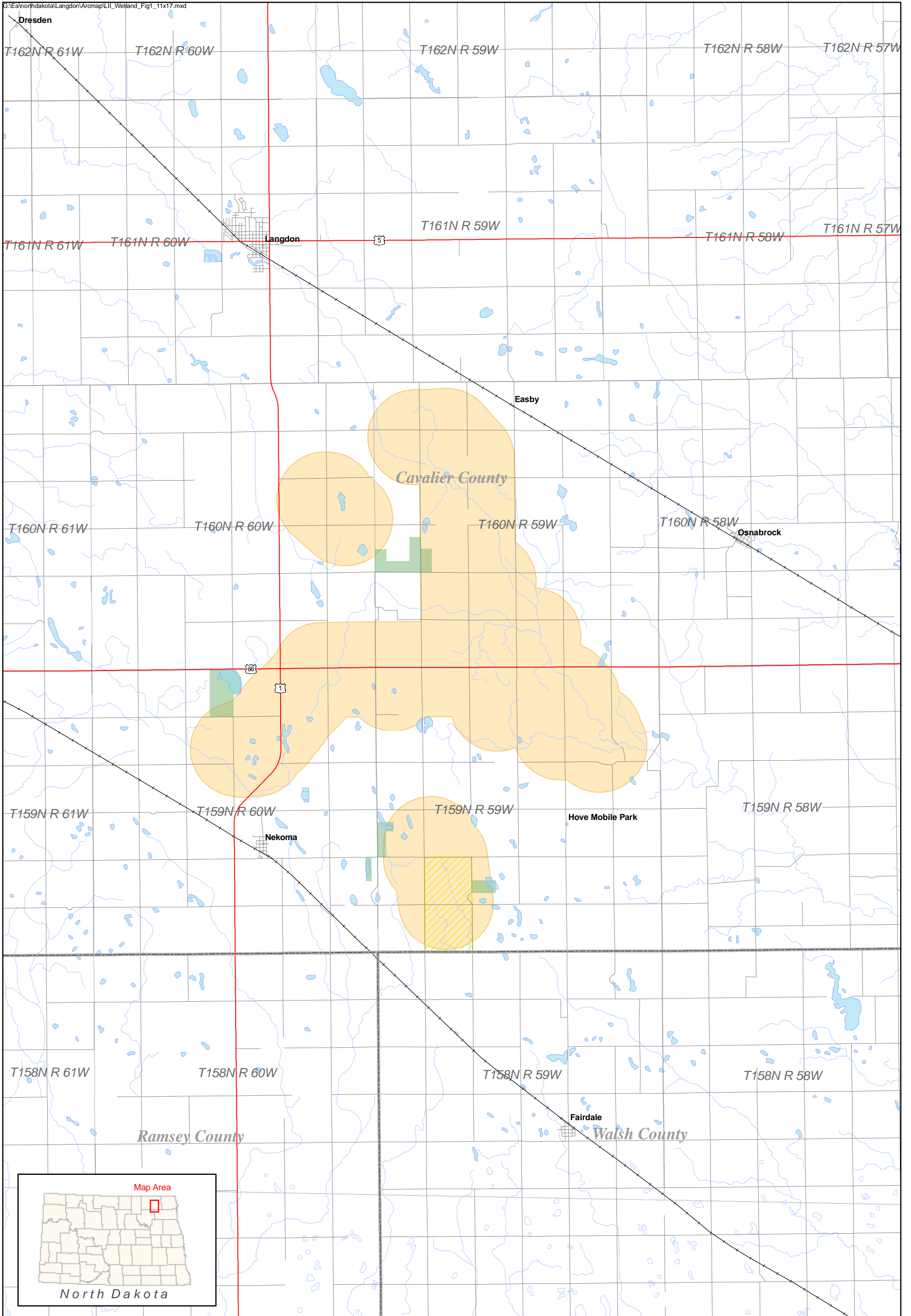
TABLES

TABLE 2
Langdon Wind Farm Expansion
Jurisdictional Crossing Impact Summary - January 2008

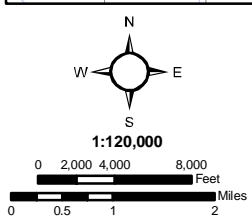
COMMENT	EASTING	NORTHING	Facility	Width (feet)	Length of UE Collection in Wetlands (feet)	Temporary Impact (Sq. Ft.)	Permanent Impacts (Sq. Ft.)	Avoidance/Minimization Recommendations
E8-1	552182.55	5394463.95	Collector	13.1	13.1	196.5	0.0	Underbore to avoid impacts
			Road			589.5	589.5	No avoidance possible if road is built. Reduce width of permanent road to minimum required to allow operational access.
E17-1	553357.20	5392444.80	Collector	52.5	52.5	787.5	0.0	Underbore to avoid impacts
E29-1	553392.62	5388461.13	Collector	49.2	49.2	738.0	0.0	Underbore to avoid impacts
E32-1	553402.57	5387327.87	Collector	28.2	28.2	423.0	0.0	Underbore to avoid impacts
NI-1	548994.77	5386557.47	Collector(2)	413.4	826.8	6201.0	0.0	Shift location of collector line installation south to reduce crossing width or underbore to avoid impacts.
O4-1	554319.66	5386608.05	Collector	9.8	9.8	147.0	0.0	Underbore to avoid impacts
O4-2	553692.39	5386602.97	Collector	13.1	13.1	196.5	0.0	Underbore to avoid impacts
Totals					992.7	8689.5	589.5	

Total length of buried collectors placed in wetland areas exceeds the 500 foot linear threshold for buried utility lines allowed by NWP 12.
Total square footage of temporary impacts exceeds the 1/10 acre threshold for no notification authorization by NWP 12.
Total square footage of permanent impacts is below the 1/2 acres eligibility threshold of NWP 12.

FIGURES



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






- | | | |
|--|---|---|
|  Project Area Boundary |  County Boundary |  Railroad |
|  Waterfowl Production Areas |  State Highway |  Lake/Pond |
|  Wetland Easement |  Local Road |  River |

Figure 1

Project Area Vicinity Map
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota

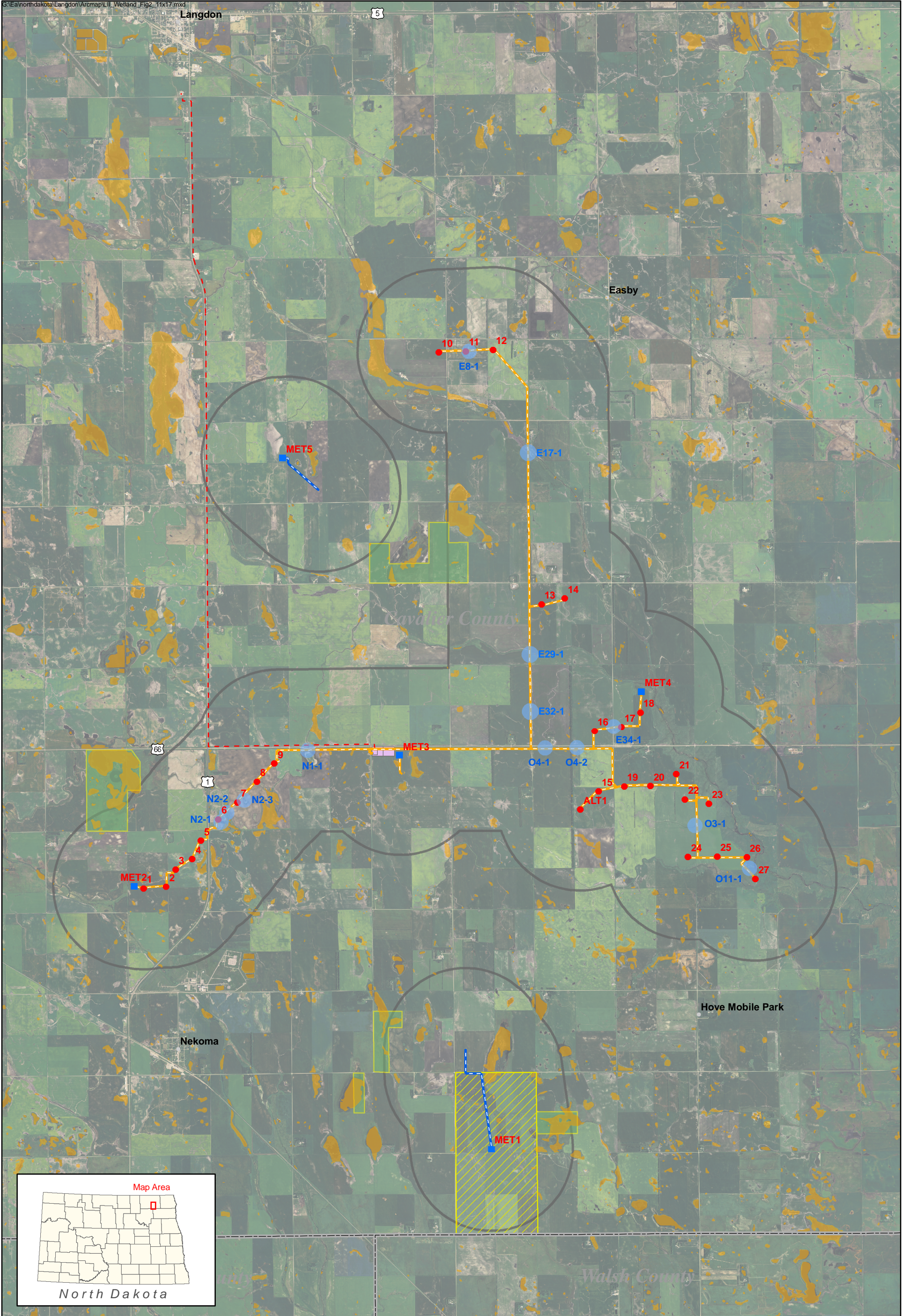
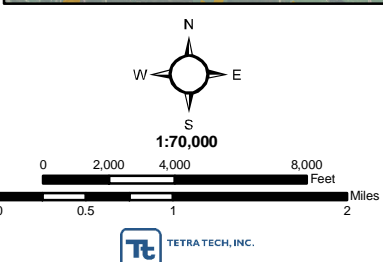
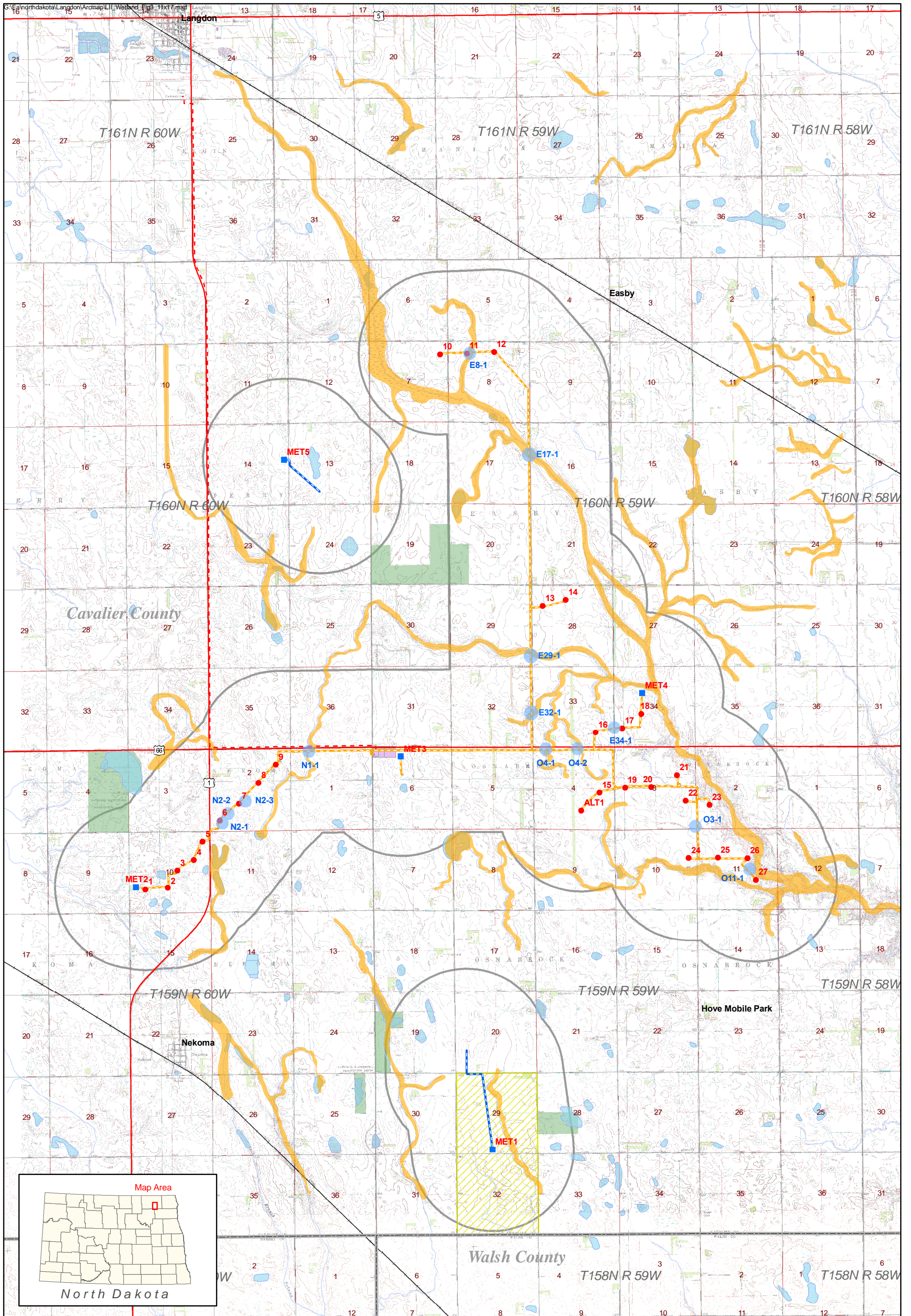


Figure 2

**Aerial Photograph with National Wetlands Inventory Map
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota**



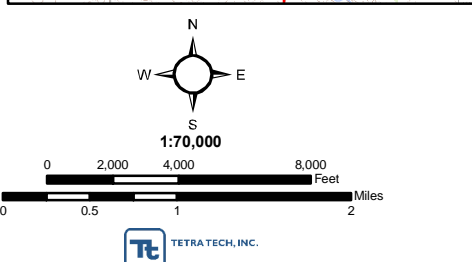
- | | | |
|---------------------------|-----------------------|--------------------------------------|
| Project Area Boundary | State Highway | Access Road |
| Waterfowl Production Area | Local Road | Transmission Line |
| Wetland Easement | Railroad | Fiber Optic Cable |
| Lake/Pond | Turbine Location | Substation |
| River | MET Tower Location | WUS and Non-Jurisdictional Crossings |
| NWI Wetland | Underground Collector | |



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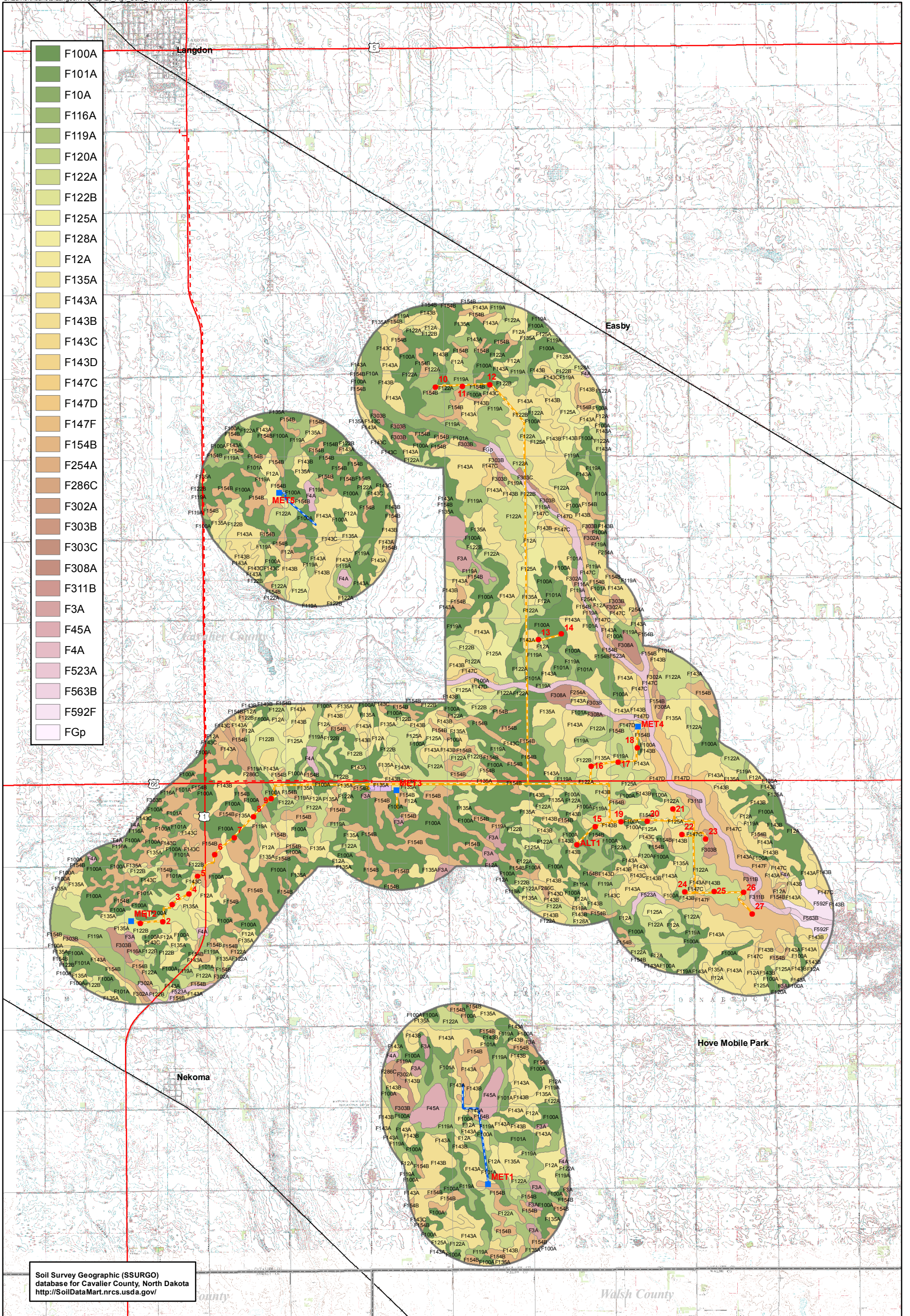
Figure 3

**Topographic Map and Corps of Engineers Jurisdictional Wetlands
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota**

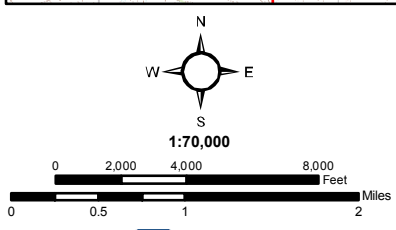


- | | | |
|---------------------------|-----------------------|--------------------------------------|
| Project Area Boundary | State Highway | Access Road |
| Waterfowl Production Area | Local Road | Transmission Line |
| Wetland Easement | Railroad | Fiber Optic Cable |
| Lake/Pond | Turbine Location | Substation |
| River | MET Tower Location | WUS and Non-Jurisdictional Crossings |
| Jurisdictional Wetland | Underground Collector | |

Tetra Tech, Inc.



Soil Survey Geographic (SSURGO) database for Cavalier County, North Dakota <http://SoilDataMart.nrcs.usda.gov/>



- Phase II Project Area
- County Boundary
- Substation
- State Highway
- Local Road
- Railroad
- Turbine Location (01/03/08 Array)
- Underground Collector
- Access Road
- Transmission Line
- Met Tower

Figure 4
State Soils Association Map
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota

APPENDICES

APPENDIX A
USACE JURISDICTIONAL DETERMINATION

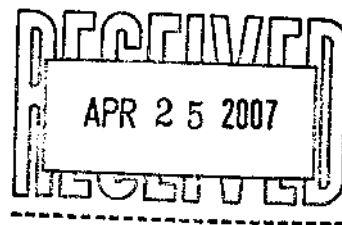


REPLY TO
ATTENTION OF

North Dakota Regulatory Office

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-8640

April 20, 2007



[NWO-2007-540-BIS]

Tetra Tech
ATTN: Jeffrey R. Rice, Environmental Group Manager
PO Box 30615
Billings, Montana 59107

Dear Mr. Rice:

This is in response to your April 2, 2007 request for a jurisdictional determination on an additional 50 sections of property located southeast of Langdon in Cavalier County. The purpose of your request is to assist in the design of the project that avoids and/or minimizes impacts to jurisdictional areas to the greatest extent practicable.

Your requests have been assigned Application No. NWO-2007-540-BIS. Please reference this number when you write or call us regarding this proposal.

The Corps of Engineers regulates the discharge of dredged or fill material under Section 404 of the Clean Water Act. For your convenience, I have highlighted the jurisdictional areas within your proposed project area on the revised map provided April 2, 2007. The tributary systems identified in the east side of the area flow to the South Branch Park River. Tributary systems identified in the west side of the area flow into the East Branch of Nekoma Coulee. These tributary systems and their adjacent wetlands are jurisdictional waters of the United States subject to regulation under Section 404. Therefore, permits will be required prior to commencement of construction if there will be a discharge of dredged or fill material, even temporarily, into these systems.

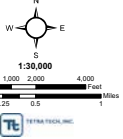
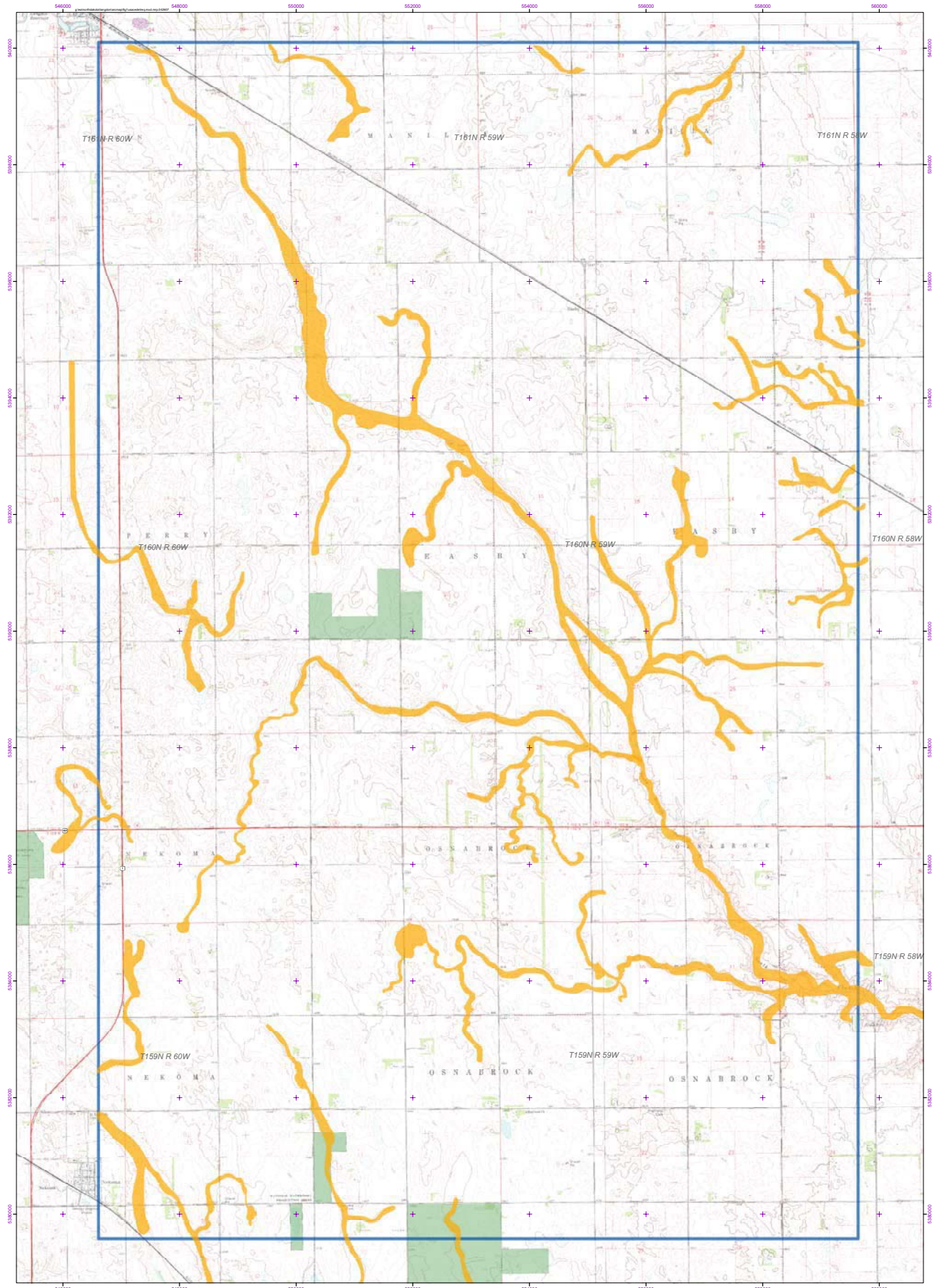
A decent decision by the US Supreme Court in the Rapanos/Carabell cases has brought into questions the Corps' regulatory jurisdiction over certain waters of the United States regulated under Section 404 of the Clean Water Act. At this time we are awaiting guidance from our Headquarters regarding our jurisdiction and hope to have that guidance in the near future. This guidance may change our jurisdictional determination. If you believe our jurisdictional determination is inappropriate in light of the Rapanos/Carabell court decision, you may ask the Corps to reevaluate it once we receive further guidance from our Headquarters.

If you have any questions regarding this letter or our program, please do not hesitate to write me, or **Toni R. Erhardt** of my staff, at the above address, or call us at (701) 255-0015.

Sincerely,

Daniel E. Cimarosti
Regulatory Program Manager
North Dakota

Enclosure



■ Jurisdictional Wetlands
■ Approximate Project Area
■ Langdon WPA-WE_Areas_12-19-08

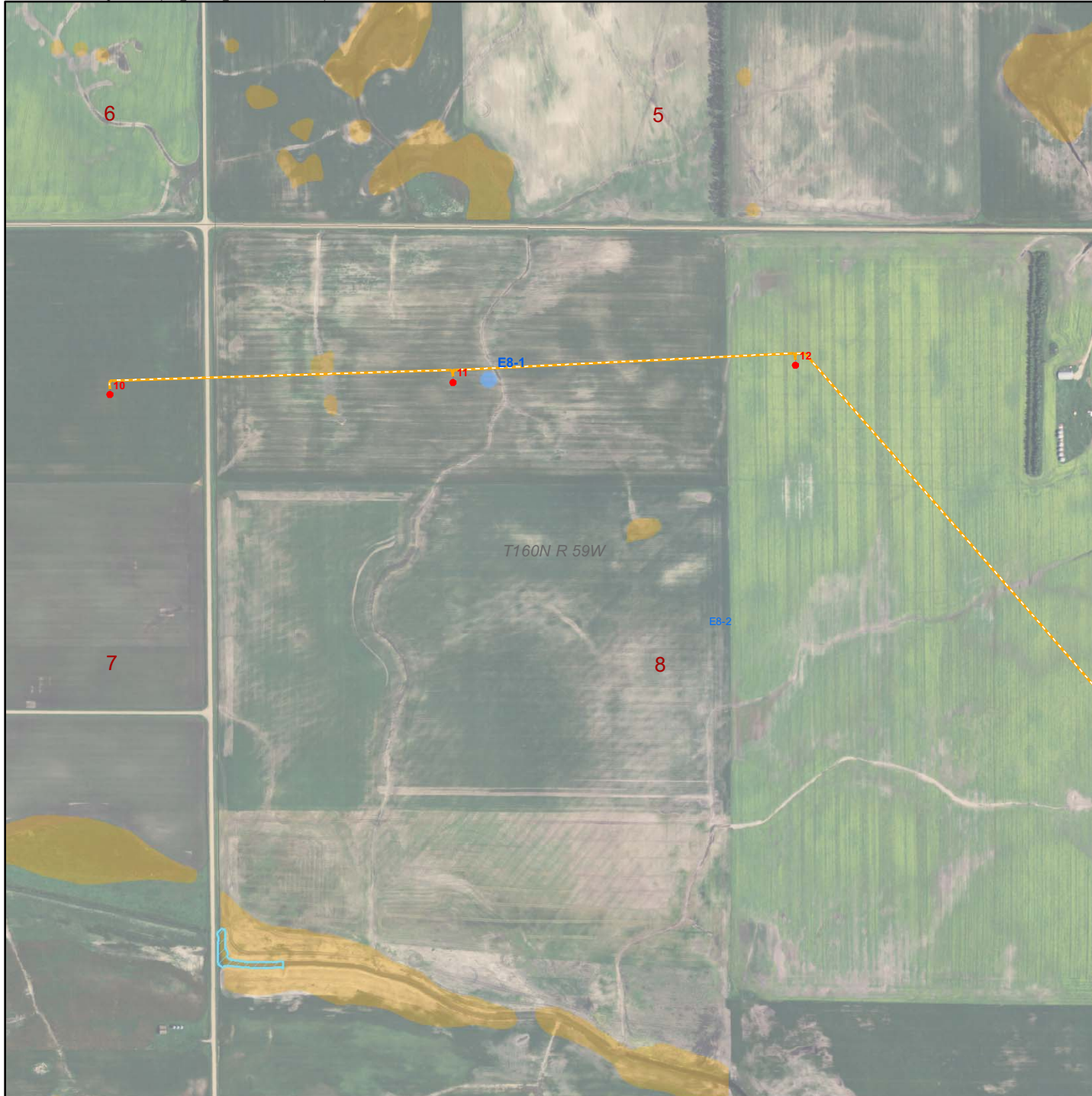
Figure 1
USACE Determination Request
Langdon Wind Energy Center
Cavalier County, North Dakota
















April 2007

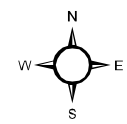
APPENDIX B
SUPPORTING DOCUMENTATION
AERIAL VIEWS OF JURISDICTIONAL CROSSINGS
FIELD DATA SHEETS
SITE PHOTOS

Township 160N, Range 59W (Easby Township)

Location E8-1



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation



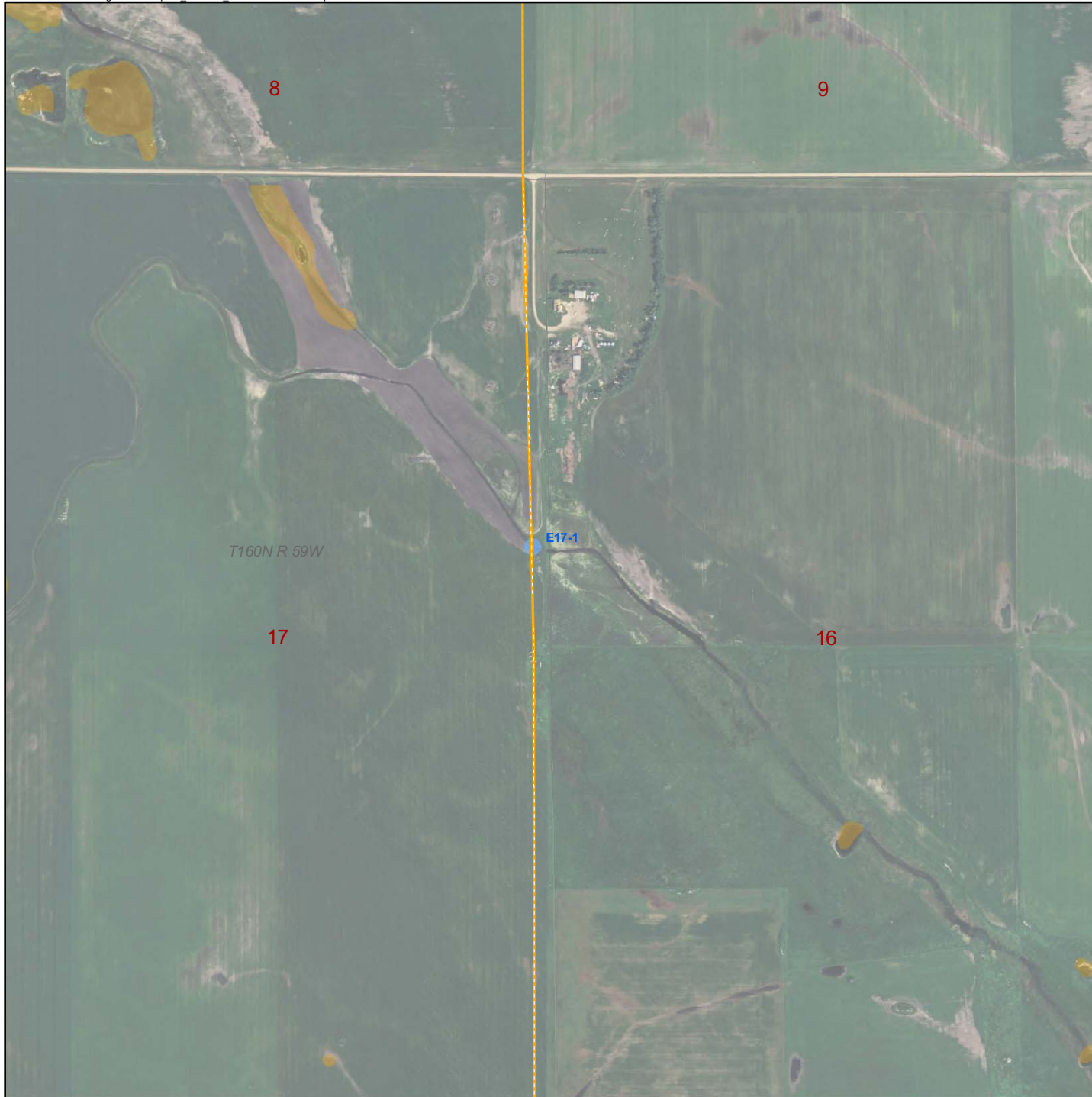
1:9,000


















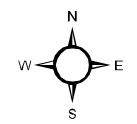
December 2007

Crossing Location
E8-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota

Location E17-1



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation



December 2007

Crossing Location
E17-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota



E17-1a: View facing west – April 26, 2007



E17-1b: View facing west – April 26, 2007

Project/Site: Langdon Wind Farm	Date: 4/26/2007	
Applicant/Owner: FPL	County: Cavalier	
Investigator(s): GCD	State: North Dakota	

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Community ID:	E17-1
Is the site significantly disturbed (Atypical Situation)?	Yes	<input checked="" type="radio"/> No	Transect ID:	T1
Is the area a potential Problem Area?	Yes	<input checked="" type="radio"/> No	Plot ID:	a

(If needed, explain on reverse).

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Salix nigra</i>	S	OBL	11			
2 <i>Phalaris arundinacea</i>	H	FACW+	12			
3 <i>Carex sp.</i>	H	FACW	13			
4 <i>Salix nigra</i>	T	OBL	14			
5 _____	_____	_____	15			
6 _____	_____	_____	16			
7 _____	_____	_____	17			
8 _____	_____	_____	18			
9 _____	_____	_____	19			
10 _____	_____	_____	20			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100 %

Remarks:

HYDROLOGY

<p><input checked="" type="checkbox"/> Recorded Data (Describe in Remarks):</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p><input checked="" type="checkbox"/> Aerial Photographs</p> <p>_____ Other</p> <p>_____ No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input checked="" type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water Marks</p> <p><input checked="" type="checkbox"/> Drift Lines</p> <p><input checked="" type="checkbox"/> Sediment Deposits</p> <p><input checked="" type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
---	---

Field Observations:

Depth of Surface Water: 14 (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Remarks:

SOILS

Map Unit Name (Series and Phase): <u>See attached North Dakota Professional Soil Classifier data sheet</u>	Drainage Class: _____
Taxonomy (Subgroup): _____	Field Observations Confirm Mapped Type? Yes No

Profile Description:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc. <u>mucky loam</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators: <input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
---	--	--

USDA Hydric Soils Field Indicator:
Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes	No	(Circle)
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes	No	Is This Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes NO
Hydric Soils Present?	<input checked="" type="radio"/> Yes	No	
Remarks:			

Project/Site: Langdon Wind Farm	Date: 4/26/2007
Applicant/Owner: FPL	County: Cavalier
Investigator(s): GCD	State: North Dakota

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Community ID:	E17-1
Is the site significantly disturbed (Atypical Situation)?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Transect ID:	T1
Is the area a potential Problem Area?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Plot ID:	b

(If needed, explain on reverse).

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Salix nigra</i>	S	OBL	11			
2 <i>Phalaris arundinacea</i>	H	FACW+	12			
3 <i>Schedonorus phoenix</i>	H	FACU+	13			
4 <i>Bromus interminus</i>	H	NI	14			
5 _____	_____	_____	15			
6 _____	_____	_____	16			
7 _____	_____	_____	17			
8 _____	_____	_____	18			
9 _____	_____	_____	19			
10 _____	_____	_____	20			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 50 %

Remarks:

HYDROLOGY

<p><input checked="" type="checkbox"/> Recorded Data (Describe in Remarks):</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p><input checked="" type="checkbox"/> Aerial Photographs</p> <p>_____ Other</p> <p>_____ No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
---	---

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: >16 (in.)

Depth to Saturated Soil: >16 (in.)

Remarks:

SOILS

Map Unit Name (Series and Phase): <u>See attached North Dakota Professional Soil Classifier data sheet</u>	Drainage Class: _____ Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup): _____	

Profile Description:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc. <u>mucky loam</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

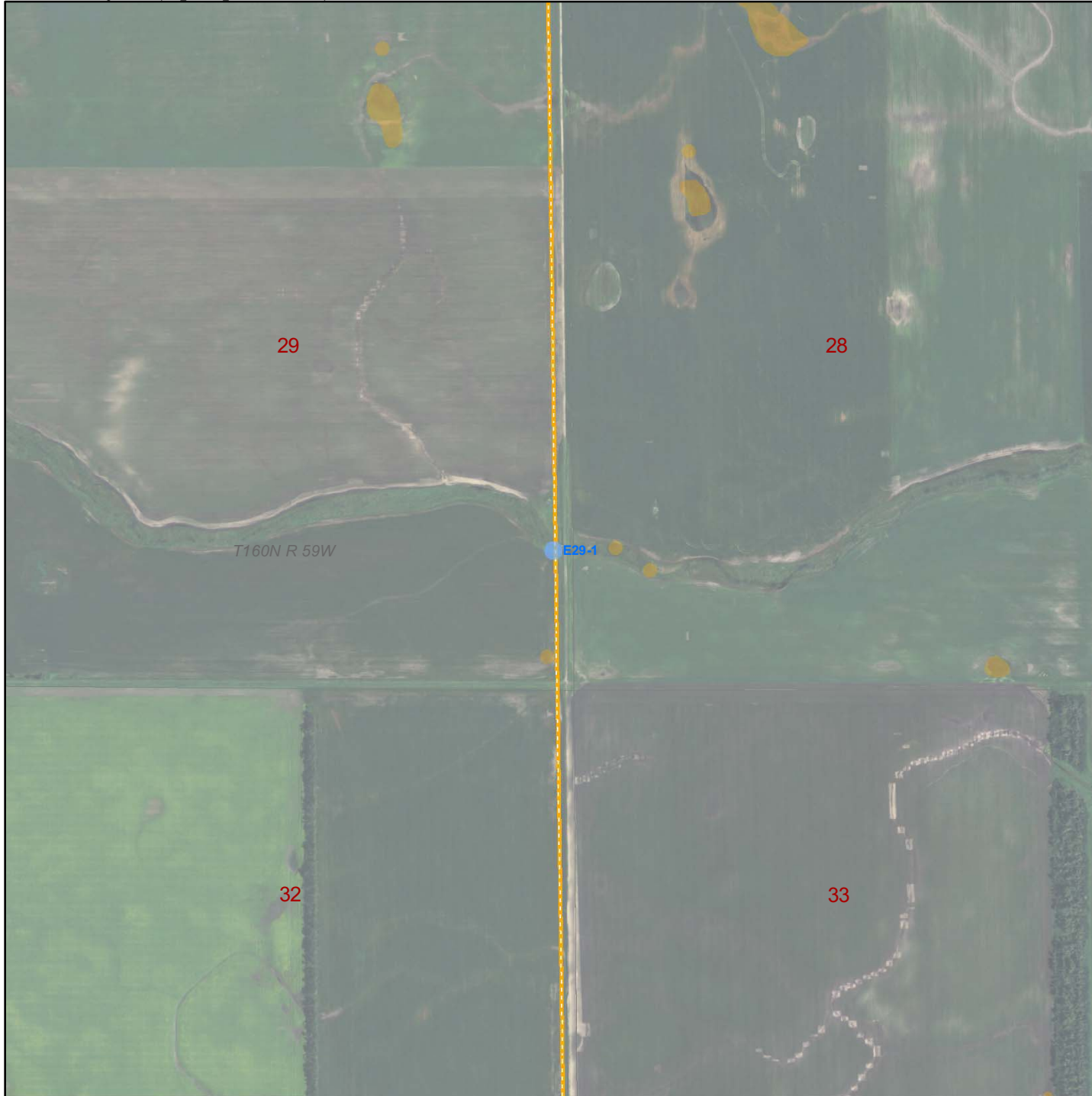
Hydric Soil Indicators: <input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
---	--	--
















USDA Hydric Soils Field Indicator: Remarks:
--

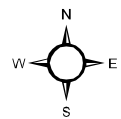
WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes No	(Circle)	
Wetland Hydrology Present? Yes <input checked="" type="radio"/> No	Is This Sampling Point Within a Wetland?	(Circle) Yes <input checked="" type="radio"/> No
Hydric Soils Present? <input checked="" type="radio"/> Yes No		
Remarks:		

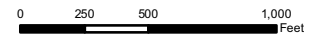
Location E29-1



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation



1:9,000



December 2007

Crossing Locations
E29-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota



E29-1: View facing east - April 26, 2007

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project/Site: Langdon Wind Farm	Date: 4/26/2007
Applicant/Owner: FPL	County: Cavalier
Investigator(s): GCD	State: North Dakota

Do Normal Circumstances exist on the site? Yes No Community ID: **E29-1**

Is the site significantly disturbed (Atypical Situation)? Yes No Transect ID: T1

Is the area a potential Problem Area? Yes No Plot ID: a

(If needed, explain on reverse).

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Typha latifolia</i>	H	OBL	11			
2 <i>Phalaris arundinacea</i>	H	FACW+	12			
3 <i>Bromus interminus</i>	H	NI	13			
4 _____	_____	_____	14			
5 _____	_____	_____	15			
6 _____	_____	_____	16			
7 _____	_____	_____	17			
8 _____	_____	_____	18			
9 _____	_____	_____	19			
10 _____	_____	_____	20			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 66.66 %

Remarks:

HYDROLOGY

<p><input checked="" type="checkbox"/> Recorded Data (Describe in Remarks):</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p><input checked="" type="checkbox"/> Aerial Photographs</p> <p>_____ Other</p> <p>_____ No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input checked="" type="checkbox"/> Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water Marks</p> <p><input checked="" type="checkbox"/> Drift Lines</p> <p><input checked="" type="checkbox"/> Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
---	---

Field Observations:

Depth of Surface Water: 36 (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

SOILS

Map Unit Name _____
 (Series and Phase): See attached North Dakota Professional Soil Classifier data sheet Drainage Class: _____
 Taxonomy (Subgroup): _____ Field Observations
 Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc. mucky loam
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators:

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content in Surface Layer in Sandy Soils
_____ Sulfidic Odor	_____ Organic Streaking in Sandy Soils
_____ Aquic Moisture Regime	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma Colors	_____ Other (Explain in Remarks)

USDA Hydric Soils Field Indicator: _____

Remarks: _____

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	(Circle)	
Wetland Hydrology Present?	(Yes)	No		Is This Sampling Point Within a Wetland? (Circle) Yes NO
Hydric Soils Present?	(Yes)	No		
Remarks: _____				

Project/Site: Langdon Wind Farm	Date: 4/26/2007
Applicant/Owner: FPL	County: Cavalier
Investigator(s): GCD	State: North Dakota

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Community ID: E29-1
Is the site significantly disturbed (Atypical Situation)?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Transect T1
Is the area a potential Problem Area?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Plot ID: b

(If needed, explain on reverse).

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	<i>Hordeum vulgare</i>	H	NI	11			
2	<i>Schedonorus phoenix</i>	H	FACU+	12			
3	<i>Bromus interminus</i>	H	NI	13			
4				14			
5				15			
6				16			
7				17			
8				18			
9				19			
10				20			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 0 %

Remarks:

HYDROLOGY

<p>x _____ Recorded Data (Describe in Remarks):</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p>x _____ Aerial Photographs</p> <p>_____ Other</p> <p>_____ No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
---	---

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: > 20 (in.)

Depth to Saturated Soil: > 20 (in.)

Remarks:

SOILS

Map Unit Name
 (Series and Phase): See attached North Dakota Professional Soil Classifier data sheet Drainage Class: _____
 Field Observations
 Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Size/Contrast	Texture, Concretions, Structure, etc.
_____	_____	_____	_____	_____	<u>mucky loam</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

USDA Hydric Soils Field Indicator:
 Remarks:

WETLAND DETERMINATION

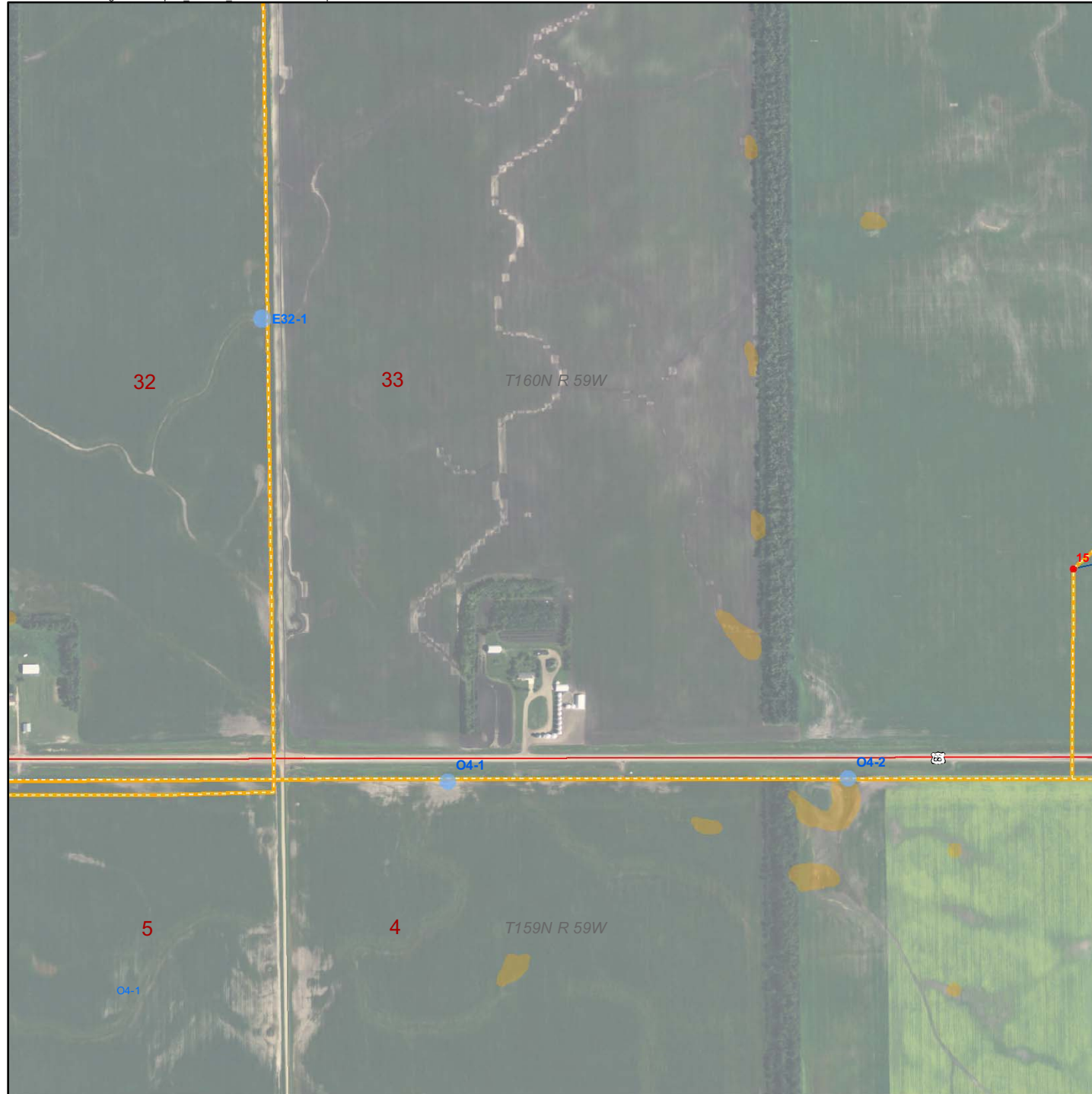
Hydrophytic Vegetation Present? Yes No (Circle)













Wetland Hydrology Present? Yes No (Circle) Is This Sampling Point Within a Wetland? Yes No (Circle)

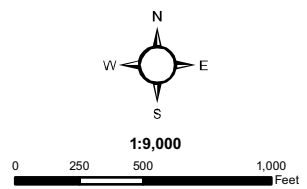
Hydric Soils Present? Yes No

Remarks:

Location E32-1



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation



 TETRA TECH, INC.
December 2007

**Crossing Locations
O4-1, O4-2, E32-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota**



E32-1: View facing east – April 26, 2007

Project/Site: **Langdon Wind Farm** Date: **4/26/2007**
 Applicant/Owner: **FPL** County: **Cavalier**
 Investigator(s): **GCD** State: **North Dakota**

Do Normal Circumstances exist on the site? Yes No Community ID: **E32-1**

Is the site significantly disturbed (Atypical Situation)? Yes No Transect T1

Is the area a potential Problem Area? Yes No No Plot ID: a

(If needed, explain on reverse).

Disturbed by farming/No vegetation present.

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 <i>No Vegetation</i>	_____	_____	11	_____	_____
2 _____	_____	_____	12	_____	_____
3 _____	_____	_____	13	_____	_____
4 _____	_____	_____	14	_____	_____
5 _____	_____	_____	15	_____	_____
6 _____	_____	_____	16	_____	_____
7 _____	_____	_____	17	_____	_____
8 _____	_____	_____	18	_____	_____
9 _____	_____	_____	19	_____	_____
10 _____	_____	_____	20	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) % _____

Remarks: _____

HYDROLOGY

<p>x _____ Recorded Data (Describe in Remarks):</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p>x _____ Aerial Photographs</p> <p>_____ Other</p> <p>_____ No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input checked="" type="checkbox"/> Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water Marks</p> <p><input checked="" type="checkbox"/> Drift Lines</p> <p><input checked="" type="checkbox"/> Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
---	---

Field Observations:

Depth of Surface Water: 12 (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Remarks: _____

SOILS

Map Unit Name
 (Series and Phase): See attached North Dakota Professional Soil Classifier data sheet Drainage Class: _____
 Taxonomy (Subgroup): _____ Field Observations
 Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc. <u>mucky loam</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

USDA Hydric Soils Field Indicator:
 Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)

Wetland Hydrology Present? Yes No Is This Sampling Point Within a Wetland? Yes No (Circle)

Hydric Soils Present? Yes No

Remarks:
 Water of the US.

Project/Site: **Langdon Wind Farm** Date: **4/26/2007**
 Applicant/Owner: **FPL** County: **Cavalier**
 Investigator(s): **GCD** State: **North Dakota**

Do Normal Circumstances exist on the site? Yes No Community ID: **E32-1**
 Is the site significantly disturbed (Atypical Situation)? Yes No Transect T1
 Is the area a potential Problem Area? Yes No Plot ID: b

(If needed, explain on reverse).
 Disturbed by farming/No vegetation present.

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Hordeum vulgare</i>	H	NI	11			
2 <i>Bromus interminus</i>	H	NI	12			
3			13			
4			14			
5			15			
6			16			
7			17			
8			18			
9			19			
10			20			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 0 %

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
 _____ Stream, Lake, or Tide Gauge
 Aerial Photographs
 _____ Other
 _____ No Recorded Data Available

Wetland Hydrology Indicators:
 Primary Indicators:
 _____ Inundated
 _____ Saturated in Upper 12 Inches
 _____ Water Marks
 _____ Drift Lines
 _____ Sediment Deposits
 _____ Drainage Patterns in Wetlands
 Secondary Indicators (2 or more required):
 _____ Oxidized Root Channels in Upper 12 Inches
 _____ Water-Stained Leaves
 _____ Local Soil Survey Data
 _____ FAC-Neutral Test
 _____ Other (Explain in Remarks)

Field Observations:
 Depth of Surface Water: 0 (in.)
 Depth to Free Water in Pit: >16 (in.)
 Depth to Saturated Soil: >16 (in.)
 Remarks:

SOILS

Map Unit Name
 (Series and Phase): See attached North Dakota Professional Soil Classifier data sheet Drainage Class: _____
 Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
_____	_____	_____	_____	_____	<u>mucky loam</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

USDA Hydric Soils Field Indicator:
 Remarks: _____

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)

Wetland Hydrology Present? Yes No Is This Sampling Point Within a Wetland? Yes No (Circle)

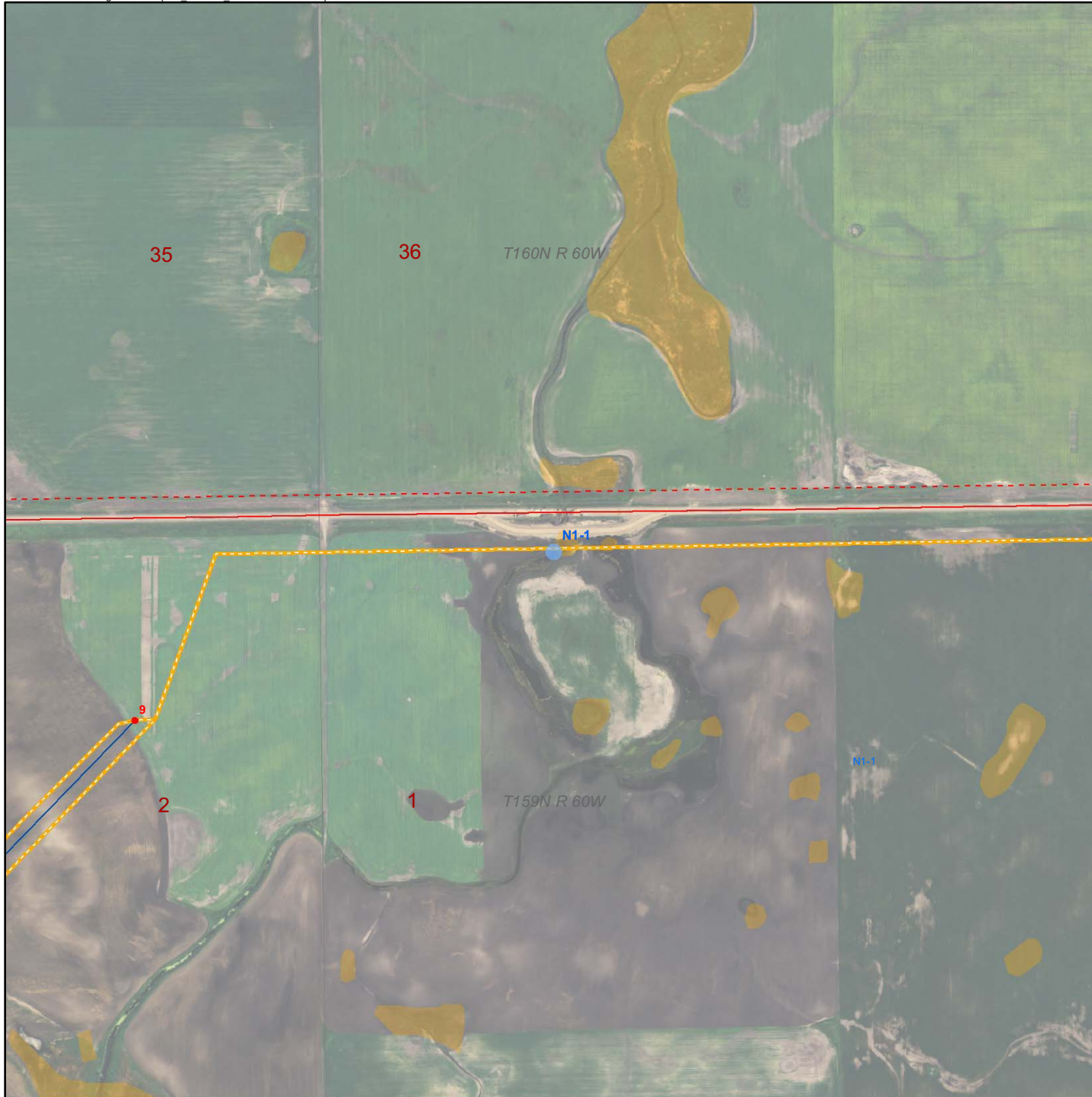
Hydric Soils Present? Yes No
















Remarks: _____

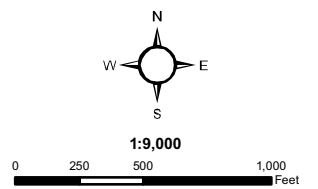
Water of the US. Jurisdictional per USACE.

Township 159N, Range 60W (Nekoma Township)

Location NI-1



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation

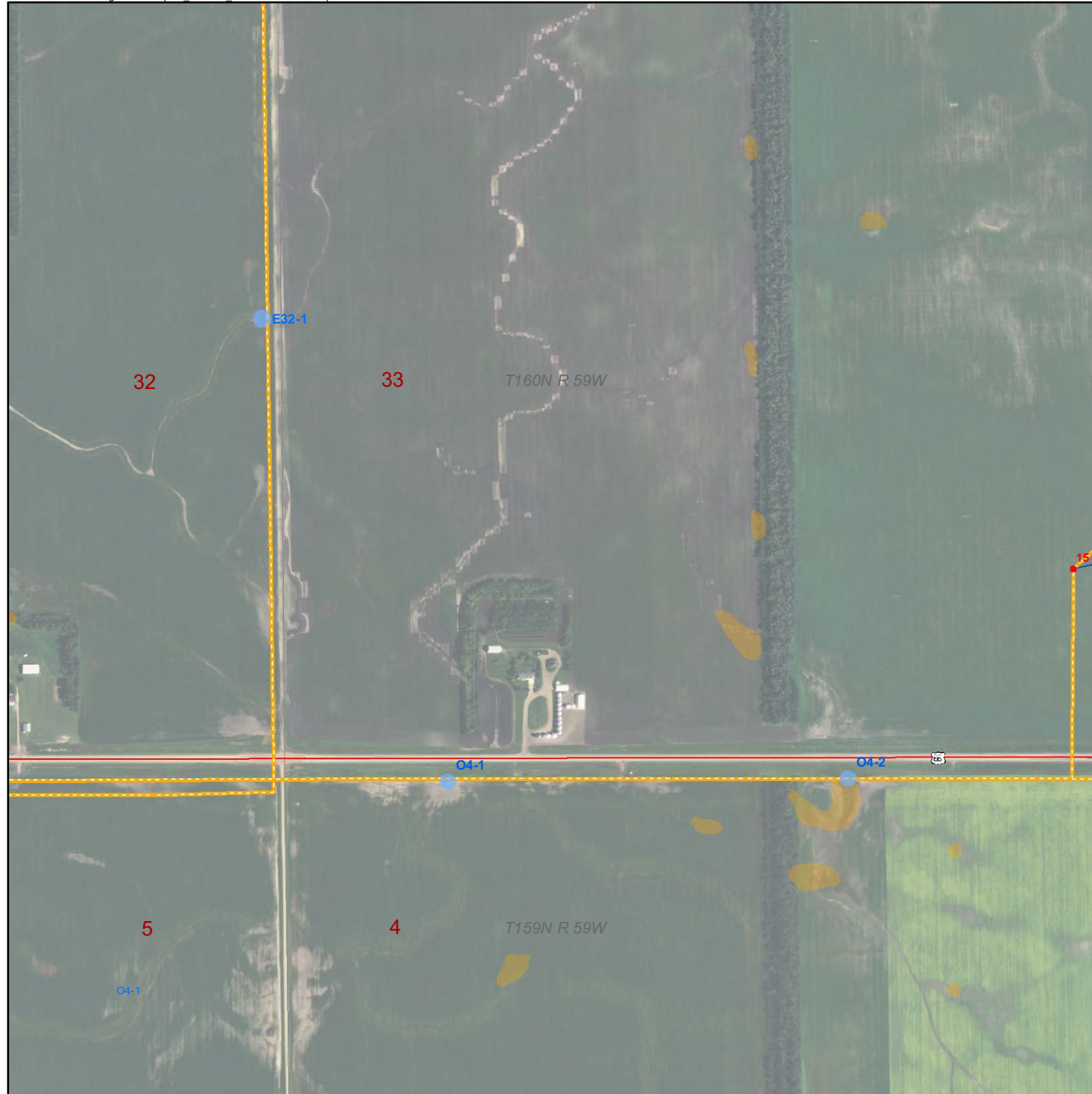

















 TETRA TECH, INC.
December 2007

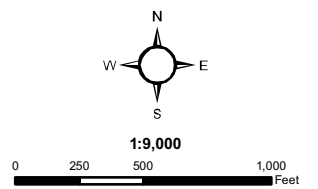
Crossing Locations
N1-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota

Township 159N, Range 59W (Osnabrock Township)

Location O4-1 and O4-2



-  Project Area Boundary
-  Waterfowl Production Area
-  NWI Wetland
-  State Highway
-  Local Road
-  Railroad
-  Crossing Location
-  GPS Wetland Area
-  Turbine Location
-  MET Tower Location
-  Underground Collector
-  Access Road
-  Transmission Line
-  Fiber Optic Cable
-  Substation



 TETRA TECH, INC.
December 2007

Crossing Locations
O4-1, O4-2, E32-1
Langdon Wind Energy Center Phase II
Cavalier County, North Dakota

APPENDIX C
TERMINOLOGY AND DEFINITIONS

APPENDIX C TERMINOLOGY AND DEFINITIONS

HYDROPHYTIC VEGETATION

Hydrophytic vegetation is plant life growing in water (or on a substrate) which is periodically deficient in oxygen as a result of excess water content. Each plant species is assigned an indicator category, which reflects the estimated possibilities of a species occurring in a wetland verses a non-wetland. Indicator categories are described as follows:

Obligate Wetland (OBG): Species, which occur almost always (estimated probability >99%) under natural conditions in wetlands.

Facultative Wetland (FACW): Species, which usually occur in wetlands (estimated probability 67-99%) but occasionally found in non-wetlands.

Facultative (FAC): Species equally likely to occur in wetlands or non-wetlands (estimated probability 34-67%).

Facultative Upland (FACU): Species which usually occur in non-wetlands (estimated probability 67-99%), but are occasionally found in wetlands (estimated probability 1-33%).

Obligate Upland (UPL): Species which occur in wetlands in another region, but occur almost always (estimated Probability >99%) under natural conditions in non-wetlands in the region specified (Reed, 1988).

A positive (+) or a negative (-) sign is often applied to the FAC indicator Category. A positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), while a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands). For the hydrophytic vegetation criteria to be met, more than 50% of the dominant plant species in any given vegetation plot must be OBL, FACW or FAC (Reed, 1988).

HYDRIC SOILS

A hydric soil is a soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the A horizon (USDA, 1991). Soil color is strongly influenced by the frequency and duration of soil saturation. Soil matrix refers to the portion of a given soil layer that has the predominant color, while mottling refers to marked spots within the soil which have contrasting colors, usually indicating a fluctuating water table.

Based on the above definition, the National Technical Committee for Hydric Soils developed the following criteria for hydric soils:

- A) All Histols (except Folists).
- B) Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:
 - I. Somewhat poorly drained and have a water table of less than 0.5 feet from the surface for a significant period during the growing season, or

2. Poorly drained or very poorly drained and have either:
 - (a) A water table at less than 1.0 feet from the surface for a significant period during the growing season if permeability is equal to or greater than 6.0 inches per hour (in/hr) in all layers within 20 inches; or
 - (b) A water table less than 1.5 feet from the surface for a significant period during the growing season if permeability is less than 6.0 in/hr in any layer within 20 inches; or
3. Soils that are ponded for long or very long duration during the growing season; or
4. Soils that are frequently flooded for long duration or very slow duration during the growing season.

Several field indicators are available for determining whether a given soil meets the definition and criteria for hydric soil and include: Organic soils (Histols) histic epipedons, sulfidic material, aquic or peraquic moisture regime, reducing soil conditions, soil color, soil appearing on the hydric soils list and iron/manganese concretions. Indicators are listed in order of decreasing reliability (USDA, 1991).

HYDROLOGY

Hydrology is the science dealing with the properties, distribution and circulation of water (Brooks, et. al., 19910). The term “wetland hydrology” encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Numerous factors including precipitation, stratigraphy, topography, soil permeability and plant cover influence the wetness of an area.

Hydrology is often the least exact of the parameters, and indicators of wetland hydrology are sometimes difficult to find in the field. Methods for determining hydrologic indicators can be categorized according to the type of indicator: recorded or field data.

Indicators of recorded data include: COE offices USGS, state, county and local agencies and planning documents of developers. Indicators of field data include: visual observation of inundation, visual observation of soil saturation (usually within 12 inches of the surface), water marks on woody vegetation, drift lines found adjacent to streams and other sources of water flow, sediment deposits on plants and other vertical objects and drainage patterns within wetlands. All indicators are listed in order of decreasing reliability.