Paulding Wind Farm IV LLC
Case No. 18-91-EL-BGN

Application Part 7 of 11

Part 7 includes:

- **Exhibit M Water Delineation Report (Part 1 of 2)**

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Exhibit M

Wetland Delineation Report

- **Appendix A – Photolog**
- **Appendix B – Wetland Map**
- **Appendix C – Wetland Forms**
- **Appendix D – Stream Assessment Forms**

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Surface Water Delineation Report

EDP Renewables, LLC
Timber Road IV Wind Project

E317505400

Cardno®

Document Information

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Acronyms

CFR	Code of Federal Regulations
CWA	Clean Water Act
DBH	diameter at breast height
DOW	Division of Wildlife
EDPR	EDP Renewables, LLC
EW	exceptional warm water habitat
FAC	Facultative Plants
FACU	Facultative Upland Plants
FACW	Facultative Wetland Plants
FLS	federally listed species
GIS	Geographic Information Systems
GPS	Global Positioning System
HDD	horizontal directional drilling
HUC	Hydrologic Unit Code
JD	Jurisdictional Determination
MBTA	Migratory Bird Treaty Act
MW	megawatt
MWH	modified warm water habitat
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OAC	Ohio Administrative Code
OBL	Obligate Wetland Plants
ODNR	Ohio Division of Natural Resources
OEPA	Ohio Environmental Protection Agency
OHWM	Ordinary High Water Mark
OWI	Ohio Wetland Inventory
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Project	Timber Road IV Wind Farm Project
RTE	rare, threatened, or endangered
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditionally Navigable Waters

TOB	Top-of-Bank
UPL	Obligate Upland Plants
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the U.S.
WWH	warm water habitat

1 Introduction

Paulding Wind Farm IV Wind, LLC, an affiliate of EDP Renewables, LLC (EDPR), is proposing to construct the Timber Road IV Wind Farm (Project) near Payne, Ohio, which is located approximately 20 miles east of Fort Wayne, Indiana. The Project is proposed as a 125.1 megawatt (MW) wind facility within an area of approximately 1,459 acres (6.1 square miles) on leased private lands (Project Corridor). The Project Corridor is located in Crane, Harrison, Paulding, Benton and Blue Creek Townships, within Paulding County, Ohio. Figure 1.1 shows an overview of the proposed Project Corridor.

In support of Project planning, Cardno conducted a field delineation survey to identify surface waters within the Project Corridor. Surface waters are regulated under the Clean Water Act (CWA), under jurisdiction of either the state or federal government. Cardno identified potentially jurisdictional Waters of the U.S. (WOTUS), including Traditionally Navigable Waters (TNW), their tributaries, and non-isolated wetlands, which are regulated under the jurisdiction of the State of Ohio and the U.S. Army Corps of Engineers (USACE) in accordance with Section 401/404 of the CWA. Cardno also identified waterbodies and isolated wetlands that do not have a significant nexus to a TNW, which are considered waters of Ohio (as defined under Ohio Administrative Code [OAC] Rule 3745-1-02(b)(77)[1]) and are regulated by the Ohio Environmental Protection Agency's (OEPA) Isolated Wetlands Permitting Program.

Cardno's field efforts focused on accessible areas within the Project Corridor, totaling approximately 1,459 acres. The Project Corridor includes proposed locations of Project components such as wind turbines, private access roads, buried collection lines, a Project substation, and temporary equipment laydown areas. The Project Corridor includes 100-feet on either side of Project components.

Prior to field surveys, Cardno conducted a desktop review of the Project Corridor to identify and classify potential environmental resources and create field maps for use during the field survey. This report outlines the methodologies and results for both the desktop review and the field survey (Sections 2 and 3). Section 4 presents the conclusions of the delineation and site survey, and Section 5 provides a list of references cited in this report. This report is also accompanied by several appendices as listed in the table of contents.

[1] OEPA 2017

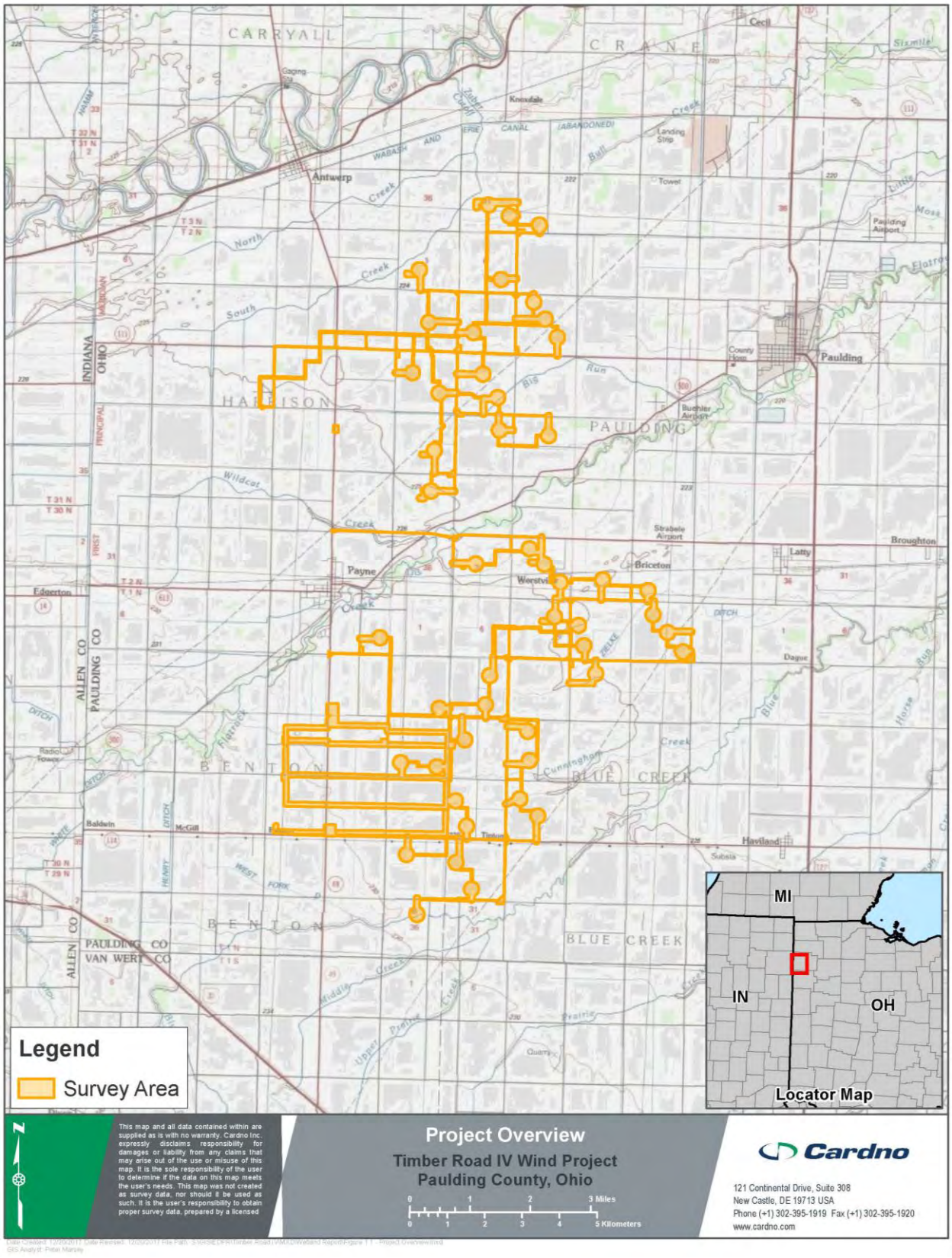

Figure 1.1 Overview of Timber Road IV Wind Farm in Paulding County, Ohio

2 Desktop Assessment

Prior to field surveys, Cardno conducted a desktop review of the Project Corridor using publically available Geographic Information Systems (GIS) data to identify and classify potential surface water features and create field maps for use during survey. Sources of this reference material included, but were not limited to: the National Land Cover Database (NLCD); the U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Soil Survey for Paulding County; historic aerial photographs; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps; U.S. Geological Survey (USGS) topographic maps; the USGS National Hydrography Dataset (NHD); and the Ohio Wetland Inventory (OWI).

Multiple sources were reviewed prior to field investigations to identify potential resources as part of a preliminary desktop review. The findings of the desktop review were also verified during the field surveys.

2.1 National Land Cover Database Review

Based on a review of available aerial imagery, the Project Corridor appeared to be largely dominated by cultivated crop areas. Review of the 2011 NLCD (Homer et al. 2015) confirmed this assessment, which showed that cultivated crops accounted for approximately 91 percent of the total acreage in the Project Corridor. The second most prominent land use within the Project Corridor was classified as Developed/Open Space areas for approximately eight percent of the acreage, followed by Developed, Low Intensity for one percent. All other land use types identified made up one percent or less of the total acreage in the Project Corridor. A summary is provided in Table 2-1 below.

Table 2-1 Land Use within the Project Corridor

Type	Project Corridor (acres)	Project Corridor (%)
Cultivated Crops	1,327.04	91%
Developed, Open Space	111.74	8%
Developed, Low Intensity	14.50	1%
Deciduous Forest	2.40	< 1%
Grassland/Herbaceous	2.37	< 1%
Shrub/Scrub	0.52	< 1%
Developed, Medium Intensity	0.42	< 1%
Developed, High Intensity	0.01	< 1%
TOTAL	**1,459**	**100%**

Source: Compiled from NLCD 2011, amended 2014

The field team observed that the land use in the Project Corridor closely matched the remote land use data described above.

2.2 Geology

The Project is located within the Central Lowland Physiographic Region of Ohio, and in particular the Maumee Lake Plains and Paulding Clay Basin Region. The Maumee Lake Plains is composed of Pleistocene-age silt, clay and wave-planed clayey till over Silurian and Devonian-age carbonate rocks and shales. Characteristically, this region has beach ridges, bars, dunes, deltas and clay flats. Elevations range from 570 to 800 feet with very low relief. The Paulding Clay Basin is composed of Pleistocene-age lacustrine clay over clay till and Silurian-age dolomites. Characteristically, this area is a flat lacustrine plain with a low-gradient. There are meandering streams throughout and easily ponded soils, with elevations ranging from 700 to 725 feet with extremely low relief (ODNR 1998[2]).

2.3 Soils

Cardno reviewed soil types for the Project Corridor using the Web Soil Survey, an application of the NRCS (USDA-NRCS 2017). Presented in Table 2-2 below, there were eight soil types identified, but no fully hydric (Hydric Rating of 100) soils were identified in the Project Corridor. The poor draining qualities of hydric soils combined with local flat or bowl-shaped topography can make locations predisposed to wetlands.

Table 2-2 Soil Types within the Project Corridor

Soil Symbol	Map Unit Description	Hydric Rating	Acreage	Project Corridor (%)
Lc	Latty silty clay, till substratum, 0 to 1 percent slopes	87	658.49	45%
HtA	Hoytville silty clay, 0 to 1 percent slopes	90	636.03	44%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	10	67.08	5%
Pc	Paulding clay, 0 to 1 percent slopes	95	61.72	4%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	90	23.55	2%
Lb	Latty silty clay loam	90	7.20	< 1%
Uc	Udorthents, clayey, hilly	6	4.75	< 1%
Sb	Saranac silty clay loam, occasionally flooded	90	0.19	< 1%
		TOTAL	**1,459.01**	**100%**

Source: Compiled from NLCD 2011, amended 2014

2.4 Navigable Waters

The Project Corridor is located within the Auglaize River Drainage Basin (Hydrologic Unit Code (HUC)-8) which flows into Lake Erie via the Maumee River. No navigable waterways occur in the Project Corridor. However, tributaries to the Maumee River (which is a navigable waterway from the mouth at Lake Erie to the Hosey Dam in Fort Wayne, Indiana) are located within the Project Corridor. Tributaries to the Maumee River in the Project Corridor include: Big Run, Blue Creek, Cunningham Creek, Flatrock Creek, Little Flatrock Creek, Sixmile Creek, Wildcat Creek, and Zuber cutoff.

[2] http://geosurvey.ohiodnr.gov/portals/geosurvey/PDFs/Misc_State_Maps&Pubs/physio.pdf

2.5 Remote Wetland and Waterbody Identification

Prior to site investigations, the Project Corridor was screened using the USFWS NWI and USGS NHD remote data for potential wetlands and waterbodies in the vicinity of the Project. The NWI data shows remotely identified wetlands, based on aerial imagery interpretation and soil surveys, while the NHD uses digital stream information to identify potential waterways.

Multiple waterbodies and few wetlands were identified within the Project Corridor, with additional streams and wetlands occurring in the vicinity of the Project Corridor. The majority of the waterbodies remotely identified appeared to be roadside and agricultural ditches. Most of the wetlands identified by Ohio Division of Natural Resources (ODNR) occurred in crop areas or wood lots.

2.6 Desktop Review Summary

The desktop review indicated potential for wetlands to be located in multiple crop areas and forested areas within the Project Corridor. The area also included a number of ditches and streams that ran between crop areas or along the roadside, which may or may not still be present. It is not uncommon for the NHD to indicate features that no longer exist due to landowners rerouting the channel or moving it underground via tiles. The vast majority of the Project Corridor, however, is cultivated crop area that limits the development of wetlands. The remotely identified features and land use information was expected given the region's heavy, historic manipulation of land use to accommodate and maintain farming operations.

3 Field Delineation Surveys

The following is a discussion of the methodologies and results of field surveys conducted in the winter of 2017 and spring of 2018 within the Project Corridor. Climatic conditions were considered normal during the survey period. Appendix A contains representative photographic documentation of the delineated wetland and waterbody features. Appendix B contains maps depicting the delineated wetlands and waterbodies. Appendix C contains the completed routine wetland data and Ohio Rapid Assessment Methodology (ORAM) assessment forms from the field efforts, and Appendix D contains the completed Headwater Habitat Evaluation Index (HEII) stream assessment forms.

3.1 Field Delineation Methodologies

Surveys were conducted in November and December 2017 and March, May and June 2018 within the approximately 1,459 acres of the Project Corridor to determine the extent of surface waters in accordance with applicable Federal and State regulations and guidelines. Surveyed areas did not include contiguous woodlots unless it was expected that infrastructure would cross through them, because these features would be avoiding during construction and operation of the Project. A Trimble® Global Positioning System (GPS) with sub-meter accuracy was used to collect data points for mapping. As wetland and waterbody point features were collected, they were assigned a FEATURE_ID with the format of:

FF-XXX-YY

Where: FF = Feature Type,

- WB – Waterbodies
- WL – Wetlands

XXX = Three-digit number as the unique identifier, and

YY = Flag number per each unique feature identified.

The information collected in the field was post-processed in the office using ARC GIS and verified by the field team for accuracy. If a feature continued outside of the Project Corridor, it was noted by the field teams.

3.1.1 Wetland Delineation Methodologies

Wetland delineations were conducted according to the 1987 USACE *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the applicable regional supplements; *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)* (USACE 2012). Together, these documents are referred to as the "Manual." The methodology outlined in the Manual requires the area being evaluated to meet the three wetland criteria in order for a wetland to be present; 1) dominance of hydrophytic vegetation, 2) hydric soils, and 3) sufficient hydrology.

Sampling points were taken at each suspected wetland, within the wetland and in an adjacent upland area. At each sampling point, Cardno:

- recorded location using GPS equipment;
- completed routine wetland determination forms in the wetland and upland area, including:
  - evaluating sampling points for dominance of hydrophytic vegetation;
  - evaluating soils for evidence of hydric conditions;
  - evaluating presence of indicators of wetland hydrology;

- recorded habitat notes for narrative descriptions and use in ORAM; and
- documented the feature's current conditions with photos.

The boundaries of each wetland were recorded by GPS at intervals to accurately capture changes in profile. Physical flagging was hung along the wetland boundary in areas that would not interfere with farming and livestock operations or disturb private landowners.

3.1.1.1 Hydrophytic Vegetation Criterion

The hydrophytic vegetation criterion is met when more than 50 percent of the dominant plant community is hydrophytic, as determined by species dominance and the assigned species-specific indicator status of the identified species. The National Wetland Plant List (NWPL) is a list of wetland plants and their assigned indicator statuses. An indicator status reflects the likelihood that a particular plant occurs in a wetland or nonwetland. Table 3-1 shows the indicator status categories for plants.

Table 3-1 Plant Indicator Categories

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	OBL	Plants that occur almost always (estimated probability > 99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1 percent) in nonwetlands.
Facultative Wetland Plants	FACW	Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands, but also occur (estimated probability 1 percent to 33 percent) in nonwetlands.
Facultative Plants	FAC	Plants with a similar likelihood (estimated probability 33 percent to 67 percent) of occurring in both wetlands and nonwetlands.
Facultative Upland Plants	FACU	Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in nonwetlands.
Obligate Upland Plants	UPL	Plants that occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in nonwetlands under natural conditions.

The Northcentral/Northeast regional supplement evaluates vegetation in four different stratums, including tree, sapling/shrub, herbaceous, or woody vine. The tree stratum includes all woody plants with a diameter at breast height (DBH) of more than 3 inches. The sapling/shrub stratum includes all woody vegetation with a DBH less than 3 inches and greater than 1 meter tall. The herbaceous stratum includes all herbaceous/non-woody plants and woody plants less than 1 meter tall. The woody vine stratum includes all the woody vines greater than 1 meter in height. Typically the vegetation in each stratum is evaluated within a uniform plot size at each sampling point. The plots are often nested, so that all trees and vines within a 30-foot radius are evaluated, then all sapling/shrubs within a 15-foot radius, and then all herbaceous plants within a 5-foot radius of the sampling point. The plot size and dimensions can be altered as needed. For example, if a wetland is identified as rectangular, the plots can be rectangular as well and of varying sizes for each of the stratum.

Dominant vegetation was assessed for hydrophytic preference. After identifying the plant species present within the sampling point of a potential wetland, the dominance and indicator status for each identified unique species was determined. Based on the results, the vegetation community being evaluated was determined to be indicative of either a wetland or nonwetland.

If the site is dominated by hydrophytic vegetation (OBL or FACW) only, then the site meets the criteria for the rapid test for hydrophytic vegetation. However, if the dominant vegetation is a mix of species and indicators, then a more detailed analysis of the dominance can be completed on the wetland determination data form. The dominance test is simply the number of dominant species that are rated as OBL, FACW, or FAC divided by the total number of dominant species. If the dominance test result is greater than 50 percent, then the hydrophytic vegetation criteria is met.

Additional methods can be used on the wetland determination form for areas where a suspected wetland has hydric soils and hydrology but fails the dominance test. Cardno utilized one such evaluation method that involves calculating a prevalence index which weights the coverage of a particular class of species (using its wetland indicator status) against the total coverage within the sampling area. If a sampling area passes this test (which requires the value to be less than or equal to 3), it can be considered a wetland. Cardno also noted the presence of morphological adaptations, which can include root buttressing, shallow roots, or multi-stemmed trunks. The presence of such adaptations is considered evidence that the plants (even FACU species) have adapted to survive in prolonged inundation or root saturation.

In rare instances, another method for identifying hydrophytic vegetation is to report "Problematic Hydrophytic Vegetation." This method is used sparingly, and reflects the delineator's opinion that conditions outside of those considered normal may be present, such as vegetation being bent or damaged to such a degree that identification to species level is impracticable. Damage to vegetation may be the result of recent severe weather, unseasonably cold conditions, or habitat destruction. Under this method, the vegetation present would be treated as consistent with a wetland, but the vegetation could not be reliably identified. This method was not used during the delineations for this Project.

3.1.1.2 Hydric Soils Criterion

The hydric soils criterion is met when the soils demonstrate characteristics representative of soils in reducing (hydric) conditions. Field teams dig small test pits to evaluate the upper 12 to 16 inches of soil (or to a depth until refusal, bedrock, or large debris preventing further digging). Cardno evaluates if the soils fall within the hydric ranges on the Munsell Color Chart, examine soil profiles for other evidence of reducing conditions, and/or observe other indicators of anaerobic activity per the Manual. Under certain conditions, hydric soils can be assumed to be present without testing, including when a sampling point is dominated by hydrophytic vegetation (i.e., vegetation rated OBL or FACW) and obvious wetland hydrology is present, such as direct observation of surface water or saturated soils.

3.1.1.3 Hydrology Criterion

The hydrology criterion is met when sufficient hydrologic indicators are present. The indicators must be representative of sufficient saturation or inundation occurring over the growing season sufficient to support a hydrophytic plant-dominated vegetative community. The Manual categorizes the wetland hydrology indicators into four groups which document different types of hydrologic observations:

- Group A indicators are based on direct observation of surface or ground water;
- Group B indicators identify the site as having evidence of potential flooding or ponding despite a lack of inundation at the time of a site visit;
- Group C indicators document evidence of soil saturation, either recent or current; and
- Group D indicators consist of landscape, soil, and vegetation features identifying contemporary wet conditions.

Each of the groups is further identified as either a primary or a secondary indicator for each group. Identification as primary or secondary is based on estimated reliability of an indicator to accurately identify wetland conditions, and can vary by region. In all regions, a single primary indicator is needed to identify the presence of wetland hydrology, or at least two secondary indicators.

Regional indicators and their status as primary or secondary are identified in Table 3-2. If an indicator does not have an 'X' for a region, then it is not applicable to that area.

Table 3-2 Hydrology Indicators and Regional Manual Status

Type of Indicator	Primary	Secondary
Group A - Observation of Surface Water or Saturate Soils		
▪ A1 - Surface Water	X	
▪ A2 - High Water Table	X	
▪ A3 - Saturation	X	
Group B - Evidence of Recent Inundation		
▪ B1 - Water Marks	X	
▪ B2 - Sediment Deposits	X	
▪ B3 - Drift Deposits	X	
▪ B4 - Algal Mat or Crust	X	
▪ B5 - Iron Deposits	X	
▪ B6 - Surface Soil Cracks		X
▪ B7 - Inundation Visible on Aerial Imagery	X	
▪ B8 - Sparsely Vegetated Concave Surface	X	
▪ B9 - Water-stained Leaves	X	
▪ B10 - Drainage Patterns		X
▪ B13 - Aquatic Fauna	X	
▪ B15 - Marl Deposits	X	
▪ B16 - Moss Trim Lines		X
Group C - Evidence of Current or Recent Soil Saturation		
▪ C1 - Hydrogen Sulfide Odor	X	
▪ C2 - Dry-season Water Table		X
▪ C3 - Oxidized Rhizospheres Along Living Roots	X	
▪ C4 - Presence of Reduced Iron	X	
▪ C6 - Recent Iron Reduction in Tilled Soils	X	
▪ C7 - Think Much Surface	X	
▪ C8 - Crayfish Burrows		X
▪ C9 - Saturation Visible on Aerial Imagery		X
Group D - Evidence from Other Site Conditions or Data		
▪ D1 - Stunted or Stressed Plants		X
▪ D2 - Geomorphic Position	X	X
▪ D3 - Shallow Aquitard		X
▪ D5 - FAC-neutral Test	X	X

3.1.2 Ohio Environmental Protection Agency - Ohio Rapid Assessment Methodology

After the field delineations were complete, the identified wetlands were scored using the OEPA's ORAM. The ORAM wetland functional assessment was developed to determine the ecological "quality" and level of function of a particular wetland in order to meet requirements under Section 401 of the CWA. Wetlands are scored on the basis of hydrology, upland buffer, habitat alteration, special wetland communities, and vegetation communities. Each of these subject areas is further divided into sub-categories under ORAM v5.0, resulting in a score that describes the wetland using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance).

Wetlands that receive a score from between 0 to 29.9 are grouped into "Category 1," 30 to 59.9 are "Category 2" and 60 to 100 are "Category 3." Transitional zones exist between "Categories 1 and 2" from 30 to 34.9 and between "Categories 2 and 3" from 60 to 64.9. However, wetland scores that fall into one of these transitional ranges should be assigned to the higher category unless collected data suggests the wetland should be placed in the lower category.

Category 1 consists of wetlands that are often isolated emergent marshes dominated by invasive species (such as cattails), with little or no upland buffers, and which are located in and around active agricultural fields. Category 2 consists of wetlands for which rare, threatened, or endangered species (RTE) and their habitat are absent, but may have well-developed habitat for other more common species. Category 2 wetlands constitute the broad middle category of "good" quality wetlands. A "Modified Category 2" wetland appears to have some signs of degradation but also has the potential to restore some of the lost functionality. Category 3 wetlands are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands that may contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide.

3.1.3 Waterbody Delineation Methodologies

Other surface waters present in the Project Corridor, including streams, ditches, and ponds were also delineated by Cardno field teams. Waterbodies were delineated by taking GPS points along the Ordinary High Water Mark (OHWM) along the course of the channel. The OHWM is defined as the lateral extents over which agencies have regulation, and is defined in the CWA and the Code of Federal Regulations (CFR) as "*The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a 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*" (33 CFR 328.3(e)). The USACE has issued additional regulatory guidance, as a Regulatory Guidance Letter, which identifies physical characteristics which can be used to identify the OHWM in the field, including: shelving, changes in soil character, bed and bank, wracking, or natural line impressed on the bank (USACE 2005).

Measurements including bankfull width (OHWM to OHWM) and Top-of-Bank (TOB) to TOB were also recorded. Photos were taken along the waterbodies to capture the typical conditions. Observational notes about the characteristics of the waterbody (such as flow regime and substrate) were recorded by the field team for use in evaluating the stream quality. Table 3-3 identifies the definitions used in assigning flow categories.

Table 3-3 Waterbody Flow Categories

Flow Category	Definition
Perennial	Flow is continuous and likely permanent across the seasons (although it may vary). Such flow can be surface based or occur as interstitial flow, which would include the flow driving underground for a portion of the channel.
Intermittent	Flow is present during extended periods of time during some seasons, but gradually returns to a state of isolated pools in the channel or a dry channel. There may be indications of subsurface flow.
Ephemeral	Flow is often not present during the majority of the year, and only occurs after a precipitation event. Channels of ephemeral streams will be dry with no evidence of isolated pools of water.

3.1.4 Headwater Habitat Evaluation Index Assessments

All flowing streams and ditches, but not ponds delineated in the Project Corridor were assessed using the HHEI. The HHEI allows for uniform scoring of various waterbodies using a standard methodology that identifies pertinent information about the waterbody including substrates, pool depths, and bankfull width.

Substrate is taken as an estimate of the types and abundance of substrate available in the sampled stream reach. The two dominant substrates are then used to calculate the score for the substrate metric. Each substrate type is scored according to potential use by biota; an example being cobble is scored as 12 points while clay or hardpan scores 0 points. Evaluation is restricted to areas of substrate in wetted areas where water is present, or along the entire course of the channel for dry stream channels. Once the dominant substrates are scored, the number of substrates recorded is added for a final substrate metric score. The substrates cannot score more than 40 points.

Maximum pool depth is also evaluated to identify whether a stream reach can support a significant fish community. Identifying pool depth can also help in determining the flow type of the stream. Maximum pool depth avoids the measurements of plunge pools since they are not characteristic of overall stream morphology. Maximum pool depth cannot score more than 30 points.

The final metric evaluated by the HHEI is the average bankfull width. Bankfull width is defined in the HHEI Manual as "…*the elevation on the stream banks where the flow is at bankfull discharge. The bankfull discharge is defined as follows '…the discharge at which channel maintenance is the most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphological characteristics of channels.' Dunne and Leopold (1978)*." (OEPA 2009). The use of bankfull width is analogous to the OHWM which was previously defined in Section 3.1.3. Bankfull width can score up to 30 points.

Once all components are evaluated, a final score is tabulated. Typical score ranges and waterbody characterizations are found in Table 3-4. Additional information is recorded on the HHEI worksheet (Appendix D) including information on surrounding land use and riparian width, flow regime at time of evaluation, sinuosity, and gradient of the stream reach, and other current conditions such as turbidity and time since last rainfall.

Table 3-4 Headwater Habitat Evaluation Index (HHEI) Scoring

Final HHEI Score	Definition
<30	Class I PHWH (Ephemeral streams, normally dry channel, little to no aquatic life)
30 - 50	Class II PHWH (Intermittent flow, summery-dry, warm water streams)
>50	Class II or III PHWH (depending on conditions)
>75	Class III (Perennial flow, cool-cold Water Streams)

PHWH – Primary Headwater Stream

3.1.5 Qualitative Habitat Evaluation Index Assessments

Larger features were evaluated using the QHEI. The QHEI form is used to describe similar aspects of waterbodies, but is focused on larger (often higher quality) waterbodies. Typically, QHEI forms are completed only for those perennial features that meet two criteria: drainage areas greater than 1 square mile *and* pools deeper than 40 centimeters (approximately 16 inches). Six principal metrics are used to score a feature. The maximum possible QHEI score is 100; waterbodies with a total score of 75 or more are characterized as potential exceptional warm water habitat (WWH). In cases where a feature scored highly on the HHEI forms but failed to meet either of QHEI criteria, it was still evaluated with the QHEI to better record the conditions present.

Where the HHEI looks to identify the dominant substrates and overall amount, the QHEI identifies the types of substrates as well as their origin and quality as the first metric. The QHEI also identifies the type of cover as a percent of cover for both pools and riffles within the sampling reach. Similar to the HHEI, different types of substrate are scored differently; for example cobble is scored for 8 points where as silt bottoms are scored for 2 points. The QHEI attributes as maximum of 20 points for substrate.

Instream cover is the second metric evaluated under the QHEI, and identifies the presence or absence as well as amount of particular types of cover that could be used by aquatic fauna. Each cover type that is present is scored on a scale of 0 (absent) to 3 (highest quality in moderate or great amounts) which help to describe the cover available in the stream reach. A final category for amount determines the overall extent of all types of cover, such as sparse between 5 and 25 percent or extensive at greater than 75 percent. Instream cover can score a maximum of 20 points.

Channel morphology is evaluated in the QHEI by scoring the sinuosity, development, channelization, and stability of the stream reach. The sum of the components cannot exceed 20 points for channel morphology.

Bank erosion and riparian zone is the fourth category evaluated by the QHEI. The erosion is identified and scored by degree, for each bank. Riparian width and flood plain quality are also scored as part of this metric, and are tabulated on a per bank basis. Flood plain land use is identified as the area approximately 100 meters beyond the riparian boundary. This metric can score a maximum of 10 points.

Pool/glide and riffle/run quality is the next metric evaluated by QHEI. A variety of components are evaluated under this metric, including the maximum depth of pools or glides present, type/speed of current, morphology of channel, riffle depth, run depth, and substrate and embeddedness in riffle/run areas of the waterbody. The pool/glide and riffle/run quality cannot score more than 20 points.

The sixth and final metric evaluated under the QHEI is the gradient of the waterbody. The gradient is estimated as change in elevation as feet per mile. Low gradients can score between 2 and 4 points where as high gradient streams can score between 6 and 10 points. This metric can score a maximum of 10 points.

Table 3-5 provides an overview of the typical score ranges and waterbody classification under QHEI.

Table 3-5 Qualitative Habitat Evaluation Index Scoring

Final QHEI Score	Definition
<32	Limited Resource Water
32 - 60	Modified Warm Water Habitat (MWH)
60 - 75	Warm Water Habitat (WWH)
>75	Possible Exceptional Warm Water Habitat (EW)

3.1.6 Ohio Mussel Survey

All native mussels in the State of Ohio are protected per Ohio Revised Code Section 1533.324, as are the ten federally protected species which may occur in the state. In order to protect these species, the ODNR's Division of Wildlife (ODNR DOW) and USFWS developed a series of survey protocols to identify the presence or absence of mussels in a waterbody. The protocols identify five types of streams based on their size and potential for federally listed species (FLS), included in the table below.

Table 3-6 Stream Classifications according to Mussel Survey Protocol

Group	Definition
Unlisted	Streams not listed in the Survey Protocol, having a watershed larger than 10 square miles with the potential for mussels but no FLS are expected
Group 1	Small to mid-sized streams, FLS not expected
Group 2	Small to mid-sized streams, FLS expected
Group 3	Large rivers, FLS not expected
Group 4	Large rivers, FLS expected

Such mussel surveys are required to be conducted by trained and accredited individuals, with the group of stream determining exact scale of surveys required. The unlisted streams and Group 1 streams may have visual reconnaissance surveys completed, with the results being forwarded to ODNR who then determine need for any additional surveys. All Group 2, 3, and 4 streams require a full survey.

Cardno field staff conduct only visual reconnaissance surveys as part of the typical delineation process. If any mussels are found during stream delineations, Cardno identifies the stream for a follow-up survey if the stream will be impacted. The survey protocol notes that use of horizontal directional drilling (HDD) eliminates the need for surveys, and that streams with a drainage area less than 10 square miles also do not require surveys. These two clarifications minimize the need for full mussel surveys.

3.1.7 Jurisdictional Determination

Cardno made a recommendation on the potential jurisdictional status of each identified surface water feature based on USACE/U.S. Environmental Protection Agency (USEPA) guidance material. Guidance used for these determinations includes documentation from the USEPA "Current Implementation of Waters of the United States"[3] which refers to the original 1986/1988 promulgation and subsequent Supreme Court cases which further defined the term.

[3] 40 CFR 230.3

The Supreme Court cases include those known as the Solid Waste Agency of Northern Cook County (SWANCC) case[4] and the Rapanos Guidance[5]. In the 2001 SWANCC decision, it was determined that the USACE could not extend CWA Section 404 jurisdiction over physically isolated wetlands using the Migratory Bird Treaty Act (MBTA). In the case, SWANCC had sought to fill isolated and non-navigable wetlands, but the USACE had extended CWA jurisdiction due to their use as habitat by migratory birds. Since the wetlands were non-navigable waters and isolated from any true navigable WOTUS, it was determined that the use of the MBTA to assert jurisdiction was improper. The Rapanos Guidance actually refers to two court cases which were consolidated, Rapanos v. United States and Carabell v United States. The combined guidance document developed after the rulings from USEPA and USACE identified several key points regarding jurisdiction and when it would be exercised:

- Agencies would always assert jurisdiction over TNWs, wetlands adjacent to TNWs, non-navigable tributaries of TNWs with relatively permanent flow (flow year round or have continuous flow at least seasonally), and wetlands abutting such tributaries;
- Agencies will evaluate the following waters for a significant nexus to a TNW before deciding jurisdiction: non-navigable tributaries that are not relatively permanent, wetlands adjacent to non-navigable tributaries that are not relatively permanent, or wetlands adjacent to but do not directly abut a relatively permanent non-navigable tributary; and
- Agencies will not assert jurisdiction over swales, erosional features, or those ditches excavated wholly in and draining only uplands that do not carry a relatively permanent flow of water.

Critical to the Rapanos Guidance was the definition of a *significant nexus*, which would be determined by assessing the flow characteristics of a tributary and functions performed by any adjacent wetlands. The function of a wetland or waterbody was the potential ability to alter the chemical, physical, or biological integrity of a down-stream TNW.

The Code of Federal Regulations (40 CFR 230.3), defines WOTUS as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as WOTUS under this definition;
5. Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not WOTUS.

[4] 68 FR 10 (January 15, 2003) https://www.gpo.gov/fdsys/pkg/FR-2003-01-15/pdf/03-960.pdf
[5] USEPA 2008

Tables 3-7 and 3-8 include Cardno's recommendation on the potential jurisdictional status of each feature.

3.2 Field Delineation Results

The following is a discussion of the results of the field surveys conducted in November and December 2017 and March, May and June 2018 within the approximately 1,459 acres of the Project Corridor to determine the extent of surface waters in accordance with applicable Federal and State regulations and guidelines.

3.2.1 General Habitat within the Project Corridor

The data obtained during the desktop review was found to be generally consistent with the results of the field survey. As identified in Table 2-1, the predominant land use in the Project Corridor is agricultural crop area, followed by developed, open areas.

The agricultural areas were comprised of harvested fields and remnants of mostly soybean and corn crops. The field team observed limited areas of cover crops or standing crops, with the majority of the fields consisting of corn and soybean stubble. The cultivated areas within the Project Corridor are expected to occupy the same general area from year to year, with the potential for the type of crop to change seasonally. Many of the crop areas and roadsides had man-made or modified ditches which helped maintain field drainage for agricultural operations. In between many of the fields, as well as along many roadsides, there were also grassy swales (consisting of *Festuca* and fescue grasses) that helped to direct stormwater runoff away from the crop area, but lacked the defined bed and bank necessary to be classified as a waterbody. Some of the fields appeared to be tiled to help with additional field drainage and this water travels to the nearby streams and ditches. In intermittent and ephemeral ditches, the channels were often vegetated with reed canary grass (*Phalaris arundinacea*) and narrow-leaf cattail (*Typha angustifolia*) indicating the presence of water during portions of the year. Some ditches, which rarely received any runoff except during severe storm events, lacked vegetation in the channel or had a mix of grasses (*Festuca* and fescue).

There were very few woodlots that were observed within the Project Corridor, many of which occurred between crop areas or along roadsides. Aggressive weedy species, such as poison ivy (*Toxicodendron radicans*) often occurred along the woodlot edges, with the interiors of woodlots comprised predominately of relatively young maples (*Acer sp.*) and oaks (*Quercus sp.*)

No evidence of RTE species was observed by Cardno during field surveys. The delineated waterbodies could potentially provide habitat, but they had significantly reduced quality due to the surrounding land use and were unlikely to be suitable for most species (i.e., high sediment loading during storms, fertilizer in runoff).

3.2.2 Description of the Delineated Wetlands in the Project Corridor

A total of six wetlands were delineated during field surveys, for a total of 3.03 acres within the Project Corridor. Five of the six wetlands were considered palustrine forested (PFO) wetlands and the sixth was identified as a palustrine emergent wetland (PEM), due to the lack of woody vegetation. Five of the wetlands scored as Modified Category 2, indicating that the habitat had been modified but still had some ecological value and utilization. The remaining wetland was a Category 2. The wetlands typically occurred in isolated woodlots that were surrounded by active agricultural fields and lacked connections to other waterbodies.

Only one of the wetlands (WL-002) is considered jurisdictional due to a potential hydrologic connection to a WOTUS. Table 3-7 provides a list of the delineated wetlands and associated characteristics. Wetland acreages reported in the summaries below are representative only of the portion of the wetland located within the Project Corridor.

- **WL-002** was a small portion (<0.01 acre) of a forested wetland located in the northern portion of the Project Corridor inside a woodlot. The wetland had several sparsely vegetated depressions among mature trees, including red oak (*Quercus rubra*), and slippery elm (*Ulmus rubra*) which exhibited signs of root buttressing. The herbaceous vegetation was limited to woodland sedge (*Carex blanda*). This wetland feature scored a 38 on the ORAM form and is expected to be a jurisdictional feature due to potential connection to WOTUS.
- **WL-003** was a small (0.23 acre), forested wetland located in the northern portion of the Project Corridor inside a woodlot. The wetland had several sparsely vegetated depressions among mature trees, including red oak, and cottonwood (*Populus deltoides*) which exhibited signs of root buttressing. The herbaceous vegetation was limited to woodland sedge and Virginia wild rye (*Elymus virginicus*). This wetland feature scored a 34 on the ORAM form and is not expected to be a jurisdictional feature due to its lack of potential connection to WOTUS.
- **WL-004** was a small (0.55 acre), emergent wetland located in the northern portion of the Project Corridor. The wetland appeared to be a managed grass area buffering a restored wetland. The wetland was dominated by grasses, including cordgrass (*Spartina pectinata*) and sedge. There were no trees or shrubs within the delineated portion. This wetland feature scored a 34 on the ORAM form and is not expected to be a jurisdictional feature due to its lack of potential connection to WOTUS.
- **WL-006** was a small (0.67 acre), forested wetland located in the northern portion of the Project Corridor. The wetland had several sparsely vegetated depressions among mature trees, including white oak (*Quercus bicolor*) and red maple (*Acer rubrum*) which exhibited signs of root buttressing. The herbaceous vegetation was limited to woodland sedge. This wetland feature scored a 34 on the ORAM form and is not expected to be a jurisdictional feature due to its lack of potential connection to WOTUS.
- **WL-008** was the largest forested wetland (1.24 acres) delineated in the northern portion of the Project Corridor. The wetland had several sparsely vegetated depressions among mature trees, predominately red maple which exhibited signs of root buttressing. The herbaceous vegetation was limited to woodland sedge. This wetland feature scored a 34 on the ORAM form and is not expected to be a jurisdictional feature due to its lack of potential connection to WOTUS.
- **WL-304** is a small (0.34 acre), forested wetland located in the southern portion of the Project Corridor. The wetland had several sparsely vegetated depressions among mature trees, predominately silver maple (*Acer saccharinum*). The herbaceous vegetation was a mix of poison ivy (*Toxicodendron radicans*), sweet woodreed (*Cinna arundinacea*), and graceful sedge (*Carex gracillima*). This wetland scored a 30 on the ORAM and was not expected to be jurisdictional due to its lack of connection to WOTUS.

Table 3-7 Wetlands Delineated in the Project Corridor

Wetland ID	Latitude of Center Point	Longitude of Center Point	Acres within Project Corridor	Wetland Type	ORAM Score	Wetland Category	Jurisdictional Recommendation	Drainage Basin
WL-002	41.167037	-84.680529	<0.01	PFO	36	2	Yes	Little Flatrock Creek
WL-003	41.14979	-84.686656	0.23	PFO	34	Modified 2	No	Little Flatrock Creek
WL-004	41.129929	-84.731561	0.55	PEM	34	Modified 2	No	Zuber Cutoff
WL-006	41.117576	-84.654821	0.67	PFO	34	Modified 2	No	Big Run-Flatrock Creek
WL-008	41.142634	-84.711596	1.24	PFO	34	Modified 2	No	Zuber Cutoff
WL-304	41.022705	-84.683849	0.34	PFO	30	Modified 2	No	Middle Blue Creek
		Total Acreage	**3.03**					

Notes:

Wetland types classified according to Cowardin et al. (1979):

PEM: Palustrine (freshwater) Emergent Wetland – characterized by erect, rooted herbaceous and grasslike plants suited to growing in wet conditions

PFO: Palustrine Forested Wetland - dominated by woody vegetation at least 20 feet tall with a tolerance to a seasonally high water table

ORAM – Ohio Rapid Assessment Method

3.2.3 Description of the Delineated Waterbodies in the Project Corridor

A total of 57 waterbodies were delineated during field surveys. The waterbody delineation results are summarized in Table 3-8. Representative photographs of typical waterbodies can also be found in Appendix A. Waterbodies were delineated in the field and further categorized for the report as either streams or ditches.

Ditches were identified as man-made or modified channels, which were manipulated by landowners or communities to improve drainage among farm fields. Modification to channels could include the mowing of bank vegetation, altering of channel morphology, or removal of vegetation or debris to maintain flow conditions. Many ditches have ephemeral or intermittent flow and heavily vegetated channels. At the time of the survey, many had standing water but a lack of flowing water. If a ditch crossed under a road, the deepest pools of water were normally located at the edges of the culvert, which occur as a result of eddies and currents of stormwater flow creating erosion.

Streams were more often considered natural channels that had indications of significant recovery since any historic modification had occurred. Streams are more likely to have vegetated riparian buffers along the banks, a variety of substrates in the channel, and pools of water which might support aquatic species. However, no streams were identified in the Project Corridor during the surveys, although they were observed to occur in nearby areas to the Project.

The OEPA's HHEI forms were completed for each stream and ditch and record and score a variety of aspects about the feature. The HHEI forms score the types and percent composition of substrates, maximum pool depth, and average bankfull width. Additional descriptive information is recorded on the forms regarding flow regime, riparian width and quality, morphology, and modification. Stream channel modification is referenced in many of the descriptions below, as either 'naturalized' or 'modified'. Naturalized features are those that have either never been modified or have historic signs of modification but appear to have recovered to a natural state. Modified features are those that appear to have recently been modified (such as through dredging or armoring of the banks) and may have little to no evidence of recovery. Scores are tallied for each feature, and result in a HHEI Category of Class I, II or III as described in Section 3.1.4 above.

While delineating the waterbodies in the Project Corridor, Cardno evaluated the features for suitability as habitat for RTE species. Due to the vast modification and disturbance present in the surrounding area, none of the waterbodies were identified as highly likely to serve as habitat for any RTE species. On average, the streams had a slightly higher potential for providing suitable habitat to RTE species (such as mussels and snakes) compared to more modified ditches, but no RTE species were observed during the field surveys. Frequently a waterbody may be able to provide physical habitat, but lack suitable water chemistry due to intensive land use in the upland areas.

Prior to field surveys, Cardno reviewed the list of known mussel streams from ODNR Division of Wildlife, and none of these streams are within the Project Corridor. Agricultural and roadside ditches were the only waterbody features delineated within the Project Corridor, and all had a drainage area less than 10 square miles. In addition, Cardno field staff conducted visual reconnaissance for mussels as part of the typical delineation process, and none were observed. As stated previously in Section 3.1.6, the survey protocol notes that streams with a drainage area less than 10 square miles do not require surveys, nor do those that would be crossed using HDD; therefore, full mussel surveys are not needed within the Project Corridor.

3.2.3.1 Class I Waterbodies

Twenty-five (25) of the delineated waterbodies found in the Project Corridor were considered Class I waterbodies. All of them were considered modified, highly disturbed ditches that lacked typical characteristics of a high quality stream. These waterbodies had very little, if any, standing water present

and served mostly as channels for stormwater runoff. They lacked variety and abundance of vegetation both within the channel and in the surrounding area. These ditches were typically found along the roadside or within crop areas and served the purpose of draining agricultural fields to support proper growing conditions. Characteristic features of these Class I waterbodies were a lack of variety in substrate, relatively shallow water depths and narrow channels. Four (4) of the Class I waterbodies are anticipated to be jurisdictional features due to their potential connection to WOTUS as tributaries or due to identification as NHD features. All of these features have a very low chance of being potential habitat for RTE species, but have a defined bed, bank, and OHWM.

3.2.3.2 Class II Waterbodies

Thirty-two (32) of the delineated waterbodies in the Project Corridor were considered Class II waterbodies, all of which were identified as ditches. Characteristic traits of the delineated Category II waterbodies were a mix of substrates, including some with gravel and cobble bottoms, deeper water depths and wider channels. Along with higher maximum pool depth measurements, many of them also had deep, flowing water at the time of the survey. The highest scoring waterbody was WB-145, which was a very wide ditch that ran between two agricultural fields and was observed to have moderately deep water throughout. Thirty (30) of the delineated Class II waterbodies are anticipated to be jurisdictional features due to their potential connection to a WOTUS. Although many were considered to be moderate quality, it is unlikely that these streams and ditches will be suitable habitat for any RTE species.

3.2.3.3 Class III Waterbodies

No Class III waterbodies were delineated within the Project Corridor.

Table 3-8 Waterbodies Delineated in the Project Corridor

Stream ID	Type	County	Linear Feet in Project Corridor	HHEI Score	QHEI Score	PHWH Class Designation	Flow Regime	Drainage Basin	Jurisdictional Recommendation	Potential RTE Habitat	Mussels Observed	SRW	WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR
WB-001	Ditch	Paulding	1,201.54	27	NA	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-002	Ditch	Paulding	5,173.32	27	NA	Class I	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-003	Ditch	Paulding	309.00	37	NA	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-004	Ditch	Paulding	4,366.08	52	NA	Class II	Intermittent	Little Flatrock Creek	Yes	Low	No													
WB-005	Ditch	Paulding	1,539.84	17	NA	Class I	Intermittent	Little Flatrock Creek	Yes	Low	No													
WB-006	Ditch	Paulding	200.03	56	NA	Class II	Intermittent	Sixmile Creek	Yes	Low	No													
WB-008	Ditch	Paulding	714.06	56	NA	Class II	Intermittent	Big Run-Flatrock Creek	Yes	Low	No													
WB-009	Ditch	Paulding	425.11	52	NA	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-010	Ditch	Paulding	2,764.69	17	NA	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-100	Ditch	Paulding	244.44	56	NA	Class II	Intermittent	Wildcat Creek-Flatrock Creek	Yes	Low	No													
WB-103	Ditch	Paulding	3,592.97	27	NA	Class I	Intermittent	Big Run-Flatrock Creek/Lower Blue Creek	Yes	Low	No													
WB-104	Ditch	Paulding	1,239.46	21	NA	Class I	Intermittent	Big Run-Flatrock Creek/Lower Blue Creek	Yes	Low	No													
WB-105	Ditch	Paulding	221.91	57	NA	Class II	Intermittent	Lower Blue Creek	Yes	Low	No					X				X	X			
WB-106	Ditch	Paulding	213.00	56	NA	Class II	Intermittent	Lower Blue Creek	Yes	Low	No													
WB-107	Ditch	Paulding	2,125.08	39	NA	Class II	Intermittent	Wildcat Creek-Flatrock Creek	Yes	Low	No													
WB-109	Ditch	Paulding	37.67	12	NA	Class I	Ephemeral	Lower Blue Creek	No	Low	No													
WB-116	Ditch	Paulding	320.62	36	N/A	Class II	Intermittent	Lower Blue Creek	Yes	Low	No					X				X	X			
WB-118	Ditch	Paulding	97.93	42	NA	Class II	Intermittent	Wildcat Creek-Flatrock Creek	Yes	Low	No													
WB-119	Ditch	Paulding	3,866.28	27	NA	Class I	Ephemeral	Wildcat Creek-Flatrock Creek	No	Low	No													
WB-120	Ditch	Paulding	3,802.12	19	NA	Class I	Ephemeral	Lower Blue Creek	No	Low	No													
WB-121	Ditch	Paulding	994.44	29	NA	Class I	Ephemeral	Lower Blue Creek	No	Low	No					X				X	X			
WB-122	Ditch	Paulding	214.99	52	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No		X							X	X		X	X
WB-129	Ditch	Paulding	3,513.22	56	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No		X							X	X		X	X
WB-130	Ditch	Paulding	8,284.83	37	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No		X							X	X		X	X
WB-131	Ditch	Paulding	1,697.75	52	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No		X							X	X		X	X
WB-134	Ditch	Paulding	213.00	62	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No													
WB-136	Ditch	Paulding	42.80	17	NA	Class I	Ephemeral	Middle Blue Creek	No	Low	No													
WB-137	Ditch	Paulding	1,199.23	62	NA	Class II	Intermittent	Middle Blue Creek	Yes	Low	No													
WB-139	Ditch	Paulding	601.32	27	NA	Class I	Ephemeral	Middle Blue Creek	No	Low	No													
WB-140	Ditch	Paulding	60.48	27	N/A	Class I	Ephemeral	Sixmile Creek	No	0	No													
WB-142	Ditch	Paulding	2,455.12	59	N/A	Class II	Intermittent	Big Run-Flatrock Creek	Yes	Low	No													
WB-143	Ditch	Paulding	1,011.03	27	N/A	Class I	Ephemeral	Big Run-Flatrock Creek	No	Low	No													
WB-144	Ditch	Paulding	2,195.95	59	N/A	Class II	Intermittent	Wildcat Creek-Flatrock Creek	Yes	Low	No													
WB-145	Ditch	Paulding	1,435.00	65	N/A	Class II	Intermittent	Wildcat Creek-Flatrock Creek	Yes	Low	No													
WB-147	Ditch	Paulding	347.87	25	N/A	Class I	Ephemeral	Middle Blue Creek	No	Low	No													
WB-150	Ditch	Paulding	415.96	65	N/A	Class II	Intermittent	Middle Blue Creek	No	Low	No													
WB-154	Ditch	Paulding	1,130.53	12	N/A	Class I	Ephemeral	Big Run-Flatrock Creek	No	Low	No													

Table 3-8 Waterbodies Delineated in the Project Corridor

Stream ID	Type	County	Linear Feet in Project Corridor	HHEI Score	QHEI Score	PHWH Class Designation	Flow Regime	Drainage Basin	Jurisdictional Recommendation	Potential RTE Habitat	Mussels Observed	SRW	WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR
WB-200	Ditch	Paulding	1,758.13	57	N/A	Class II	Intermittent	Sixmile Creek	Yes	Low	No													
WB-201	Ditch	Paulding	1,309.86	17	N/A	Class I	Ephemeral	Sixmile Creek/Zuber Cutoff	No	Low	No													
WB-202	Ditch	Paulding	76.30	17	N/A	Class I	Ephemeral	Sixmile Creek	No	Low	No													
WB-203	Ditch	Paulding	1,199.52	32	N/A	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-204	Ditch	Paulding	1,022.18	12	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-205	Ditch	Paulding	2,611.29	44	N/A	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-206	Ditch	Paulding	1,744.20	21	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-207	Ditch	Paulding	210.07	31	N/A	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-208	Ditch	Paulding	2,566.05	27	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-209	Ditch	Paulding	2,381.18	42	N/A	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-210	Ditch	Paulding	1,498.17	54	N/A	Class II	Perennial	Big Run-Flatrock Creek/Zuber Cutoff	Yes	Moderate	No													
WB-211	Ditch	Paulding	1,032.21	17	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-212	Ditch	Paulding	196.13	17	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-213	Ditch	Paulding	400.10	51	N/A	Class II	Intermittent	Big Run-Flatrock Creek	Yes	Low	No													
WB-214	Ditch	Paulding	4,765.47	47	N/A	Class II	Intermittent	Big Run-Flatrock Creek	Yes	Low	No													
WB-215	Ditch	Paulding	789.86	56	N/A	Class II	Intermittent	Zuber Cutoff	Yes	Low	No													
WB-216	Ditch	Paulding	209.43	60	N/A	Class II	Intermittent	Big Run-Flatrock Creek	Yes	Low	No													
WB-301	Ditch	Paulding	863.45	27	N/A	Class I	Ephemeral	Zuber Cutoff	No	Low	No													
WB-304	Ditch	Paulding	211.53	42	N/A	Class II	Ephemeral	Zuber Cutoff	No	Low	No													
WB-313	Ditch	Paulding	159.05	22	N/A	Class I	Ephemeral	Wildcat Creek-Flatrock Creek	No	Low	No													
	Total		**83,273.22**																					

QHEI – Scoring
< 32: Limited Resource Water (LRW)
32 to 60: Modified Warmwater Habitat (MWH)
60 to 75: Warmwater Habitat (WWH)
> 75: Possible Exceptional Warmwater Habitat (EWH)

HHEI – Scoring
< 30: Class I PHWH (typically ephemeral streams)
30 to 50 Class II PHWH (intermittent warm water streams)
> 50: Class II or III PHWH (depending on conditions)
> 75: Class III PHWH (perennial cool water streams)

Notes:
NA – Not Applicable
SRW - State Resource Water
WWH – Warm Water Habitat
EWH – Exceptional Warm Water Habitat
MWH – Modified Warm Water Habitat
SSH – Seasonal Salmonid Habitat
CWH – Cold Water Habitat
LRW – Limited Resource Water
PWS - Public Water Supply
AWS – Agricultural Water Supply
IWS – Industrial Water Supply
BW - Bathing Waters
PCR – Primary Contact Recreations
SCR – Secondary Contact Recreation
UNT – Unnamed Tributary

4 Conclusions

The Project Corridor was dominated by agricultural land use (cultivated crops). The history of land conversion for farming and other landscape manipulation to support farming operations has reduced the land available for surface waters to develop. The small forested portions of the Project Corridor occurred as small sparse woodlots located between crop fields or as windrows along historic property boundaries. The quality of ditches and streams was consistently low across all delineated waterbodies. The higher quality streams exhibited greater channel development, less evidence of disturbance or modification, and moderate quality habitat in the riparian buffer. The six wetlands identified in the Project Corridor occurred in depressional areas near or in forested areas. Habitat development in one of the wetlands was limited to herbaceous vegetation mostly, with the forested wetland being dominated by young tree species. Due to the lack of mature habitat development, relatively small size, and proximity to active land manipulation (for crops), five these wetlands scored as Modified Category 2 on ORAM, and were not considered jurisdictional. The sixth wetland scored slightly higher as a Category 2 and was considered jurisdictional due to potential connectivity to a WOTUS.

Cardno delineated 57 waterbodies, with 34 of them expected to be jurisdictional due to their hydrologic connectivity to a potential WOTUS. All of the delineated waterbodies were identified as ditches.

During the field surveys, Cardno did not observe any RTE species in the Project Corridor or vicinity, or mussel species in the waterbodies in the Project Corridor. The relative sparseness of the woodlots and fragmentation of wooded habitats by roads, residential land use, and farm fields reduces the likelihood of significant wildlife occurring in the Project Corridor.

The findings of this investigation represent a study of the Project Corridor for non-tidal wetlands and waterbodies. The findings depend on the season, the conditions at that time of year, site-specific influences (e.g. anthropogenic disturbance), and individual professional judgment. This report represents a professional estimate of the Project Corridor wetlands and waterbodies based upon available information and techniques. Final verification of their boundaries for regulatory purposes can only be completed through a Jurisdictional Determination (JD) review by the USACE or its duly appointed representative.

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Exhibit M

- **Appendix A – Photolog**

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William V. Vorys (0093479)
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Attorneys for Paulding Wind Farm IV LLC

Date Filed: July 2, 2018

Timber Road IV Wind Project, Paulding County, Ohio
Wetland and Waterbody Field Delineation Surveys
Representative Photolog
Winter 2017 & Spring 2018

Date: 11/08/2017 **Description: Photo of a typical grassy swale that was commonly found along roadsides and through agricultural fields. This swale is located adjacent to a partially harvested corn field, which was a common sight during field surveys. Most fields like this one within the Project Corridor are planted with corn or soybean during growing season.**	
Date: 11/08/2017 **Description: Photo of typical adjacent agricultural fields within the Project Corridor. On the left is a recently planted crop, and on the right is a recently harvested corn field. At the time of the survey, there was often still remnants of last year's harvested crops in the fields. Minimal buffer area was observed between agricultural fields and it was common that these areas were occupied by grassy swales or excavated ditches.**	

Timber Road IV Wind Project, Paulding County, Ohio
Wetland and Waterbody Field Delineation Surveys
Representative Photolog
Winter 2017 & Spring 2018

Date: 11/08/2017 **Description: Typical photo of the interface between crop areas and isolated woodlots. Many of the woodlots were directly connected to the crop areas and had no buffer to the surrounding landuse. This type of interaction could prevent development of high quality habitat due to the constant impact of surrounding landuse (runoff and ground clearing disturbance).**	
Date: 11/11/2017 **Description: Typical photo of an upland wooded area. Some woodlots within the Project Corridor had moderate density and a few mature trees, but most are very open and consist mainly of young trees. The most common tree species were maple, oak and elm. These wood lots were frequently found surrounded by crop fields or along the roadside.**	

Timber Road IV Wind Project, Paulding County, Ohio
Wetland and Waterbody Field Delineation Surveys
Representative Photolog
Winter 2017 & Spring 2018

Feature: WB-103 **Date: 11/09/2017** **Description: Photo of a typical ephemeral, Class I ditch. Many of the ephemeral ditches found within the Project Corridor were located along the roadside or in between agricultural fields. These ditches characteristically have no standing water, a lack of diversity in substrate and surrounding vegetation, and relatively narrow banks and channels. Ephemeral features such as this one were not anticipated to be jurisdictional.**	
Feature: WL-122 **Date: 11/10/2017** **Description: Photo of a typical intermittent, Class II ditch running between two crop fields. It was a common observation by field teams that many man-made ditches would be excavated between agricultural fields for the purpose of stormwater runoff. This waterbody had a very narrow channel and relatively shallow water depths.**	

Timber Road IV Wind Project, Paulding County, Ohio
Wetland and Waterbody Field Delineation Surveys
Representative Photolog
Winter 2017 & Spring 2018

Feature: WB-003 **Date: 11/08/2017** **Description: Photo of a typical, intermittent Class II waterbody. This feature, like many other intermittent ditches had a wide channel and relatively deep pools of water. Intermittent ditches could potentially dry out during the summer or during droughts leaving sporadic pools.** **This particular waterbody showed signs of recent excavation (material was side cast to the right in the photo), which was an example of the types of modification experienced.**	
Feature: WB-100 **Date: 11/09/2017** **Description: Photo of a typical intermittent, Class II, highly vegetated waterbody. This waterbody also acted as a roadside drainage feature and had relatively deep but turbid water. The banks of this ditch were vegetated with young saplings and other weedy species and received a high HHEI score due to it's wide channel, depth of water, and mix of substrate.**	

Timber Road IV Wind Project, Paulding County, Ohio
Wetland and Waterbody Field Delineation Surveys
Representative Photolog
Winter 2017 & Spring 2018

Feature: WL-002 **Date: 03/27/2018** **Description: Photo of a forested wetland located within a woodlot in the Northern portion of the Project Corridor. WL-002 is a marginal, depressional wetland that is dominated by trees and vegetated depressions. Tree species consisted mostly of elm, oak and maple. This wetland is potentially connected to a WOTUS and is expected to be jurisdictional.**	
Feature: WL-008 **Date: 05/01/2018** **Description: Photo of a forested wetland located to the east of an existing string of turbines in the northern half of the Project Corridor. This wetland is not anticipated to be jurisdictional due to a lack of connection to a WOTUS.**	

Exhibit M

- **Appendix B – Wetland Map**

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Attorneys for Paulding Wind Farm IV LLC

Date Filed: July 2, 2018

Timber Road IV Wind Project

APPENDIX B

WETLAND AND WATERBODY MAPS

Legend

- Turbine Location
- Upland Datapoint
- Wetland Datapoint
- Survey Area
- Field Delineated Wetlands
- Field Delineated Waterbody
- Proposed Collection Line
- Proposed Access Road
- Substation/Laydown Area
- ODNR Wetland
- NWI Wetland
- Local Road
- State Road
- US Highway

Data Source:

Wetland and Waterbody Maps
Map Index

Timber Road IV Wind Farm
Paulding County, Ohio

0 1 2 3 4 Miles
0 1 2 3 4 5 6 Kilometers

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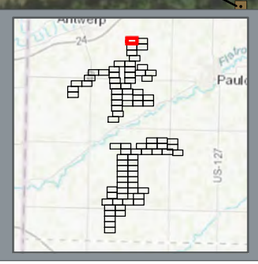
GIS Analyst: Peter.Marsey

WL-002-UPL

WB-201 (E)

WB-200 (I)

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
County, City, Township Boundaries, Railroads: ESRI Data and Maps (2014)
Roads: U.S. Census Bureau Tiger Files (2017)



Wetland and Waterbody Maps (Sheet 1 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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Wetland and Waterbody Maps (Sheet 2 of 85)

Timber Road IV Wind Farm
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GIS Analyst: Peter.Marsey

WL-002

WL-002-WET

WB-201 (E)

WB-202 (E)

WB-140 (E)

Town Hwy 162

Twp Hwy 162

Rd 162

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
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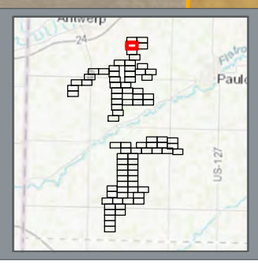

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Twp Rd 71

Town Hwy 71

Twp Hwy T-77

Rd 162

Twp Hwy 162

Town Hwy 162

Co Rd 71

Data Sources:
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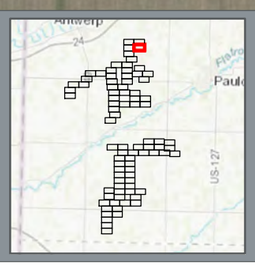

Wetland and Waterbody Maps (Sheet 4 of 85)

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Wetland and Waterbody Maps (Sheet 5 of 85)

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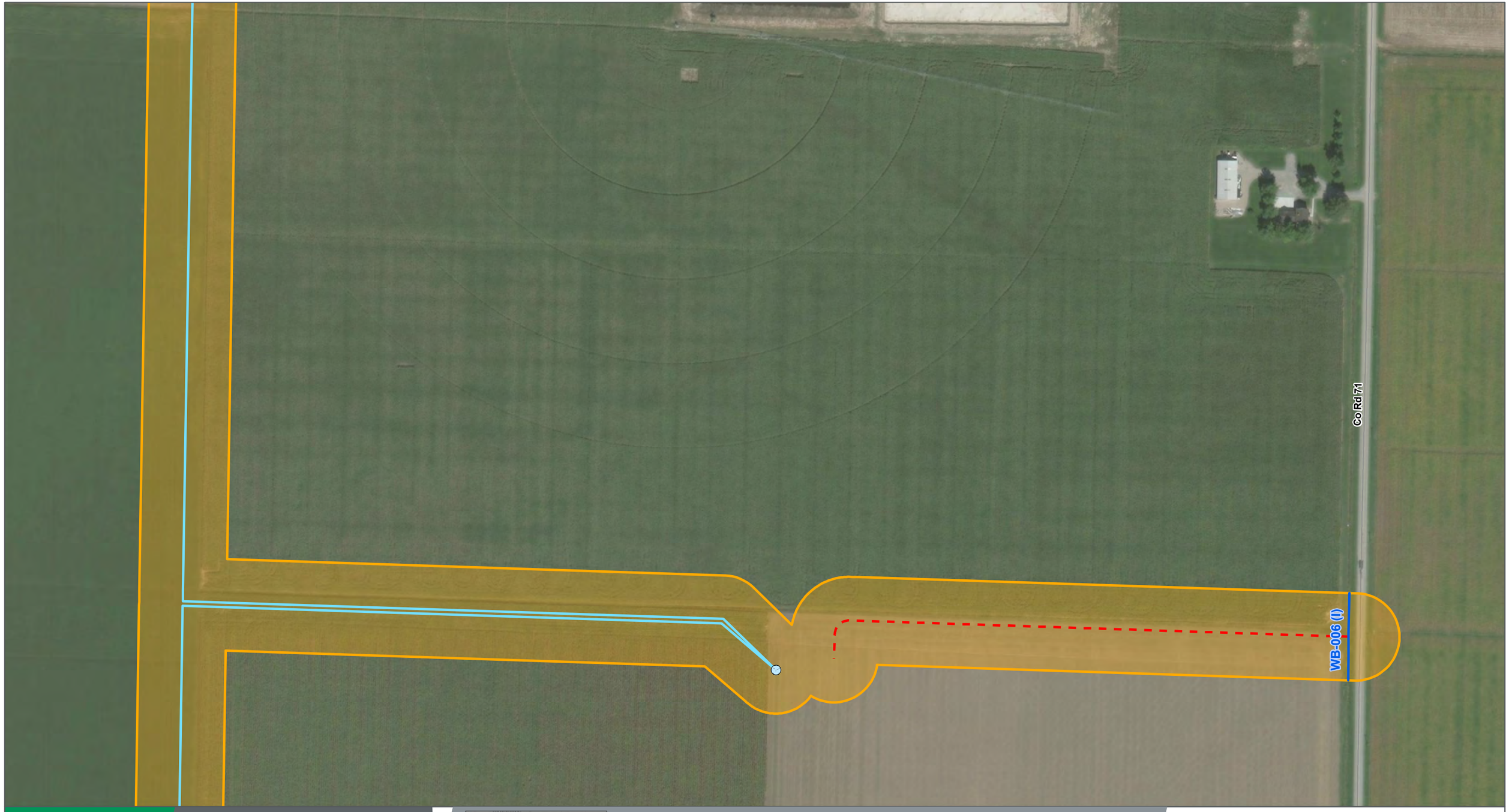

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Wetland and Waterbody Maps (Sheet 6 of 85)

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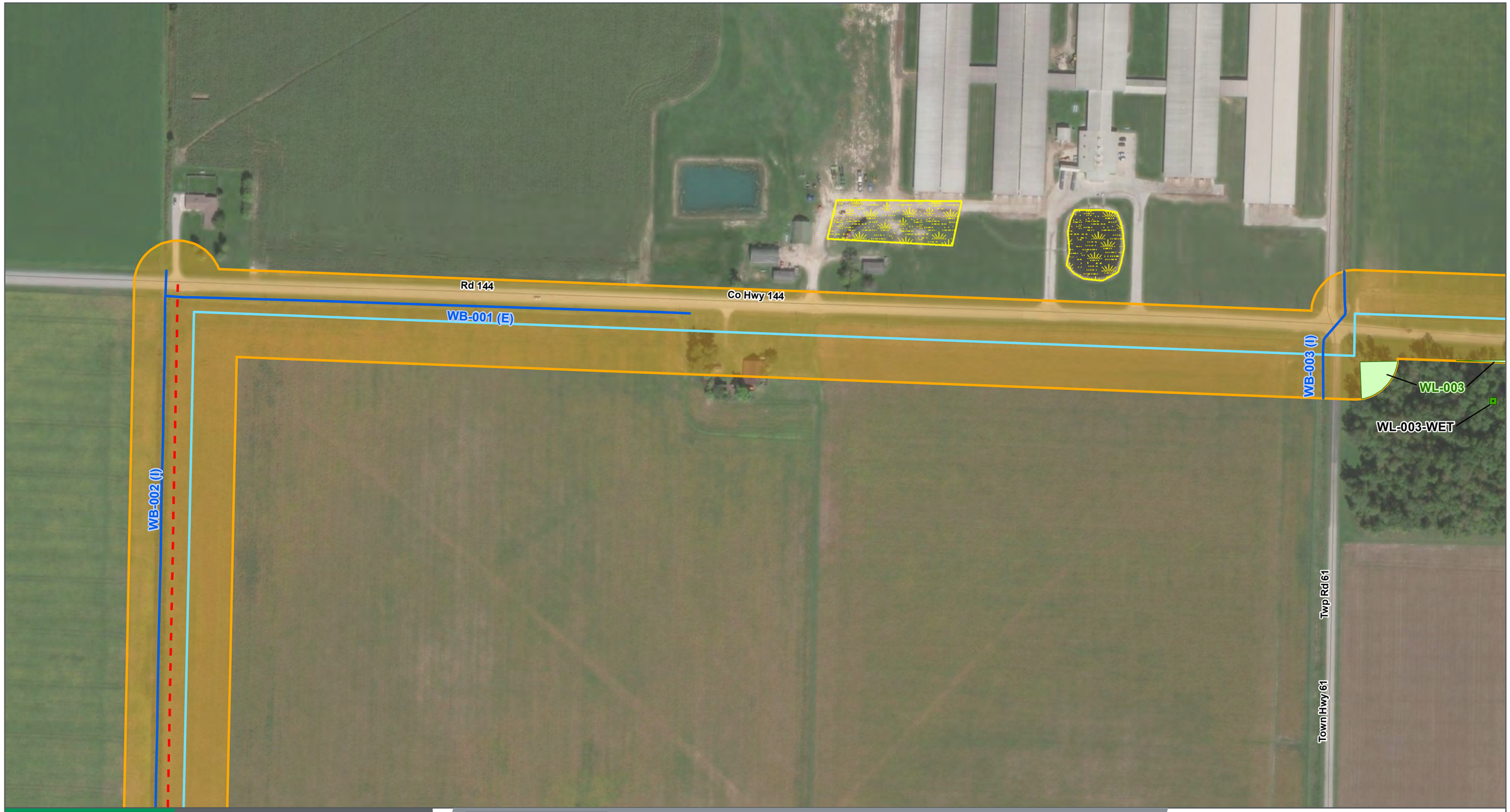

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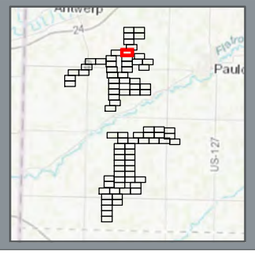

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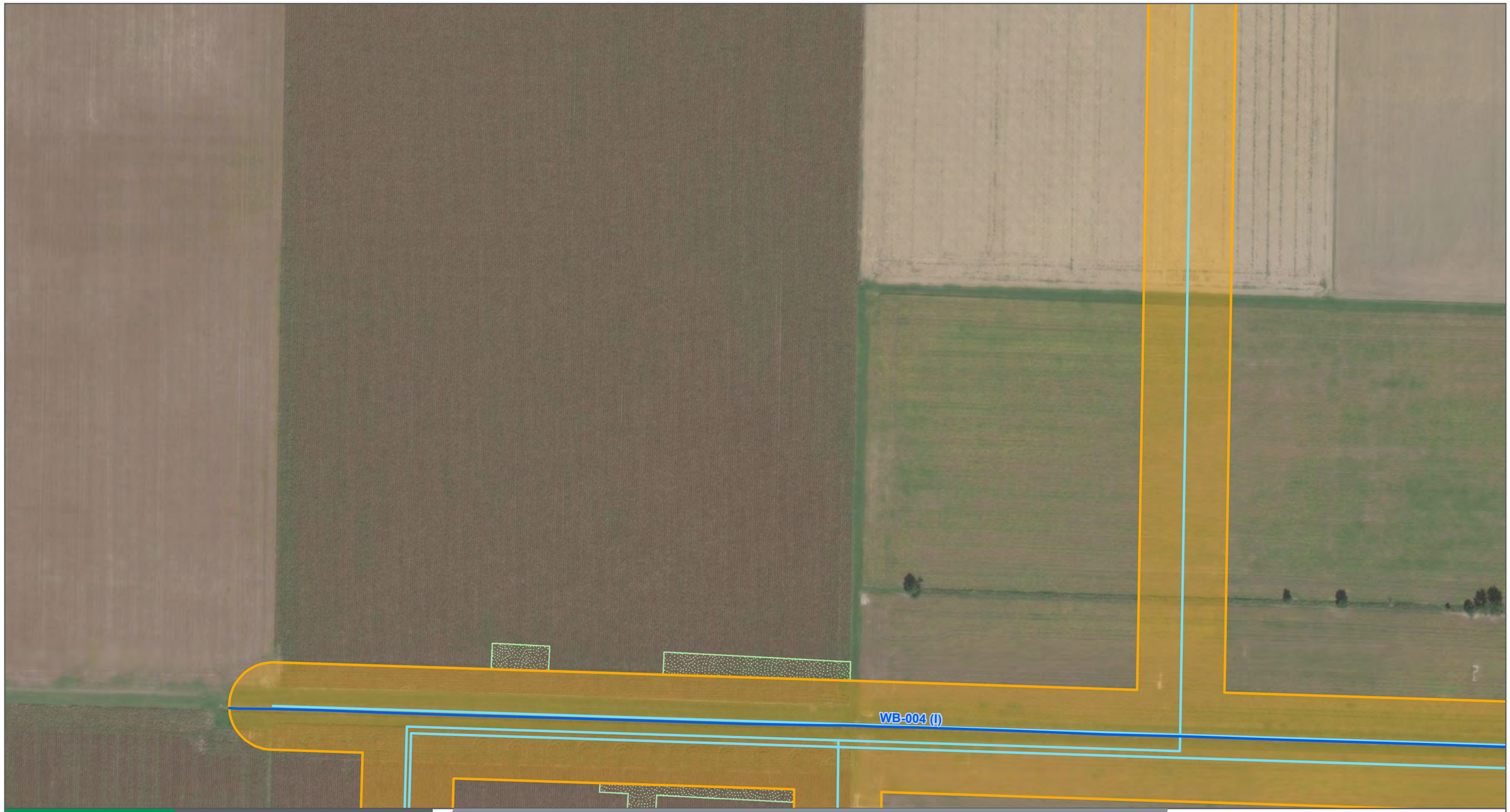

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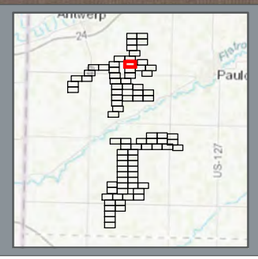

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Wetland and Waterbody Maps (Sheet 11 of 85)

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Wetland and Waterbody Maps (Sheet 12 of 85)

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Paulding County, Ohio

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GIS Analyst: Peter.Marsey

WB-009 (I)

WL-008-UPL

WL-008-WET

WL-008

WB-203 (I)

Town Hwy 51 Twp Rd 51

WB-203 (I)

WB-204 (E)

WB-009 (I)

Data Sources:
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Wetland and Waterbody Maps (Sheet 13 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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Wetland and Waterbody Maps (Sheet 14 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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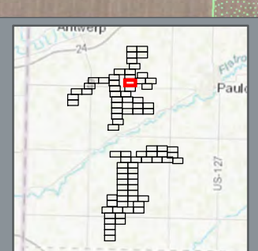
Roads: U.S. Census Bureau Tiger Files (2017)



Wetland and Waterbody Maps (Sheet 15 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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GIS Analyst: Peter.Marsey

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
Wetlands: Cardno (2017),
Ohio DNR Wetlands Inventory
(1991), USFWS (1979)
County, City, Township
Boundaries, Railroads:
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Roads: U.S. Census Bureau
Tiger Files (2017)

Wetland and Waterbody Maps (Sheet 16 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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Wetland and Waterbody Maps (Sheet 17 of 85)

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Paulding County, Ohio

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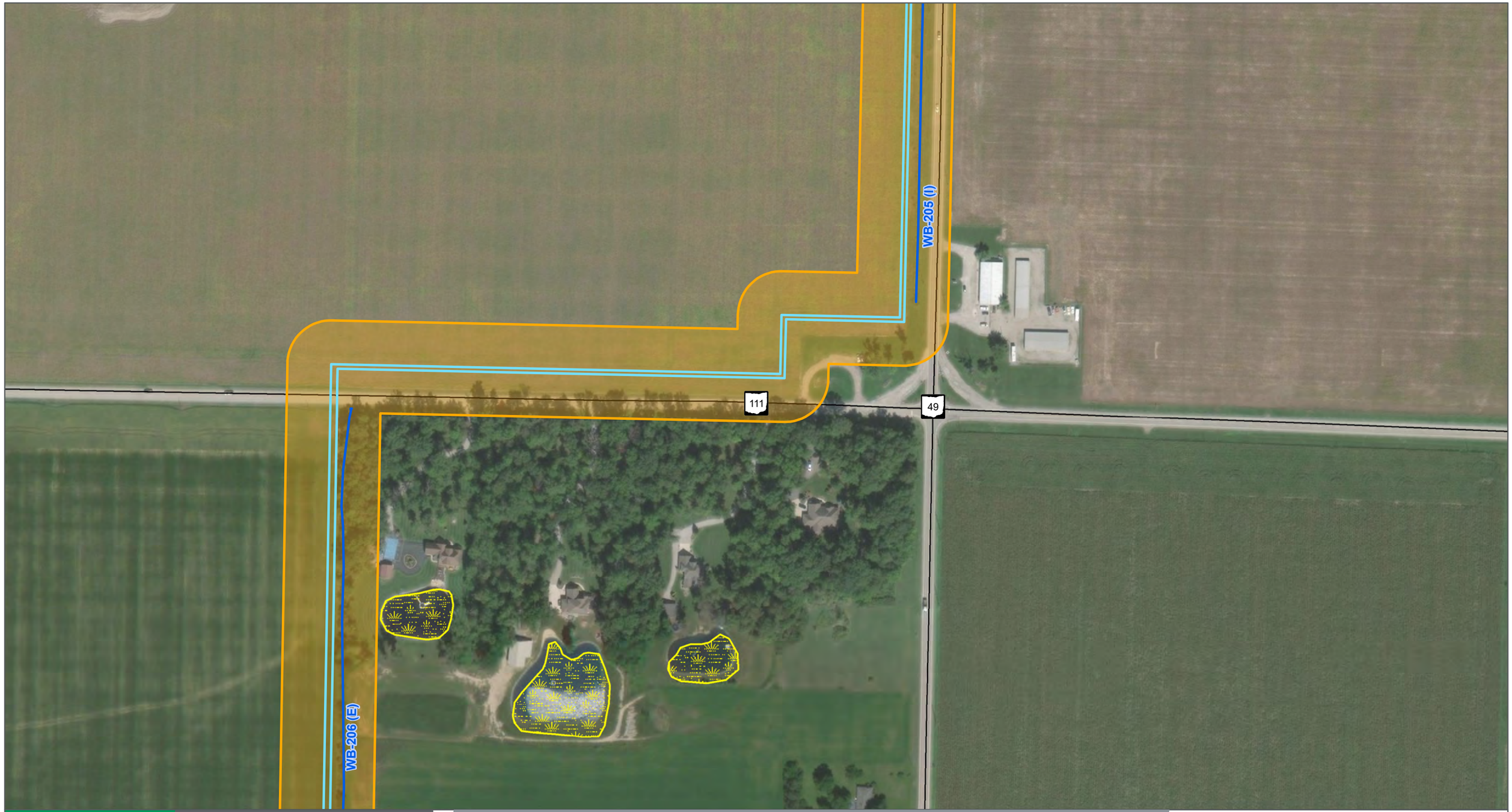

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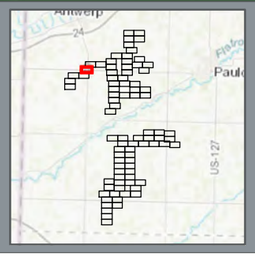

Wetland and Waterbody Maps (Sheet 18 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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Wetland and Waterbody Maps (Sheet 19 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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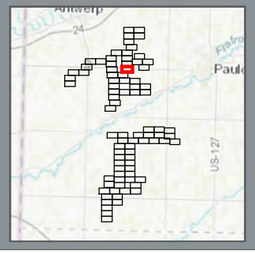

Wetland and Waterbody Maps (Sheet 20 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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GIS Analyst: Peter.Marsey

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Wetland and Waterbody Maps (Sheet 21 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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Wetland and Waterbody Maps (Sheet 22 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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GIS Analyst: Peter.Marsey

WB-206 (E)

WL-004-WET

WL-004

WL-004-UPL

WB-207 (I)

WB-208 (E)

49

Twp Rd T-134

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
County, City, Township Boundaries, Railroads: ESRI Data and Maps (2014)
Roads: U.S. Census Bureau Tiger Files (2017)

Wetland and Waterbody Maps (Sheet 23 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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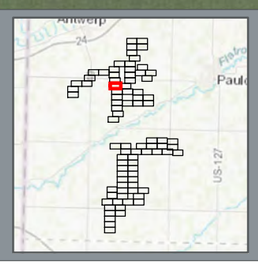

Wetland and Waterbody Maps (Sheet 24 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
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Twp Rd 61

Town Hwy 61

WB-142 (I)

WB-211 (E)

Data Sources:
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Infrastructure: EDPR (2017)
Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
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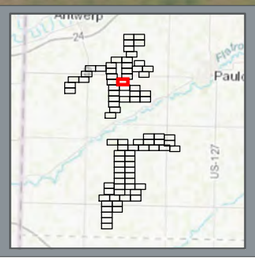

Wetland and Waterbody Maps
(Sheet 25 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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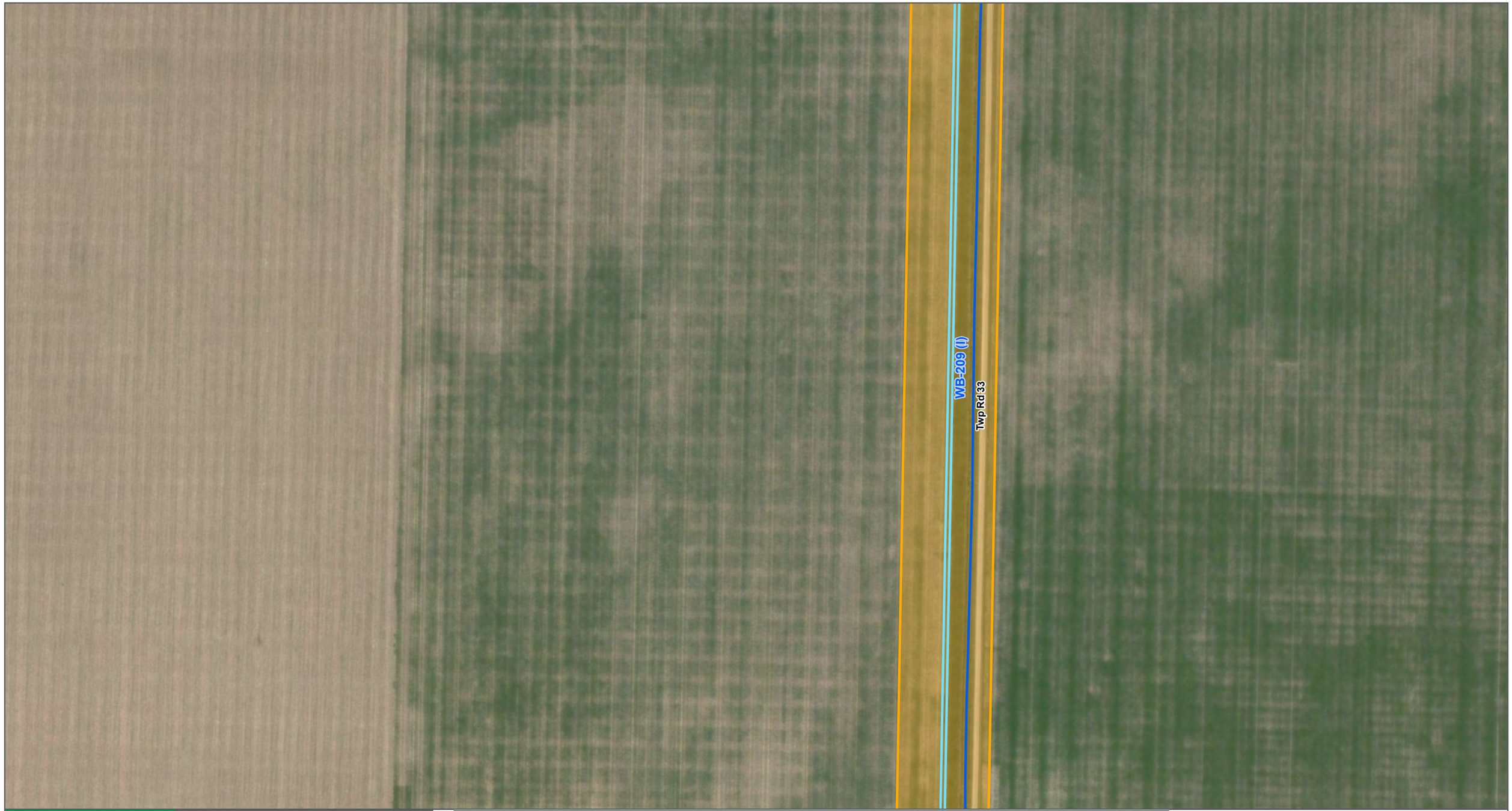

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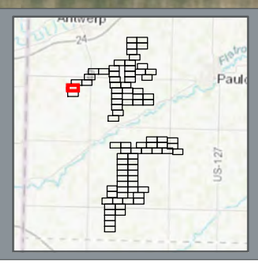

Wetland and Waterbody Maps (Sheet 26 of 85)

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Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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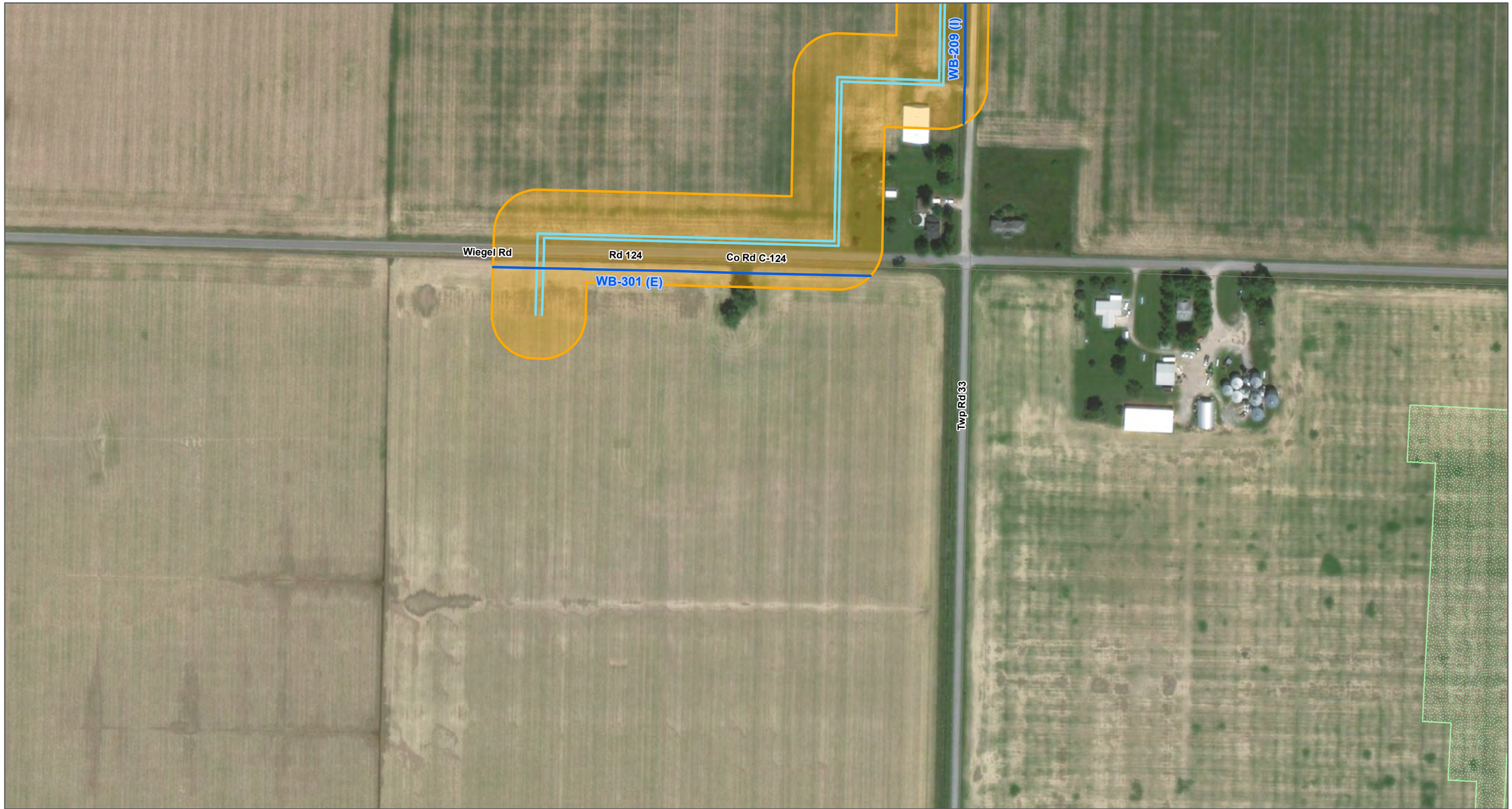

Data Sources:
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Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
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Wetland and Waterbody Maps (Sheet 27 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
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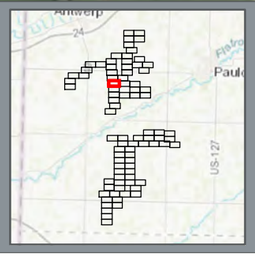

Wetland and Waterbody Maps
(Sheet 28 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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GIS Analyst: Peter.Marsey

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Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
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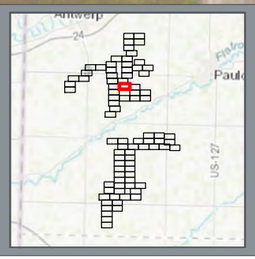

Wetland and Waterbody Maps (Sheet 29 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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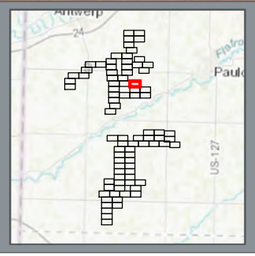

Wetland and Waterbody Maps (Sheet 30 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
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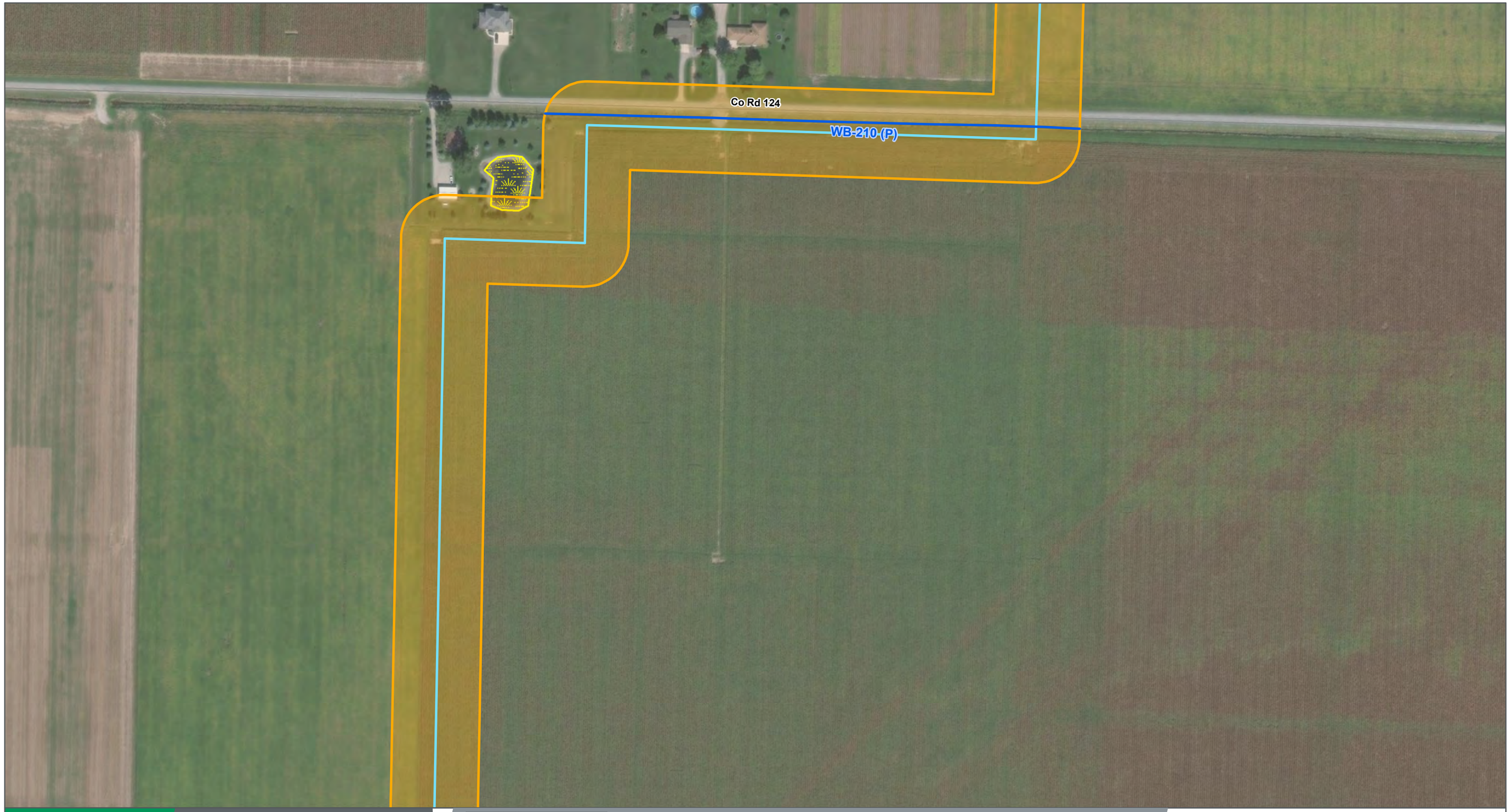

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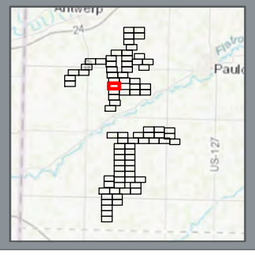

Wetland and Waterbody Maps (Sheet 31 of 85)

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Paulding County, Ohio

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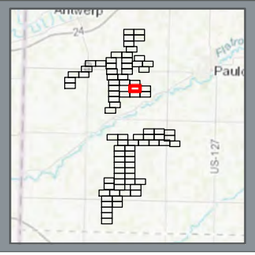

Wetland and Waterbody Maps (Sheet 32 of 85)

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Paulding County, Ohio

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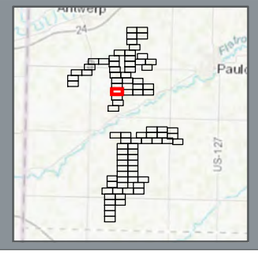

Wetland and Waterbody Maps (Sheet 34 of 85)

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Paulding County, Ohio

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GIS Analyst: Peter.Marsey

WB-212 (E)

Twp Rd 61

Town Hwy 61

WB-154 (E)

WB-214 (I)

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
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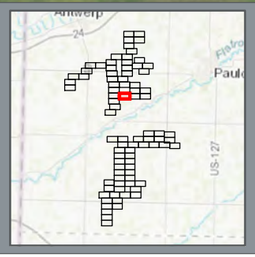

Wetland and Waterbody Maps (Sheet 35 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

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GIS Analyst: Peter.Marsey

Co Rd 71

Rd 112

Town Hwy 112

Twp Hwy 112

WB-214 (I)

Data Sources:
Imagery NAIP (2015)
Infrastructure: EDPR (2017)
Wetlands: Cardno (2017), Ohio DNR Wetlands Inventory (1991), USFWS (1979)
County, City, Township Boundaries, Railroads: ESRI Data and Maps (2014)
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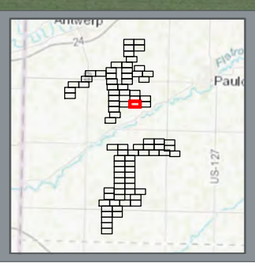

Wetland and Waterbody Maps (Sheet 36 of 85)

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Paulding County, Ohio

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Wetland and Waterbody Maps (Sheet 37 of 85)

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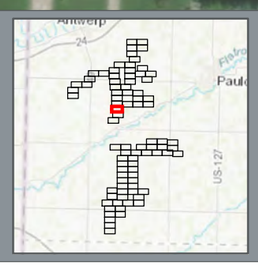

Wetland and Waterbody Maps (Sheet 38 of 85)

Timber Road IV Wind Farm
Paulding County, Ohio

0 100 200 300 400 500 600 Feet
0 25 50 75 100 125 150 175 Meters

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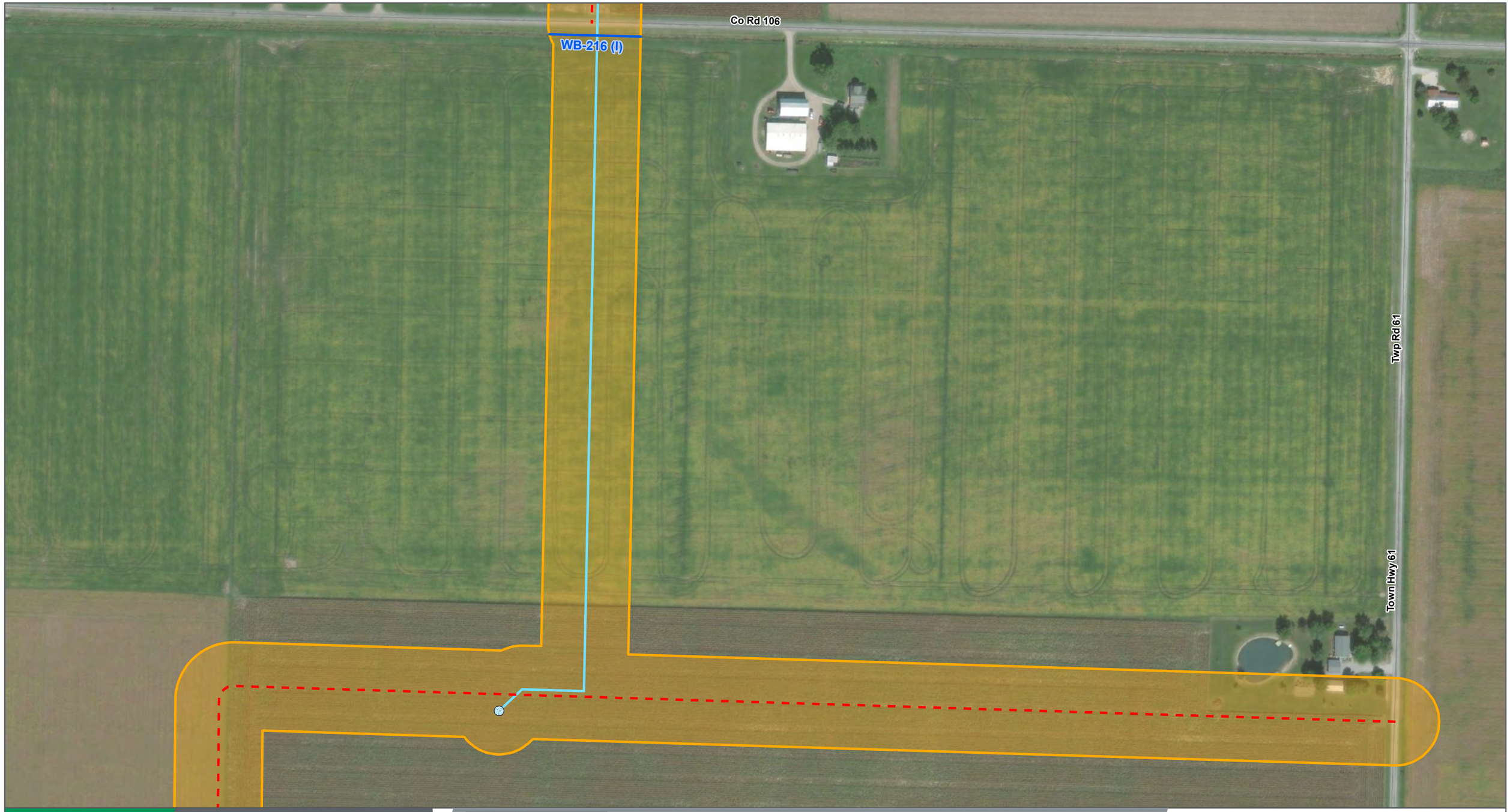
GIS Analyst: Peter.Marsey



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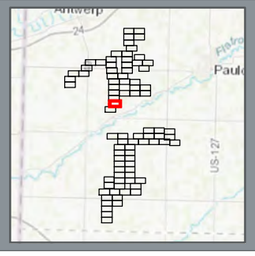

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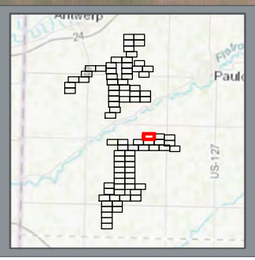

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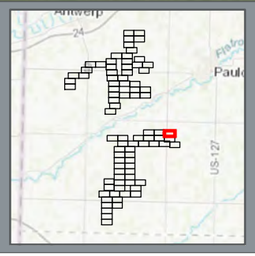

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Co Hwy 82

Rd 82

WB-144 (I)

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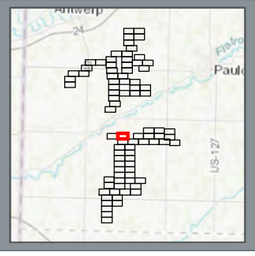

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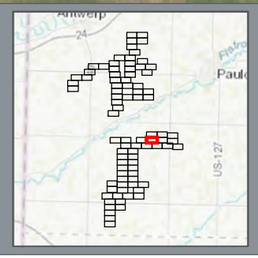

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Summary: Application – Part 7 of 11 – Exhibit M (Part 1 of 2) electronically filed by Christine M.T. Pirik on behalf of Paulding Wind Farm IV LLC