

**Vinton Solar Energy LLC
Case No. 19-393-EL-BLN**

Application Part 3 of 3

Part 3 includes:

- Exhibit E Ohio State Historic Preservation Office Review Letter February 2019**
- Exhibit F U.S. Fish and Wildlife Service Correspondence**
- Exhibit G Site Characterization Study Report January 2018**
- Exhibit H Wetlands and Other Waters of U.S. Delineation Report January 2018**
- Exhibit I Raptor Nest Survey Report June 2017**

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Exhibit E

Ohio State Historic Preservation Office Review Letter February 2019

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(Sent from SHPO by Email only)

In reply refer to
2017-VIN-39428

February 8, 2019

Gabriel Klooster, Associate, Renewable Development
Invenergy
One South Wacker Drive, Suite 1800
Chicago, IL 60606

Re: Vinton Solar Energy, Supplement 17-0774-EL-BGN
Elk Township, Vinton County, Ohio

Dear Mr. Klooster,

This is in response to correspondence from your office dated January 31, 2019, transmitting the archaeological report titled "Phase I Cultural Resources Investigation of the Vinton Solar Energy Center Transmission Line, Elk Township, Vinton County, Ohio" by James N. Greene, dated January 2019. The comments of the Ohio State Historic Preservation Office (SHPO) are submitted in accordance with provisions of Ohio Revised Code 149.53 requesting cooperation among state agencies in the preservation of historic properties, Ohio Administrative Code 4906-4, and with provisions of the National Historic Preservation Act of 1966, as amended, and regulations at 36 CFR 800.

The proposed aerial electrical transmission line extends for approximately 500 m from the area proposed for the solar farm construction to the Elk Substation on the east side of the Village of McArthur. The archaeological survey presented in the January 2019 report completes an intensive survey along the aerial electrical transmission line corridor. The survey included pedestrian walk-over and shovel testing. No archaeological sites were identified. The archaeologists did not observe any earthen mounding along the bluff edge that could indicate the presence of a prehistoric burial mound and as a result the archaeologists do not recommend any further investigation along the corridor near the bluff edge. The SHPO agrees with this conclusion. The archaeologists noted the presence of an older home near the existing Elk Substation, however they did not observe or recover any evidence of an archaeological midden in the portion of the corridor crossing the Elk Creek floodplain and extending to the substation. No further archaeological work was recommended for this section of the corridor. The SHPO agrees with this conclusion.

The SHPO understands that it is important during this stage of planning for this project to identify a viable transmission line corridor to connect the solar farm to the grid. Because the survey along the corridor did not result in the identification of any cultural resource that would be directly affected by the construction of an electrical transmission line, the SHPO agrees that the corridor provides a viable connection. No further coordination with this office is necessary for the transmission line corridor portion of the project unless there is a change in the scope. If new or additional information on historic properties or effects to historic properties are discovered this office should be notified.

Mr. Gabriel Klooster
February 8, 2019
Page 2

There is much more work for us to do to complete the required consideration of the effects of the project on cultural resources. The SHPO looks forward to the receipt of reports for both architecture-history and archaeological surveys of the solar farm area pursuant to previously provided SHPO recommendations as the development of the project proceeds towards construction.

Any questions concerning this matter should be addressed to David Snyder at (614) 298-2000, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,



David Snyder, Ph.D., RPA, Archaeology Reviews Manager
Resource Protection and Review

DMS/ds (Serial Number 1077472)

xc: Jonathan Pawley, OPSB
James Greene, TRC Solutions

Exhibit F

U.S. Fish and Wildlife Service Correspondence

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Attorneys for Vinton Solar Energy LLC

From: Whittle, Jason <JWhittle@trcsolutions.com>
Sent: Wednesday, April 12, 2017 11:03 AM
To: Sponsler, Michael
Subject: Fwd: Invenergy LLC, Vinton Solar Energy Center Project, Vinton Co.

Out in field today. Second letter to follow

Jason Whittle
 330.472.8210

From: susan_zimmermann@fws.gov <susan_zimmermann@fws.gov> on behalf of Ohio, FW3 <ohio@fws.gov>
Sent: Wednesday, April 12, 2017 10:58:35 AM
To: Whittle, Jason
Cc: nathan.reardon@dnr.state.oh.us; kate.parsons@dnr.state.oh.us
Subject: Invenergy LLC, Vinton Solar Energy Center Project, Vinton Co.



UNITED STATES DEPARTMENT OF THE INTERIOR
 U.S. Fish and Wildlife Service
 Ecological Services Office
 4625 Morse Road, Suite 104
 Columbus, Ohio 43230
 (614) 416-8993 / Fax (614) 416-8994



TAILS: 03E15000-2017-TA-1089

Dear Mr. Whittle,

We have received your recent correspondence requesting information about the subject proposal. There are no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. The following comments and recommendations will assist you in fulfilling the requirements for consultation under section 7 of the Endangered Species Act of 1973, as amended (ESA).

The U.S. Fish and Wildlife Service (Service) recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat (e.g., forests, streams, wetlands). Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted to determine whether a Clean Water Act section 404 permit is required. Best management practices should be used to minimize erosion, especially on slopes. All disturbed areas should be mulched and revegetated with native plant species. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats.

FEDERALLY LISTED SPECIES COMMENTS: All projects in the State of Ohio lie within the range of the federally endangered **Indiana bat** (*Myotis sodalis*) and the federally threatened **northern long-eared bat** (*Myotis septentrionalis*). In Ohio, presence of the Indiana bat and northern long-eared bat is assumed wherever suitable habitat occurs unless a presence/absence survey has been performed to document absence. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear

features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. In the winter, Indiana bats and northern long-eared bats hibernate in caves and abandoned mines.

Should the proposed site contain trees ≥ 3 inches dbh, we recommend that trees be saved wherever possible. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and trees ≥ 3 inches dbh cannot be avoided, we recommend that removal of any trees ≥ 3 inches dbh only occur between October 1 and March 31. Seasonal clearing is being recommended to avoid adverse effects to Indiana bats and northern long-eared bats. While incidental take of northern long-eared bats from most tree clearing is exempted by a 4(d) rule (see <http://www.fws.gov/midwest/endangered/mammals/nleeb/index.html>), incidental take of Indiana bats is still prohibited without a project-specific exemption. Thus, seasonal clearing is recommended where Indiana bats are assumed present.

If implementation of this seasonal tree cutting recommendation is not possible, summer surveys may be conducted to document the presence or probable absence of Indiana bats within the project area during the summer. If a summer survey documents probable absence of Indiana bats, the 4(d) rule for the northern long-eared bat could be applied. Surveys must be conducted by an approved surveyor and be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid federal permit. Please note that summer surveys may only be conducted between June 1 and August 15.

If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no tree clearing should occur on any portion of the project area until consultation under section 7 of the ESA, between the Service and the federal action agency, is completed. We recommend that the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence.

Due to the project type, size, and location, we do not anticipate adverse effects to any other federally endangered, threatened, proposed, or candidate species. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the ESA, and are consistent with the intent of the National Environmental Policy Act of 1969 and the Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John Kessler, Environmental Services Administrator, at (614) 265-6621 or at john.kessler@dnr.state.oh.us.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Dan Everson". The signature is fluid and cursive, with the first name "Dan" being more prominent than the last name "Everson".

Dan Everson
Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW

Kate Parsons, ODNR-DOW

Exhibit G

Site Characterization Study Report January 2018

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Attorneys for Vinton Solar Energy LLC

SITE CHARACTERIZATION STUDY REPORT

Vinton Solar Energy Center Right-of-Way

Vinton County, Ohio

January 2018

TRC Project No. 274099.1000.0000



Prepared For:

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CONFIDENTIAL BUSINESS INFORMATION

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Acronyms

DOW	Division of Wildlife
GIS	Geographic Information System
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Conservation
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OAC	Ohio Administration Code
ODNR	Ohio Department of Natural Resources
OPSB	Ohio Power Siting Board
ROW	Right-of-Way
TRC	TRC Environmental Corporation
U.S.	United States
USDA-NRCS	United States Department of Agriculture – Natural Resources Conservation Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VSE	Vinton Solar Energy, LLC
WEG	Wind Energy Guidelines

1.0 INTRODUCTION

On behalf of Vinton Solar Energy, LLC (VSE), TRC Environmental Corporation (TRC) has prepared this Site Characterization Report as part of the environmental studies conducted for the Vinton Solar Energy Center Right-of-Way (ROW) Project (Project). The Study Area consists of the potential construction impact area totaling 6.7 acres (2.7 hectares) located in Elk Township, Vinton County, Ohio. The area investigated was dominated by emergent herbaceous and scrub/shrub wetland, and upland deciduous forest. The parcel is bordered by the proposed Vinton Solar Energy Center on the east and the Elk Substation on the west.

For the purposes of this report, the Project Area is the area which VSE will propose to include within their Ohio Power Siting Board (OPSB) application for a certificate of environmental compatibility and public need, issued by the OPSB. The land is privately owned and is located approximately 1.0 miles (1.6 kilometers) northeast of the Village of McArthur in Vinton County, Ohio (Figure 1.1).

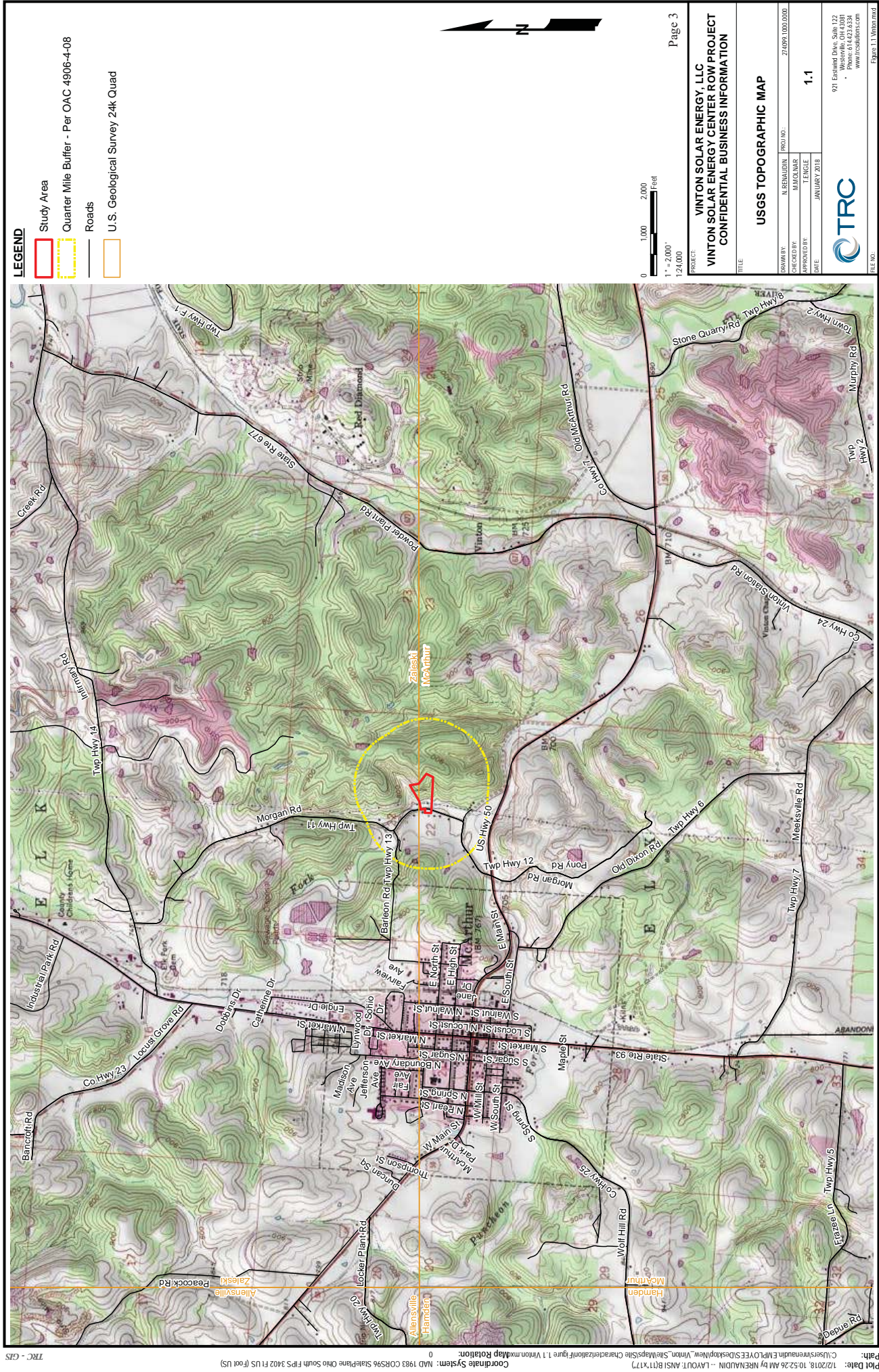
The primary objective of the survey was to identify and evaluate wetlands and other waters of the U.S. within the Study Area, such that the resources could be considered in the planning, design, permitting, and installation of the proposed Project in accordance with Ohio Administrative Code (OAC) Chapter 4906-4-08 (B)(1)(a)(iv-v)-(b).

The Study Area as used in this report consists of the area where potential construction disturbance will occur (Impact Area) and an additional approximately 100-foot (30-meter) buffer in accordance with the OAC 4906-4-08(B)(1)(b). The study objectives were to provide information needed to address questions posed under the Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Study tiers of the U.S. Fish and Wildlife Service's (USFWS) Land-Based Wind Energy Guidelines (WEG) (USFWS 2012), and to provide data to comply with the OPSB requirements at OAC 4906-4-08(B)(1). The wind guidelines were used because the USFWS has not developed a similar tiered approach for solar development.

The Study Area lies within the Unglaciaded Plateau section of the Western Allegheny Plateau physiographic province of Ohio (Wilkin, Nava and Griffith 2011). The Unglaciaded Plateau covers southeastern Ohio and contains deep valleys, high hills, and winding streams (ODNR, Ohio Department of Natural Resources Division of Natural Areas and Preserves no date (n.d.)). Sandstone is common in the region and supports a variety of cliffs, gorges, natural bridges and waterfalls. A long belt of high hills stretching from Monroe to Columbiana Counties divides eastward and westward flowing streams (ODNR, Ohio Department of Natural Resources Division of Natural Areas and Preserves n.d.). Topography in the region consists of steep

slopes and high ridges, with elevations ranging from 781 feet (238 meters) above mean sea level to approximately 961 feet (293 meters) above mean sea level along the ridgetops.

The proposed Project is located within the Ohio River drainage basin. The United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) maintains a classification system for identifying watersheds by hydrologic unit code (HUC). The Project is located within the Raccoon-Symmes (8-Digit HUC: 05090101) river basin (USDA-NRCS, Watershed Boundary Dataset 2013). The streams and tributaries found within the Study Area include Elk Fork and unnamed tributaries to Elk Fork. Soils consist of Steinsburg-Gilpin Association, very steep (StF); Wharton-Latham Silt Loams, 25 to 40 percent slopes (WhL1E1); Omulga silt loam, 2 to 6 percent slopes (Omu1B1); and Stokly-Philo silt loams, 0 to 3 percent slopes, frequently flooded (SkP1AF) (USDA-NRCS, Web Soil Survey 2016).



LEGEND

- Study Area
- Quarter Mile Buffer - Per OAC 4906-4-08
- Roads
- U.S. Geological Survey 24k Quad

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1" = 2,000'
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Page 3

PROJECT
VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER ROW PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE
USGS TOPOGRAPHIC MAP

DRAWN BY	N. REINAUDIN	PROJ NO.	274899.1000.0000
CHECKED BY	MACOLAR		
APPROVED BY	T. ENGLE		
DATE	JANUARY 2018		

1.1

97' Eastwood Dr. Sub 122
Vinton, OH 45891
Phone: 614.423.6334
www.trcsolutions.com

TRC

Figure 1.1 Vinton.mxd

2.0 METHODS

The preliminary site assessment and site characterization were completed using a combination of a) existing information obtained from available public sources including reports, published literature, on-line databases, and geographic information system (GIS) data, b) field reconnaissance, and c) agency consultation.

2.1 Existing Information from Available Public Sources

The following publicly available data sources were used to complete a literature review required by OAC 4906-4-08(B)(1)(c), which specifies including review of a 0.25-mile (0.40-kilometer) buffer beyond the Study Area boundary – (Figure 1.1 - USGS Topographic Map). The following data sources were used to complete this review:

- Google Earth Pro (Google 2017)
- National Audubon's Important Bird Areas (National Audubon Society n.d.)
- National Audubon's Christmas Bird Count (National Audubon Society n.d.)
- United States Geological Survey (USGS) National Land Cover Database (NLCD) (USGS, NLCD 2016)
- Ohio Department of Natural Resources (ODNR) National Heritage Database (ODNR, Division of Wildlife Ohio Natural Heritage Database n.d.)
- U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), Web-Soil Survey (USDA-NRCS, Web Soil Survey 2016)
- USFWS Information for Planning and Conservation (IPaC) (USFWS, IPaC Information for Planning and Consultation n.d.)
- USFWS National Wetlands Inventory (NWI) (USFWS, National Wetlands Inventory 2017)

From these sources, TRC created a Land Cover and NWI map, and a list of species of concern possibly occurring in the Study Area and their typical habitat requirements.

2.2 Field Reconnaissance

A field reconnaissance of the Study Area was conducted December 21, 2017, to complete the following:

- Ground-truth NLCD land cover types and locations;
- Document where land cover types provide habitat for species of concern;

- Ground-truth NWI mapped potential wetland locations;
- Document readily observable features that may serve to attract wildlife, if any; and
- Record incidental wildlife observations.

Vegetation and surface waters were surveyed in the Study Area. Based on field observations, the NLCD classification map units were either confirmed or reclassified. Readily identifiable land cover changes were recorded and mapped. These were mapped based on vegetative structure and dominant species composition. The boundaries were mapped in the field using a global positioning system (GPS) (where accessible) and completed using current Google Earth™ imagery.

Data developed from existing information were utilized during the field reconnaissance to document areas where land cover types may provide suitable habitat for species of concern. Land cover types were field-verified, and locations were documented if they provided potentially suitable habitat for species of concern. For species with specific or narrowly-defined habitat requirements, potentially suitable habitats were viewed (where accessible), and the presence or absence of the specific habitat requirements were recorded.

NWI mapped wetland locations were assessed to ascertain the presence or absence of wetland vegetation and wetland hydrology (noting the predominant vegetative strata, dominant plant species, and type, i.e., stream, pond, lake, etc.).

Readily observable features that could serve as suitable habitat for wildlife, if any, were mapped and briefly described. Incidental wildlife observations were recorded.

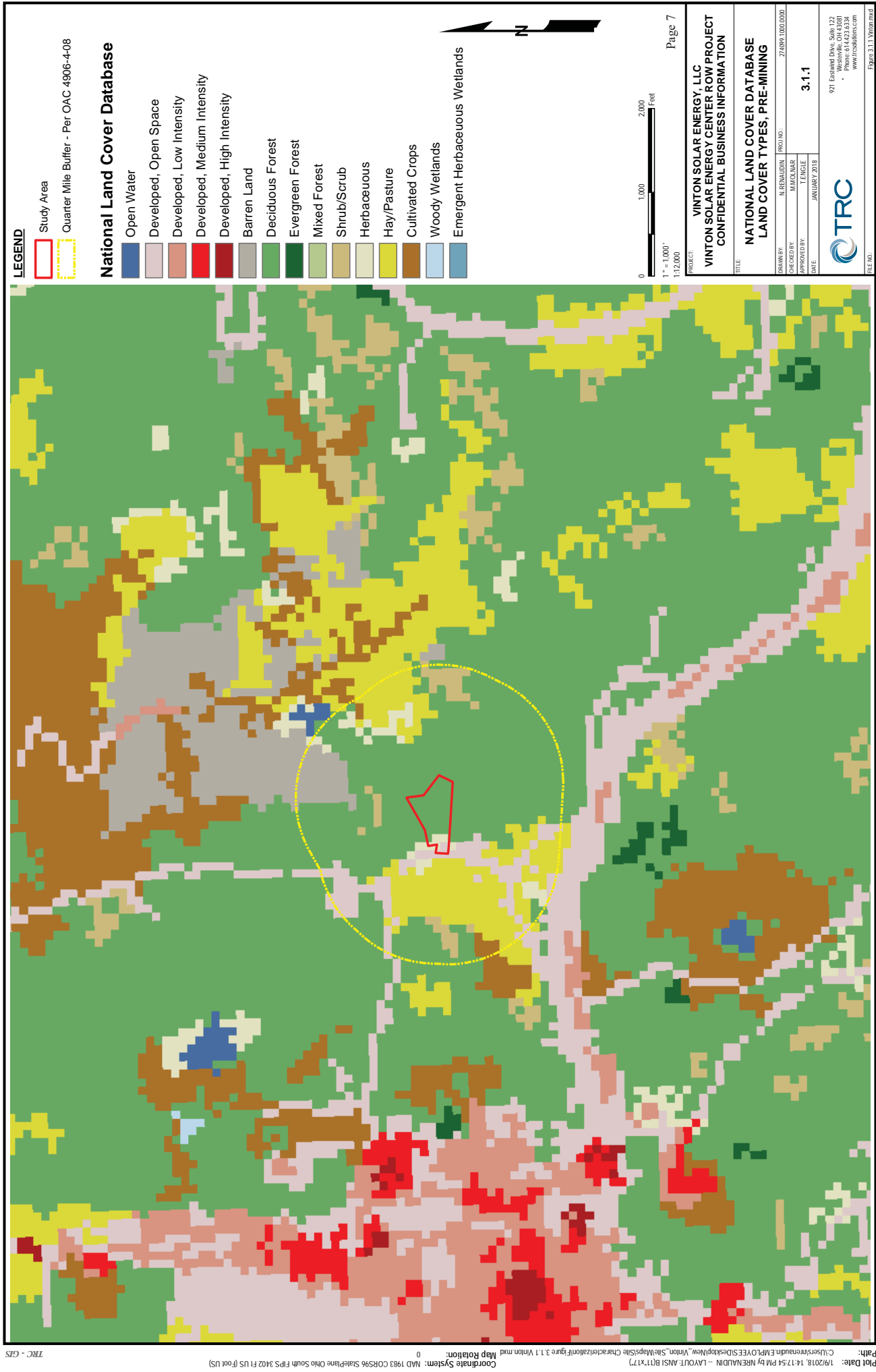
3.0 RESULTS

3.1 Land Cover

Cover types in the Study Area, prior to mining activity, were comprised of a mixture of Deciduous Forest, Developed, Open Space, and Herbaceous as mapped by the NLCD (USGS, NLCD 2016) (Figure 3.1.1). Based on field investigations, ground truthed land cover types within the Study Area were comprised of deciduous forest, developed, high intensity, open water, herbaceous, as well as palustrine emergent and scrub/shrub wetlands (Figure 3.1.2). As shown in Table 3.1, field-verified NLCD data indicates that approximately 76.7 percent of the Study Area is comprised of Deciduous Forest.

Table 3.1. Field-Verified National Land Cover Database Land Cover Types within the Vinton Solar Energy Center Right-of-Way Study Area, Vinton County, Ohio, 2018.

Cover Type	Acres	Hectares	Percent (%)
Deciduous Forest	5.1	2.1	76.7
Developed, High Intensity	0.41	0.17	6.1
Open Water	0.39	0.16	5.8
Herbaceous	0.38	0.15	5.7
Emergent Wetland	0.32	0.13	4.6
Scrub/Shrub Wetland	0.08	0.03	1.1
Total	6.7	2.7	100.0



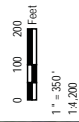
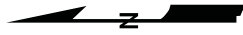


LEGEND

-  Study Area
 Quarter Mile Buffer - Per OAC 4906-4-08

Ground Truthed Land Use

- DECIDUOUS FOREST
DEVELOPED, HIGH INTENSITY
EMERGENT WETLAND
HERBACEOUS
OPEN WATER
SCRUB/SHRUB WETLAND



Page 8

PROJECT
VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER ROW PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE	NATIONAL LAND COVER DATABASE GROUND TRUTHED LAND USE
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DRAWN BY:	N. RENAUDIN	PROJ. NO.: 274099.1000.0000
CHECKED BY:	M. MOLNAR	
APPROVED BY:	T. ENGLE	
DATE:	JANUARY 2018	



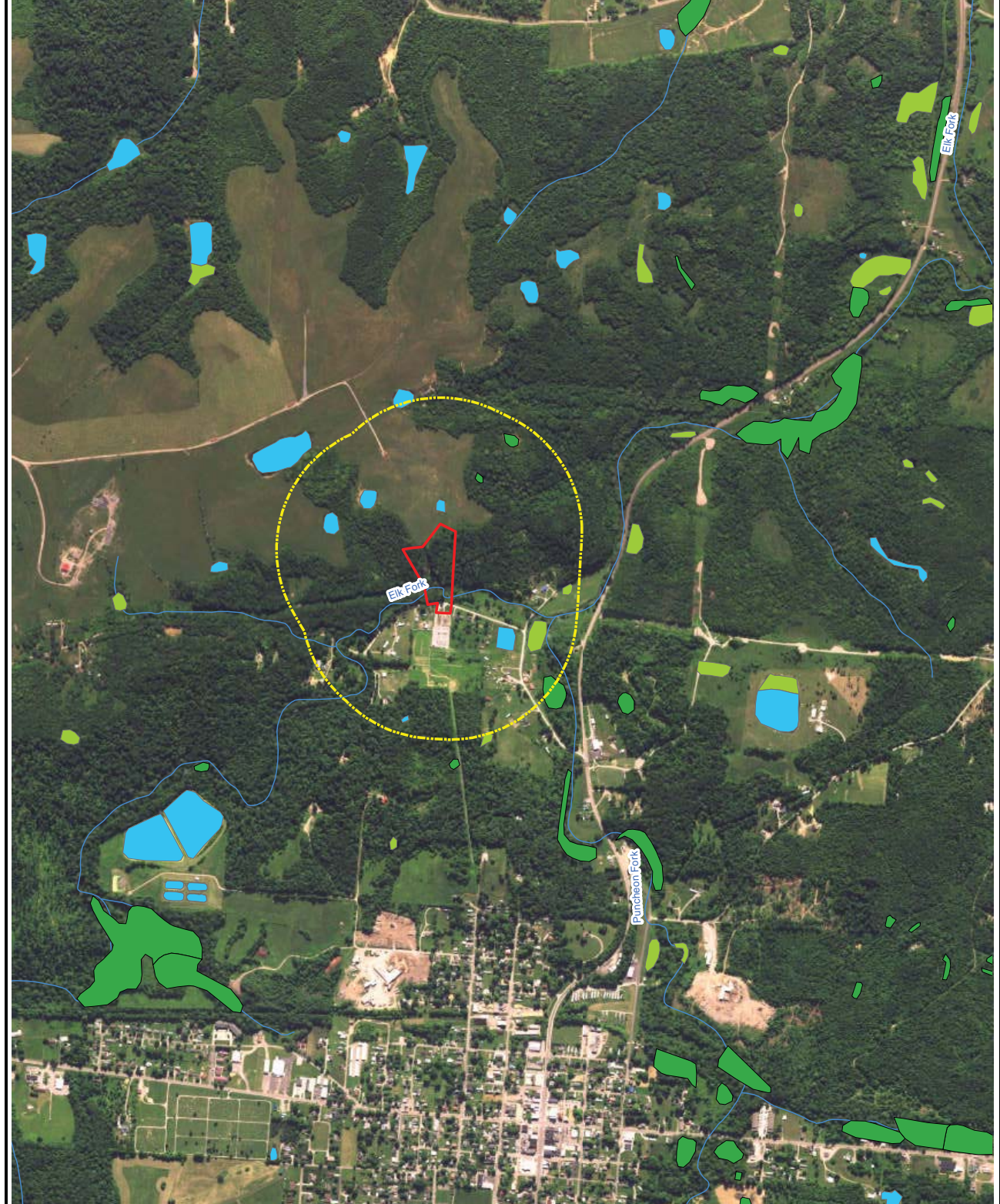
921 Eastwind Drive, Suite 122
Westerville, OH 43081
• Phone: 614.423.6334
www.jrcsolutions.com

FILE NO.: Figure 3.1.2 Vntan.mxd

3.2 NWI Wetlands

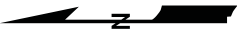
Prior to conducting the field reconnaissance, in accordance with OAC 4906-4-08(B)(1)(c), a literature review of NWI maps (USFWS, National Wetlands Inventory 2017) identified three (3) palustrine emergent wetlands, three (3) palustrine forested/shrub wetlands, and six (6) palustrine unconsolidated bottom ponds within the 0.25-mile (0.40-kilometer) buffer around the Study Area boundary. Based on the review of NWI mapping, the Study Area, excluding other Waters of the United States (U.S.) (ephemeral, intermittent and perennial streams), does not contain wetland habitat (Figure 3.2).

In the field, TRC identified and documented the boundaries of one (1) palustrine emergent-scrub/shrub wetland in the Study Area. The palustrine emergent-scrub/shrub wetland documented during field reconnaissance was not depicted on NWI mapping.



LEGEND

- Study Area
- Quarter Mile Buffer - Per OAC 4906-4-08
- National Hydrography Dataset (NHD) Streams
- National Wetlands Inventory (NWI) Wetlands**
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine



PROJECT		VINTON SOLAR ENERGY, LLC	
PROJECT		VINTON SOLAR ENERGY CENTER ROW PROJECT	
TITLE		CONFIDENTIAL BUSINESS INFORMATION	
NATIONAL WETLANDS INVENTORY AND			
NATIONAL HYDROGRAPHY DATASET (NHD)			
DRAWN BY	N. RENAUDIN	PROJ. NO.	274099 100.0000
CHECKED BY	MAKOLMAR		3.2
APPROVED BY	T. ENGLE		
DATE	JANUARY 2018		
TRC		921 Eastwood Drive, Suite 102 Westerville, OH 43081 Phone: 614.243.6334 www.trcsolutions.com	
FILE NO.		Figure 3.2 Wetlands.mxd	

3.3 Habitat Description

The Study Area is primarily comprised of upland deciduous forest and a palustrine emergent-scrub/shrub, floodplain wetland. The dominant tree species in the upland deciduous forest include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), red oak (*Quercus rubrum*), and white oak (*Quercus alba*).

Several small tributaries to Elk Fork occur intermittently throughout the Study Area. In addition, one (1) wetland, a floodplain palustrine emergent/scrub-shrub wetland was identified. This wetland was found to be of moderate quality (Category 2) and dominated by wetland species, such as common rush (*Juncus effusus*), narrowleaf cattail (*Typha angustifolia*), green bulrush (*Scirpus atrovirens*), shallow sedge (*Carex lurida*), and rice cutgrass (*Leersia oryzoides*). Portions of this vegetation (trees and saplings) appear to have been historically clear cut.

Correspondence received from the USFWS (USFWS, Technical Assistance Letter 2018) in a Technical Assistance Letter dated January 11, 2018, indicated that no federal wilderness areas, wildlife refuges or designated critical habitat were identified on or within a 1.0-mile (1.6-kilometer) radius of the Study Area. Correspondence, dated January 2, 2018, from the ODNr Natural Heritage Database (ODNR, Natural Heritage Database 2018) indicates that the ODNr Division of Wildlife (DOW) is unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, or other protected natural areas on or within a 1.0-mile (1.6-kilometer) radius of the Study Area. Field surveys completed within the Study Area confirmed ODNr results that no unique, sensitive or critical habitats were present.

Portions of the Study Area were found to have been historically clear cut with limited habitat diversity. As noted in Section 3.1, field reconnaissance was consistent with land use data, indicating the Study Area is comprised mainly of deciduous forest. The vegetation within the Study Area provides limited habitat that may be attractive to species of concern, and contains no high quality habitat (i.e., no large undisturbed grasslands and no woodlands) at risk of fragmentation. The topography within the Study Area is hilly but without prominent ridgelines that may attract raptors. Manmade structures (i.e., buildings) that may have the potential to attract bat species are absent.

3.4 Wildlife Species

According to ODNr (ODNR, Natural Heritage Database 2018) and USFWS (USFWS, Technical Assistance Letter 2018), there are no records of species of concern within the Study Area. The USFWS IPaC (USFWS, IPaC Information for Planning and Consultation n.d.) identified one (1) federally listed plant, one (1) federally listed insect, two (2) federally listed bat species, and ten (10) migratory birds of

conservation concern as having ranges that overlap the Study Area. Additionally, the USFWS (USFWS, Technical Assistance Letter 2018) Technical Assistance letter, dated January 11, 2018, identified one (1) federal species of concern and Ohio endangered species within the range of the Study Area. Nesting and/or roosting habitat is present within the wooded habitat of the Study Area. Additionally, foraging is available over the Elk Fork and the abutting wetland. Refer to Section 3.4.1 and Table 3.4.1 for further detail on threatened and endangered species.

3.4.1 Federally Listed Species

The USFWS (USFWS, IPaC Information for Planning and Consultation n.d.) identified the federally endangered species running buffalo clover (*Trifolium stoloniferum*), federally endangered American burying beetle (*Nicrophorus americanus*), federally endangered Indiana bat (*Myotis sodalis*), and federally threatened northern long-eared bat (*Myotis septentrionalis*) as having the potential to occur within Vinton County. The USFWS (USFWS, Technical Assistance Letter 2018) Technical Assistance Letter, dated January 11, 2018, identified the federal species of concern timber rattlesnake (*Crotalus horridus horridus*) as having potential to occur within Vinton County. None of the aforementioned species were identified by the USFWS as having recorded occurrences within the Study Area (USFWS, Technical Assistance Letter 2018) (Table 3.4.1).

Table 3.4.1 Wildlife Species of Concern, Status, Preferred Habitat, and Potential Seasons of Occurrence for Species that are Known or Likely to Occur in the Vinton Solar Energy Center Right-of-Way Study Area.

Wildlife Type/ Common Name	Scientific Name	Status ¹	Habitat by Season	Seasons of Potential Occurrence and Likelihood of Occurrence in the Study Area ²			
				Spring	Summer	Fall	Winter
BIRDS							
<i>Raptors</i>							
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC	Nests near mature trees and snags winter through springs; forages in various habitats	L	L	L	L
Golden eagle	<i>Aquila chrysaetos</i>	SC	Nests on cliffs or in the largest trees of forested stands. Probability of presence in late winter.	N	N	N	L
<i>Non-raptors</i>							
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SC	Nests in deciduous woodlands and thickets and uses the same for migration; winters in South America.	L	L	L	N
Bobolink	<i>Dolichonyx oryzivorus</i>	SC	Hayfields and meadows. In migration, marshes. Wintering in South America.	N	L	N	N
Eastern whip-poor-will	<i>Antrostomus vociferus</i>	SC	Forests with open understories. Can be found in both purely deciduous and mixed deciduous-pine forests, often in areas with sandy soil. Winters in southern North American and Central America.	L	L	L	N
Golden-winged warbler	<i>Vermivora chrysoptera</i>	SC	Breed in tangled, shrubby habitats such as regenerating clear cuts, wet thickets and tamarack bogs. Spend winters in open woodlands and shade-coffee plantations of Central and South America.	N	L	N	N

Table 3.4.1 Wildlife Species of Concern, Status, Preferred Habitat, and Potential Seasons of Occurrence for Species that are Known or Likely to Occur in the Vinton Solar Energy Center Right-of-Way Study Area.

Wildlife Type/ Common Name	Scientific Name	Status ¹	Habitat by Season	Seasons of Potential Occurrence and Likelihood of Occurrence in the Study Area ²			
				Spring	Summer	Fall	Winter
Non-Raptors							
Henslow's sparrow	<i>Ammodramus henslowii</i>	SC	Uses large grasslands in all seasons; winters in the southern North America.	L	L	L	N
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	SC	A year round resident of Ohio; a cavity nester in deciduous woodlands with oak or beech, groves of dead or dying trees year around.	H	H	H	H
Wood thrush	<i>Hylocichla mustelina</i>	SC	Nest in deciduous woodland and mixed forests throughout eastern U.S. in small trees or saplings; a ground forager in woodlands throughout the year; it winters in Central America.	L	L	L	N
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	SC	Found on steep slopes with dense understory in the eastern deciduous forests; winters in Central America and the Caribbean.	L	L	L	L
INSECTS							
American burying beetle	<i>Nicrophorus americanus</i>	FE	Lives in many types of habitat, with a slight preference for grasslands and open understory hickory forests	L	L	L	L
MAMMALS							
Indiana bat	<i>Myotis sodalis</i>	FE	Summer roosting in trees with loose bark over 9.0 inches (22.9 centimeters) in diameter; winters in caves	M	M	M	N

Table 3.4.1 Wildlife Species of Concern, Status, Preferred Habitat, and Potential Seasons of Occurrence for Species that are Known or Likely to Occur in the Vinton Solar Energy Center Right-of-Way Study Area.

Wildlife Type/ Common Name	Scientific Name	Status ¹	Habitat by Season	Seasons of Potential Occurrence and Likelihood of Occurrence in the Study Area ²			
SpringSummerFallWinter							
MAMMALS							
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT	Summer roosting in trees with loose bark over 3.0 inches (7.6 centimeters) in diameter; winters in caves	M	M	M	N
REPTILE							
Timber rattlesnake	<i>Crotalus horridus</i>	SC	Occurs in the Unglaciated Allegheny Plateau and are a woodland species and utilize sunlit gaps in the canopy for basking; winters in deep rock crevices on high dry, ridges; in the fall, return to the same den.	L	L	L	L
PLANTS							
Running buffalo clover	<i>Trifolium stoloniferum</i>	FE	Occurs in mesic habitats of partial to filtered sunlight where there is a pattern of moderate disturbance (mowing, grazing, etc.); most found in regions underlain with limestone or calcareous bedrock; majority of populations occur within the Appalachian and Bluegrass regions	L	L	L	L

Sources:

The Cornell Lab of Ornithology, Birds of North America <https://birdsna.org/Species-Account/bna/species> accessed January 3, 2018
McCormac, James and Kennedy, Gregory. Birds of Ohio. Edmonton: Lone Pine Pub., 2004. Print.
ODNR website <http://wildlife.ohiodnr.gov/species-and-habitats/state-listed-species> accessed January 3, 2018
USFWS website <https://www.fws.gov/midwest/endangered/index.html> accessed January 3, 2018.

¹ FE = Federal-endangered, FT = Federal-threatened, SC = Species of Concern

² Likelihood of occurrence Key: H = High potential; M = Moderate potential; L = Low potential and N = No potential; C = Confirmed sighting

Federally Listed Threatened and Endangered Species

Running Buffalo Clover (*Trifolium stoloniferum*)

The federally endangered running buffalo clover requires periodic disturbance and a somewhat open habitat to successfully flourish, but it cannot tolerate full-sun, full-shade, or severe disturbance. Historically, running buffalo clover was found in rich soils in the ecotone between open forest and prairie. Those areas were probably maintained by the disturbance caused by American bison (*Bison bison*). Today, the species is found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails (USFWS, Endangered Species 2015).

The literature review, agency consultation and field reconnaissance survey found no potential of preferred habitat in the Study Area. The Study Area contains severely eroded soils, full-shaded woodlots, mowed/maintained areas with full-sun, and emergent-scrub/shrub wetland. Additionally, the species was not detected during field reconnaissance.

American Burying Beetle (*Nicrophorus americanus*)

Historical records offer little insight into what type of habitat is preferred by the federally endangered American burying beetle. Current information suggests that this species is a habitat generalist, capable of living in many types of habitat. It has a slight preference for grasslands and open understory of oak-hickory forests. However, the beetles are carrion specialists in that they need carrion the size of a dove or a chipmunk in order to reproduce. Carrion availability may be the greatest factor determining where the species can survive (USFWS, Endangered Species 2016).

The literature review, agency consultation and field reconnaissance survey found low potential of preferred habitat in the Study Area. The Study Area has several types of land cover, including deciduous forest with open understory, emergent-scrub/shrub wetland and mowed/maintained areas. Carrion the size of doves and chipmunks may likely be present throughout the year; however, preferred habitat is also found immediately adjacent (outside of) to the Study Area. Additionally, the species was not detected during field reconnaissance.

Indiana bat (*Myotis sodalis*)

The federally endangered, Indiana bat occurs over a range that extends from the east coast to Midwestern United States, including Ohio (USFWS, Endangered Species 2017). Indiana bats hibernate during winter in caves and mines, subsequently migrating to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. Indiana bats utilize a variety of habitats to forage on flying insects found along rivers, lakes, open fields and uplands (USFWS, Endangered Species 2017).

Although the Indiana bat has the potential to inhabit all counties in Ohio, correspondence with the ODNR (ODNR, Natural Heritage Database 2018) Natural Heritage Database, dated January 2, 2018, indicates no Indiana bat capture locations were recorded within a 5.0-mile (8.0-kilometer) radius or hibernacula within a 10-mile (16-kilometer) radius of the Study Area.

Based on field reconnaissance and literature reviewed, the likelihood of the Indiana bat occurring within the Study Area is low during spring, summer and fall (Table 3.4.1). Potentially suitable summer roosting habitat (i.e. loose tree bark on dead or dying trees and crevices) is present within the Study Area; however, the area did not contain cliffs, caves or mines typically utilized for winter hibernation. Based on proposed construction activities, including winter tree clearing, the Indiana bat does not have the potential of being affected by the proposed Project.

Northern long-eared bat (*Myotis septentrionalis*)

The federally threatened northern long-eared bat range extends throughout most of southern Canada and the eastern and Midwestern United States (excluding parts of the southeast United States) and is primarily associated with North American forests (USFWS, Endangered Species 2017). Historically, the northern long-eared bat is found statewide in Ohio (USFWS, Technical Assistance Letter 2018). Currently, ODNR (ODNR, Natural Heritage Database 2018) data related to the northern long-eared bat species remains incomplete.

The northern long-eared bat forages over open fields near caves and forests (USFWS, Endangered Species 2017). The northern long-eared bat is similar to the Indiana bat in its use of caves and mines for hibernation. The northern long-eared bat requires very high humidity associated with selected hibernacula. After hibernation, the bats are found in wooded or semi-wooded habitats for the duration of the summer months. The northern long-eared bat utilizes crevices and loose bark on trees (> 3.0 inches [7.6 centimeters] in diameter at breast height) for roosting, although it is considered to be opportunistic and less selective than the Indiana bat (USFWS, Endangered Species 2017).

Based on field reconnaissance and literature reviewed, the likelihood of the Indiana bat occurring within the Study Area is low during spring, summer and fall (Table 3.4.1). Potentially suitable summer roosting habitat (i.e. loose tree bark on dead or dying trees and crevices) is present within the Study Area; however, the area did not contain cliffs, caves or mines typically utilized for winter hibernation. Based on proposed construction activities, including winter tree clearing, the northern long-eared bat does not have the potential of being affected by the proposed Project.

Bald eagle (*Haliaeetus leucocephalus*)

Bald eagle habitat includes estuaries, large lakes, reservoirs, rivers and some seacoasts and marshes where they forage for fish. Bald eagles will also feed on waterfowl, turtles, rabbits, snakes, other small animals and carrion (USFWS, IPaC Information for Planning and Consultation n.d.). Bald eagles require a combination of readily available prey, perching areas, and nesting sites. In winter, bald eagles congregate near open water in tall trees for spotting prey and night roosts for shelter (USFWS, IPaC Information for Planning and Consultation n.d.).

According to ODNR (ODNR, Natural Heritage Database 2018), no record of bald eagles are known to occur within the Study Area. Open water habitat and tall trees are present; however, no large nests were observed within or immediately adjacent to the Study Area at the time of field reconnaissance. Based on secondary source review, agency coordination and field reconnaissance, the bald eagle has a low potential of occurring in the Study Area.

Golden eagle (*Aquila chrysaetos*)

Golden eagles build nests on cliffs or in the largest trees of forested stands that often afford unobstructed view of the surrounding habitat (USFWS, IPaC Information for Planning and Consultation n.d.). No large nests were observed within or immediately adjacent to the Study Area at the time of the field reconnaissance. Additionally, golden eagles are rare in Ohio and therefore are not anticipated to be present in the Study Area. Based on secondary source review and field reconnaissance, the golden eagle has a low potential of occurring in the Study Area.

3.4.2 State-listed Species

The ODNR did not identify state-listed species as being present within 1.0 mile (1.6 kilometers) of the Study Area (ODNR, Natural Heritage Database 2018).

Other State-Listed Species

The timber rattlesnake is an Ohio endangered species (USFWS, Technical Assistance Letter 2018). The range for this rattlesnake is restricted to the Unglaciated Allegheny Plateau. Timber rattlesnakes are a woodland species and utilize sunlit gaps in the canopy for basking. They winter in deep rock crevices on high and dry ridges. They return to the same area in the fall (USFWS, Technical Assistance Letter 2018). Although, wooded habitat occurs within the Study Area, no rock crevices or outcroppings were noticed at the time of the field reconnaissance. Based on secondary source review and field reconnaissance, the timber rattlesnake has a low potential of occurring in the Study Area (Table 3.4.1).

Although summer roosting occurrences for the state-listed Indiana bat have been recorded in Vinton County, the ODNR (ODNR, Natural Heritage Database 2018) has no record for capture locations within a 5.0-mile (8.0-kilometer) radius, or hibernacula within a 10-mile (16-kilometer) radius of the Study Area. Additionally, ODNR does not have sufficient data concerning the northern long-eared bat.

Field reconnaissance was conducted on December 21, 2017, at a time when large populations of bird species have migrated from the area. However, during the previous field reconnaissance conducted on April 4, 2017 for the Vinton Solar Energy Project, no state-listed bird species were recorded during incidental observations in the Study Area (Table 3.4.2).

Table 3.4.2. Incidental Bird Species Observations at the Vinton Solar Energy Center, Vinton County, Ohio, 2017.

Common Name	Scientific Name	Listed Status
Killdeer	<i>Charadrius vociferus</i>	None
American Robin	<i>Turdus migratorius</i>	None
European Starling	<i>Sturnus vulgaris</i>	None
Brown-headed Cowbird	<i>Molothrus ater</i>	None
Turkey Vulture	<i>Cathartes aura</i>	None
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	None
Horned Lark	<i>Eremophila alpestris</i>	None
American Kestrel	<i>Falco sparverius</i>	None
American Crow	<i>Corvus brachyrhynchos</i>	None
Canada Goose	<i>Branta canadensis</i>	None
Mallard	<i>Anas platyrhynchos</i>	None
Purple Martin	<i>Progne subis</i>	None
Eastern Meadowlark	<i>Sturnella magna</i>	None
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	None
Northern Cardinal	<i>Cardinalis Cardinalis</i>	None
White-breasted Nuthatch	<i>Sitta carolinensis</i>	None
Field Sparrow	<i>Spizella pusilla</i>	None
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	None
Red-tailed Hawk	<i>Buteo jamaicensis</i>	None
Northern Flicker	<i>Colaptes auratus</i>	None
Northern Mockingbird	<i>Mimus polyglottos</i>	None
Wild Turkey	<i>Meleagris gallopavo</i>	None
Broad-winged Hawk	<i>Buteo platypterus</i>	None

3.4.3 Federal and State Species of Concern¹

The timber rattlesnake is a federal species of concern (USFWS, Technical Assistance Letter 2018). The range for this rattlesnake is restricted to the Unglaciaded Allegheny Plateau. They are a woodland species

¹ Species of Concern is an informal term. It is not defined in the federal Endangered Species Act. The term commonly refers to species that are declining or appear to be in need of conservation, which avoids formal listing.

and utilize sunlit gaps in the canopy for basking. They winter in deep rock crevices on high and dry ridges. They return to the same area in the fall (USFWS, Technical Assistance Letter 2018). Although, wooded habitat occurs within the Site, no rock crevices or outcroppings were noticed at the time of the field reconnaissance. Based on secondary source review and field reconnaissance, the timber rattlesnake has a low potential of occurring in the Study Area. In addition, due to the project type, size, and location there is not an anticipated potential for adverse effect on any federal or state species of concern.

The Study Area is predominately deciduous forest and located immediately adjacent to an actively grazed pastureland and mowed/maintained areas with limited habitat diversity. The ODNr (ODNR, Natural Heritage Database 2018) did not identify species of concern. The USFWS (USFWS, IPaC Information for Planning and Consultation n.d.) identified only Migratory Birds of Conservation Concern (Section 3.4.4. below). No other wildlife species were identified as species of concern.

3.4.4 Birds of Conservation Concern

TRC reviewed the USFWS IPaC (USFWS, IPaC Information for Planning and Consultation n.d.) for Migratory Birds of Conservation Concern that could potentially occur in the Study Area. The USFWS IPaC identified 10 species, including bald eagle, black-billed cuckoo, bobolink, eastern whip-poor-will, golden eagle, golden-winged warbler, Henslow's sparrow, red-headed woodpecker, wood thrush and yellow-bellied sapsucker (Table 3.4.1). Deciduous forest land cover is predominate within the Study Area. This land cover provides habitat for migratory and non-migratory birds. Additionally, foraging is available over the Elk Fork and the abutting wetland and adjacent ponds, located outside the Study Area, offer some habitat for migrating waterfowl. However, winter tree clearing will be conducted as part of the proposed Project, at a time when migratory birds would have left the Study Area. Additionally, Project plans do not include disturbance of any Waters of the U.S. within the Study Area.

3.4.5 Breeding Bird Survey Routes

The nearest Breeding Bird Survey Route (USGS, North American Breeding Bird Survey 2001) is located approximately 2.0 miles (3.2 kilometers) east of the Study Area, known as the Zaleski State Forest Route (Figure 3.4.5). The ten most common birds recorded on this Breeding Bird Survey Route are listed in Table 3.5. In general these species are characteristic of woodland habitats, with the exception of the American robin (*Turdus migratorius*) and American crow (*Corvus brachyrhynchos*) which are more habitat generalists. The wood thrush (*Hylocichla mustelina*) is listed as a Bird of Conservation Concern (Figure 3.4.5).

Table 3.2.5 Ten Most Common Species Observed on the Zaleski State Forest Route, Start Year 2016, End Year 2016.

Common Name	Scientific Name
Wood Thrush	<i>Hylocichla mustelina</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Eastern Towhee	<i>Pipilo erythrophthalmus</i>
American Crow	<i>Corvus brachyrhynchos</i>
Scarlet Tanager	<i>Piranga olivacea</i>
American Robin	<i>Turdus migratorius</i>
Tufted Titmouse	<i>Baeolophus bicolor</i>
Hooded Warbler	<i>Wilsonia citrina</i>
Eastern Wood-Pewee	<i>Contopus sordidulus</i>

3.4.6 Christmas Bird Counts

The nearest Christmas Bird Count Circle (National Audubon Society n.d.) is located in Athens, Ohio, located approximately 8.0 miles (12.8 kilometers) east of the Study Area (Figure 3.4.5). The ten most common species observed are birds that primarily utilize open spaces and open water resources. None of these species are Birds of Conservation Concern.



Table 3.4.6 Bird Species Commonly Observed on National Audubon Society's Athens Christmas Bird Counts.

Common Name	Scientific Name
European starling	<i>Sturnus vulgaris</i>
Canada goose	<i>Branta canadensis</i>
American Robin	<i>Turdus migratorius</i>
Turkey Vulture	<i>Cathartes aura</i>
American Crow	<i>Corvus brachyrhynchos</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Carolina Chickadee	<i>Poecile carolinensis</i>
Mourning dove	<i>Zenaida macroura</i>
Mallard	<i>Anas platyrhynchos</i>
American Goldfinch	<i>Spinus tristis</i>

3.4.7 Important Bird Areas

The nearest designated National Audubon Society Important Bird Area (National Audubon Society n.d.) in the vicinity of the Project is Tar Hollow State Park - Ruffed Grouse Management Area, located approximately 15.0 miles (24.1 kilometers) west of the Study Area (Figure 3.4.5). Tar Hollow is Ohio's third-largest state forest, encompassing just over 16,000 acres (6,475 hectares), and surrounds the Tar Hollow State Park's 620 acres (251 hectares), including a 15-acre lake. The majority of the forest is wooded with a variety of forest communities, including planted pine plantations and native stands of Virginia pine (*Pinus virginiana*) and pitch pine (*Pinus rigida*). Approximately 1,700 acres (688 hectares) have been set aside to improve ruffed grouse (*Bonasa umbellus*) habitat (National Audubon Society n.d.).

Important breeding species known to occur at the Tar Hollow State Park include the cerulean warbler (*Setophaga cerulea*), Kentucky warbler (*Geothlypis formosa*), hooded warbler (*Wilsonia citrina*), black and white warbler (*Mniotilta varia*), worm eating warbler (*Helmitheros vermivorum*), northern parula (*Setophaga americana*), yellow-throated warbler (*Setophaga dominica*), Louisiana waterthrush (*Parkesia motacilla*), and pine warbler (*Setophaga pinus*) (National Audubon Society 2017).

Habitats that occur within the Study Area, predominately deciduous forest containing sugar maple, red maple, red oak, and white oak, likely occur within Tar Hollow State Park. However, the Study Area does not contain stands of Virginia or pitch pines, or habitat suitable for the ruffed grouse.

3.4.8 Species of Habitat Fragmentation Concern

The Study Area contains species of trees commonly found within Ohio's deciduous forests. Tree clearing associated with the proposed Project will likely fragment this section of forest. However, habitat found within the Study Area is widespread throughout the region. Terrestrial and avian species found within the Study Area will be able to transverse the ROW.

4.0 SPECIAL STATUS LANDS

Agency correspondence and queries were based on the Study Area as well as the 1.0-mile (1.6-kilometer) radius of the surrounding area.

4.1 Conservation Lands

The USFWS (USFWS, Technical Assistance Letter 2018) Technical Assistance Letter reported “no federal wilderness areas, wildlife refuges or designated critical habitat is present within the vicinity” of the Study area. Correspondence from ODNR (ODNR, Natural Heritage Database 2018) dated January 2, 2018, reported that the agency is unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, or other protected natural areas within a 1.0-mile (1.6-kilometer) radius of the Study Area.

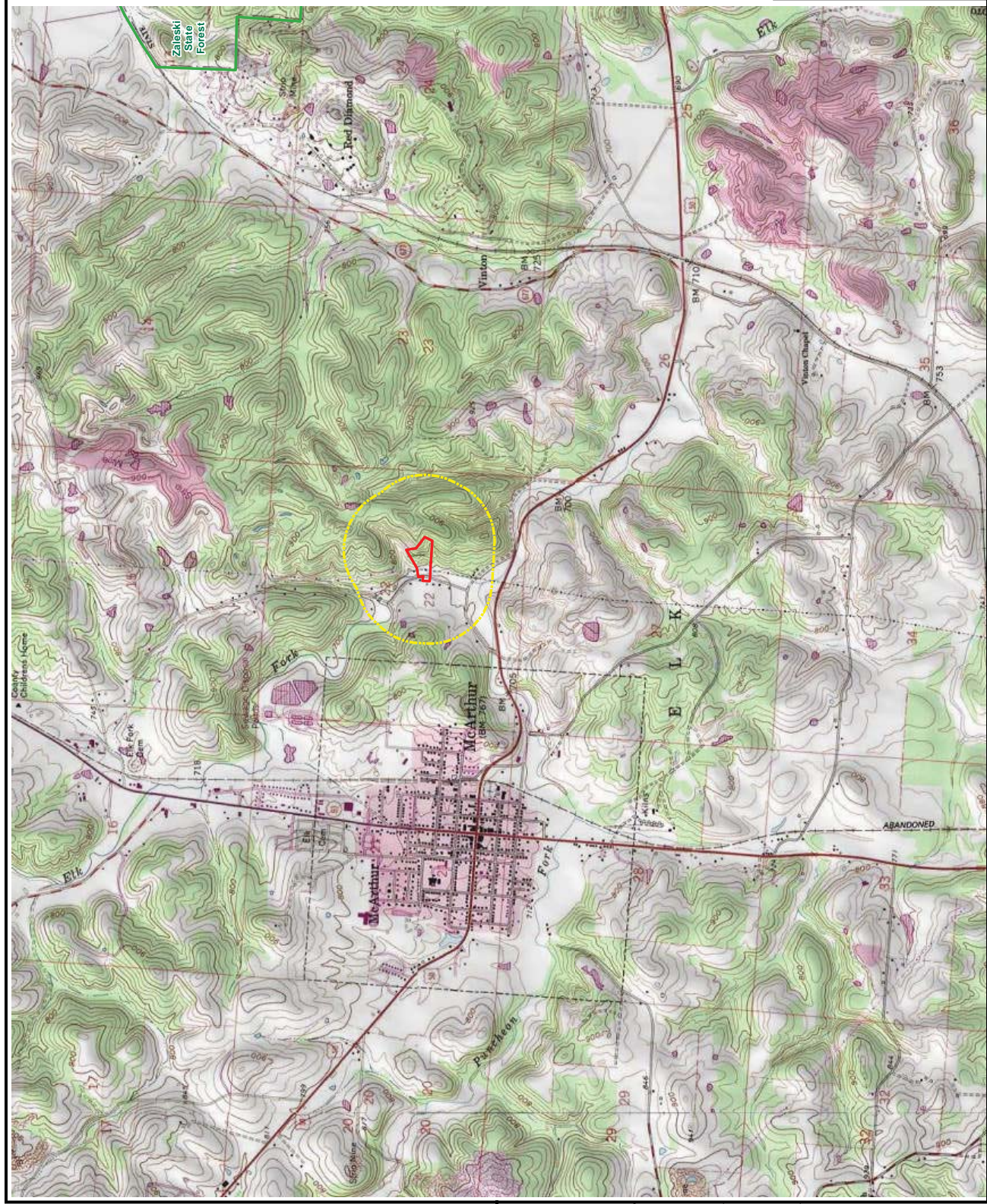
Publicly available databases showed one public land, the Zaleski State Forest, is located within 10 miles (16 kilometers) east of the Study Area. The State Forest is located within 2.0 miles (3.2 kilometers) of the Study Area (Figure 4.1). Zaleski State Forest is the second largest forest in Ohio’s system of state forests. The park provides backpacking opportunities as well as some educational outreach about the historic aspects of the forest. Within the Zaleski State Forest is a 1,100-acre (445-hectare) Grouse Management Area as well as approximately 4,000 acres (1,618 hectares) of forest designated as a Turkey Management Area. These areas are managed under cooperative agreements between the Division of Forestry, the Division of Wildlife and the Ruffed Grouse Society.

4.2 Habitats of Biodiversity Significance

Ohio does not inventory and classify sites of biodiversity significance. Ohio has a Natural Areas and Preserves program which designates areas as a State Nature Preserve based on its unique features such as remnants of Ohio’s pre-settlement past, rare and endangered species, and geologic formations (ODNR, Natural Areas and Preserves n.d.). As indicated in Section 4.1 above, no unique properties or critical habitat are within the vicinity of the Study Area.

LEGEND

- Study Area
- Quarter Mile Buffer - Per OAC 4906-4-08
- Plant Communities Of Concern
- Federal, State, Local Owned or Managed Lands



Plot Date: 12/20/18, 09:37:40 AM by NRENAUDIN - LAYOUT: A818171x177
 Path: C:\Users\NRENAUDIN\EMPLOYEE\Sidekick\New_Vinton_Site\MapSite\Characteristic\figure 3.3 Vinton.mxd
 Coordinate System: NAD 1983 CRS96 StatePlane Ohio South FIPS 3402 US (Foot US)
 Map Rotation: 0
 TRC - GIS

0 1,000 2,000 Feet

1" = 2,000'

124,000

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VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER ROW PROJECT
CONFIDENTIAL BUSINESS INFORMATION

PLANT COMMUNITIES OF CONCERN
AND FEDERAL/STATE/LOCAL
OWNED OR MANAGED LANDS

DRAWN BY:	N. RENAUDIN	PROJ. NO.	274999 100 0000
CHECKED BY:	M. COLLINS	T. ENGLE	
DATE:	JANUARY 2018		

4.1

971 Eastwood Drive, Suite 122
 Vinton, Ohio 44688
 Phone: 614.423.6334
 www.trcsolutions.com

Figure 3.3 Vinton.mxd

5.0 PLANT COMMUNITIES OF CONCERN

No plant communities of concern were identified through agency queries (USFWS, Technical Assistance Letter 2018) (ODNR, Natural Heritage Database 2018) or database reviews within the Study Area or the surrounding 1.0-mile (1.6-kilometer) radius (Figure 4.1).

6.0 LITERATURE CITED

- Google. 2017. *Google Earth Pro*. January 17. Accessed December 20, 2017. <https://earth.google.com/>.
- National Audubon Society. n.d. *Audubon Christmas Bird Count*. Accessed December 29, 2017. <http://www.audubon.org/conservation/science/christmas-bird-count>.
- . n.d. *Audubon Important Bird Areas*. Accessed December 29, 2017. <http://www.audubon.org/important-bird-areas>.
- . n.d. *Important Bird Areas Tar Hollow*. Accessed January 2, 2018. <http://www.audubon.org/important-bird-areas/tar-hollow>.
- ODNR. n.d. *Division of Wildlife Ohio Natural Heritage Database*. Accessed December 29, 2017. <http://wildlife.ohiodnr.gov/species-and-habitats/ohio-natural-heritage-database>.
- . n.d. *Natural Areas and Preserves*. Accessed January 2, 2018. <http://naturepreserves.ohiodnr.gov/>.
- . 2018. "Natural Heritage Database." Columbus, January 2.
- . n.d. *Ohio Department of Natural Resources Division of Natural Resources and Preserves*. Accessed December 29, 2017. <http://naturepreserves.ohiodnr.gov/natural-features-of-ohio/geologic-features/physiographic-regions#UnglaciadedAppalachianPlateau>.
- USDA-NRCS. 2013. *Watershed Boundary Dataset*. Accessed December 29, 2017. <https://datagateway.nrcs.usda.gov/GDGorder.aspx>.
- . 2016. *Web Soil Survey*. Accessed December 20, 2017. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- USFWS. 2015. *Endangered Species*. October 15. Accessed January 2, 2018. <https://www.fws.gov/midwest/endangered/plants/runningb.html>.
- . 2016. *Endangered Species*. July 19. Accessed January 2, 2018. https://www.fws.gov/midwest/endangered/insects/ambbb/abb_fact.html.
- . 2017. *Endangered Species*. December 11. Accessed January 2, 2018. <https://www.fws.gov/midwest/endangered/index.html>.
- . n.d. *IPaC Information for Planning and Consultation*. Accessed December 29, 2017. <https://ecos.fws.gov/ipac/>.
- . 2012. *Land-Based Wind Energy Guidelines*. March 23. Accessed December 29, 2017. https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.
- . 2017. *National Wetlands Inventory*. October 1. Accessed December 20, 2017. <https://www.fws.gov/wetlands/data/Mapper.html>.
- . 2018. "Technical Assistance Letter." *Tails# 03E15000-2017-TA-1090*. Columbus, January 11.
- USGS. 2016. *NLCD*. November 29. Accessed December 29, 2017. https://www2.usgs.gov/climate_landuse/lcs/projects/nlcd.asp.

—. 2001. *North American Breeding Bird Survey*. October 31. Accessed January 2, 2018.
<https://www.pwrc.usgs.gov/bbs/index.cfm>.

Wilkin, E, F J Nava, and G Griffith. 2011. *North American Terrestrial Ecoregions Level III*. Commission for Environmental Cooperation, Canada.
http://www.cec.org/Atlas/Files/Terrestrial_Ecoregions_L1/TerrestrialEcoregions_L1_GeoPDF.zip.

Exhibit H

Wetlands and Other Waters of U.S. Delineation Report January 2018

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WETLANDS AND OTHER WATERS OF THE U.S. DELINEATION REPORT

Vinton Solar Energy Center Right-of-Way

Vinton County, Ohio

January 2018

TRC Project No. 274099.1000.0000



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Acronyms

DOW	Division of Wildlife
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HHEI	Headwater Habitat Evaluation Index
HUC	Hydrologic Unit Code
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate wetland
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
ORAM	Ohio Rapid Assessment Method
PEM	Palustrine emergent
PFO	Palustrine forested
PHWH	Primary Headwater Habitat
POW	Palustrine open-water
Project	Vinton Solar Energy Center Right-of-Way Project
PSS	Palustrine scrub-shrub
QHEI	Qualitative Habitat Evaluation Index

Report	Wetlands and Other Waters of the U.S. Delineation Report
ROW	Right-of-Way
RPW	Relatively Permanent Water
SRW	State Resource Water
TNM	The National Map
TNW	Traditional Navigable Water
TRC	TRC Environmental Corporation
UPL	Upland
U.S.	United States
USACE	United States Army Corps of Engineers
USDA-NRCS	United States Department of Agriculture – Natural Resources Conservation Service
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VSE	Vinton Solar Energy, LLC
WWH	Warmwater Habitat
WQC	Water Quality Certification

1.0 INTRODUCTION

On behalf of Vinton Solar Energy, LLC (VSE), TRC Environmental Corporation (TRC) has prepared this Wetlands and Other Waters of the U.S. Delineation Report (Report) as part of the environmental studies conducted for the Vinton Solar Energy Center Right-of-Way (ROW) Project (Project), located in Vinton County, Ohio. This Report contains the methodology and results of the wetland identification and delineation investigations performed by TRC. Mr. Justin Pitts and Ms. Maggie Molnar (TRC), environmental scientists who have over 17 years of combined experience, were the field scientists and preparers of this Report.

The primary objective of the survey was to identify and evaluate wetlands and other waters of the U.S. within the Study Area, such that the resources could be considered in the planning, design, permitting, and installation of the proposed Project in accordance with Ohio Administrative Code (OAC) Chapter 4906-4-08 (B)(1)(a)(iv-v)-(b).

The Study Area consists of the potential construction impact area totaling 6.7 acres (2.7 hectares). The area investigated was dominated by emergent herbaceous and scrub/shrub wetland, and upland deciduous forest. The parcel is bordered by the Vinton Solar Energy Center on the east and the Elk Substation on the west. Currently, the undeveloped land is privately owned (Appendix A, Figure 1).

The Study Area lies within the Unglaciaded Plateau section of the Allegheny Plateau physiographic province of Ohio (Wilkin, Nava and Griffith 2011). The Unglaciaded Plateau covers southeastern Ohio and contains deep valleys, high hills, and winding streams (ODNR 2017). Sandstone is common in the region and supports a variety of cliffs, gorges, natural bridges and waterfalls. A long belt of high hills stretching from Monroe to Columbiana Counties divides eastward and westward flowing streams (ODNR 2017). Topography in the region consists of steep slopes and high ridges, with elevations ranging from 781 feet (238 meters) above mean sea level, to approximately 961 feet (293 meters) above mean sea level along the ridgetops. The proposed Project is located within the Ohio River drainage basin. The United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) maintains a classification system for identifying watersheds by hydrologic unit code (HUC). The Project is located within the Raccoon-Symmes (8-Digit HUC: 05090101) river basin (USDA/NRCS, Watershed Boundary Dataset 2013). The streams and tributaries found within the Study Area include Elk Fork and unnamed

tributaries to Elk Fork. The Study Area is located within Elk Township in Vinton County, Ohio (Appendix A, Figure 1).

2.0 METHODOLOGY

Pursuant to the United States Army Corps of Engineers (USACE) wetlands and other waters of the U.S. delineation methodology, potential wetland and other waters of the U.S. located within the Study Area were identified, delineated, and mapped through the combined use of existing available public source information and field investigation.

2.1 DESKTOP REVIEW METHODOLOGY

The sources utilized for the desktop review included: the United States Geological Survey (USGS) Zaleski, Ohio (1985) and McArthur, Ohio (1961) 7.5 minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1), soil datasets acquired from the Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2016) for Vinton County, Ohio (Appendix A, Figure 2), the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) for Ohio (USFWS 2016) (Appendix A, Figure 3), the United States Geological Survey (USGS) National Hydrography Dataset (NHD) (USGS 2017) (Appendix A, Figure 3), the Ohio Environmental Protection Agency (Ohio EPA) 401 Water Quality Certification (WQC) for the Nationwide Permits Stream Eligibility Map (Ohio EPA 2017) (Appendix A, Figure 4), the Federal Emergency Management Agency (FEMA) flood hazard risk map (FEMA 2016) (Appendix A, Figure 5), the Ohio EPA OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017), and the Ohio Department of Natural Resources (ODNR), Division of Wildlife (DOW). Sources were reviewed to identify conditions that may be present within the Study Area. The results of the desktop review were used to aid in the field investigation.

2.2 FIELD METHODOLOGY-WETLANDS

Wetland resources within the Study Area were identified and their boundaries determined in accordance with the USACE *Wetlands Delineation Manual (1987 Manual)* (USACE 1987), utilizing the *Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (Regional Supplement)* (USACE 2012). Consistent with the *1987 Manual*, wetland determinations were based on dominant plant species, soil characteristics, and hydrologic characteristics. In addition, wetlands and other waters of the U.S. were evaluated in accordance with the Ohio Environmental Protection Agency (Ohio EPA) as part of the State of Ohio's Water Quality Standards

(OAC Chapter 3745-1). Areas that exhibit hydric soils, wetland hydrology, and a dominance of hydrophytic vegetation were considered potentially jurisdictional wetlands. Wetlands or other waters of the U.S. are considered potentially jurisdictional until verified by the USACE (USACE/USEPA 2008). A photographic log of field observations is presented in Appendix B. Completed USACE Wetland Determination Data Forms- Eastern Mountains and Piedmont Region are presented in Appendix C.

Soils were examined by excavating a soil pit with a soil auger approximately 10 to 18 inches (25 to 46 centimeters) below the ground surface. The exposed soil profile was examined for characteristics using hydric soil criteria described in the National Technical Committee for Hydric Soils *Field Indicators of Hydric Soils in the United States* (USDA 2010). Hue, value, and chroma of the matrix (e.g., 10YR 6/1) and mottles (e.g., 10YR 5/6) of moist soils are examined, as determined by using the *Munsell Soil Color Chart* (Munsell Color 2009). Mottled soils with a matrix chroma of 2 or less, or unmottled soils with a matrix chroma of 1 or less are considered to exhibit hydric soil characteristics (USDA 2010). Mottled soils with a matrix chroma greater than 2 and unmottled soils with a matrix chroma greater than 1 are considered to exhibit non-hydric characteristics.

The hydrology criterion in the *Regional Supplement* requires that an area exhibit at least one primary or at least two secondary indicators of wetland hydrology. Examples of primary wetland hydrology indicators include standing water or saturated soils, water marks on trees, drift lines, water-stained leaves, and oxidized root zones surrounding living roots. Examples of secondary wetland hydrology indicators include drainage patterns, microtopographic relief, presence of crayfish burrows, and sparsely vegetated concave surfaces. Additional secondary signs of hydrology include visible saturation on aerial photography and a positive facultative (FAC)-neutral test as described below (USACE 2010).

Plants were identified to the lowest taxonomic level possible, using professional texts to differentiate cryptic taxa (E. L. Braun 1967) (E. L. Braun 1969) (Gleason and Cronquist 1991) (Holmgren 1998) (Mohlenbrock 2001) (Mohlenbrock 2001) (Mohlenbrock 2002) (Mohlenbrock 2006) (Mohlenbrock 2011) (Newcomb 1977) (Rhoads and Block 2007) (Rothrock 2009) (Stein, Binion and Acciavatti 2003) (Voss and Reznicek 2012) (Weakley, Ludwig and Townsend 2013). Dominant vegetation for each community was determined by estimating dominant species in the tree, sapling/shrub, herbaceous, and woody vine strata. Dominant species were determined by using the 50/20 dominance rule for each stratum, which was accomplished by estimating the percent areal cover for each species. The relative percent areal cover was calculated for each species by dividing each species percent cover by the total percent cover for all species and multiplying by

100. The species were then arranged in descending order of relative percent cover. A running total was kept by adding the relative cover of each species starting with the species with the highest relative cover until the total cover equals 50. All species included in this calculation are regarded as dominant. Species of equal cover value that contributed to meeting the sum of 50 are also considered dominant. Additionally, other species that solely accounted for 20 percent or more of the relative percent cover were also considered dominant species.

The indicator status of each dominant species was determined. An indicator status of obligate wetland (OBL), facultative wetland (FACW), FAC, facultative upland (FACU) and/or upland (UPL) has been assigned to each plant species in the *U.S. Army Corps of Engineers National Wetlands Plant List* (Lichvar, Banks, et al. 2016). In accordance with the aforementioned guidance, an area was classified with hydrophytic vegetation when, under normal circumstances, more than 50 percent of the composition of the dominant species from all strata has OBL, FACW, and/or FAC species.

A FAC-neutral test was calculated for each data set as a means of determining the presence of wetland hydrology. This test considers all FAC species as neutral for wetland determination and compares the number of dominant species wetter than FAC (e.g., OBL, FACW) against the number of dominant species drier than FAC (e.g., FACU, UPL). A positive FAC-neutral test results when dominant species wetter than FAC are more prevalent than dominant species drier than FAC. A positive FAC-neutral test is a secondary indicator of wetland hydrology.

Plots, and consequently communities, that meet the three criteria of hydric soils, wetland hydrology, and hydrophytic vegetation are considered wetlands. Wetland boundaries were mapped where one or more of these criteria gave way to upland characteristics. Samples were also taken in nearby apparent upland areas to confirm that one or more of the criteria were not met in these locations.

Wetlands within the Study Area were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* (Cowardin, et al. 1979). Wetland classifications were based upon hydrophytic vegetation type and dominance found within the delineated wetland, and included the following classification types: palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO), palustrine open-water (POW), or a combination of these classifications (Cowardin, et al. 1979).

The wetland boundaries were flagged, and surveyed through the use of a Global Positioning System (GPS) receiver capable of sub-meter accuracy (model GeoHX handheld, Trimble, Sunnyvale, California). The delineated wetlands were labeled (e.g., *Wetland A*, *Wetland B*, etc.), and correspond to the wetlands illustrated on the Delineated Resources map provided in Appendix A, as Figure 6A. The wetland boundaries were mapped as polygons and the wetland areal extents were calculated using the shapefile properties utility in ArcMap.

Wetland boundaries that extend beyond the Study Area are collected to the edge of the Study Area and categorized as “Open Ended” within the GPS data to indicate that the wetland continued. Wetlands that were just outside the Study Area had points collected on them and were indicated as “Outside Study Area” within the GPS data.

2.3 OHIO RAPID ASSESSMENT METHOD

In accordance with Ohio EPA requirements, delineated wetlands within the Study Area were categorized using the Ohio Rapid Assessment Method (ORAM Version 5.0) (Mack 2001). The scoring sheets (data forms) for individual wetlands were completed and were the basis for the provisional wetland categorizations. The ORAM is designed to aid in the determination of wetland categories as defined in Ohio’s Wetland Antidegradation Rule (OAC Rule 3745-1-54). Wetlands were categorized as low quality (Category 1) to high quality (Category 3). The score from the Quantitative Rating ranges from 0 to 100 and the scoring breakdown for wetland regulatory categories is as follows:

Category 1: 0 – 29.9 (Low Quality)

Category 1 or 2 Gray Zone: 30 – 34.9

Category 2: 35 – 44.9 (Moderate Quality)

Category 2 or 3: 60 – 64.9

Category 3: 65 - 100 (High Quality)

The ORAMs were performed using detailed field evaluations and supplemented by aerial photographic interpretation to aid in boundary determination estimates located beyond the Study Area. While the score and conclusions of the ORAM are designed such that they correlate well with more detailed measures of the biology of the wetlands, they are not considered absolutely definite. ORAM scores are considered preliminary until verified by the Ohio EPA. Refer to Appendix D for completed ORAM data forms.

The scoring sheets (ORAM Version 5.0 Field Form Quantitative Rating) for individual wetlands were completed and were the basis for the provisional wetland categorizations. The delineated wetlands and preliminary ORAM scores are illustrated in Appendix A, Figure 6B.

2.4 OTHER WATERS OF THE U.S.

The Study Area was screened for the presence of areas that meet the criteria for “other waters of the U.S.” specified in the *1987 Manual*. Other waters of the U.S. consist of ephemeral, intermittent, and perennial streams, as well as open water features, such as ponds. Drainage channels that exhibited defined “bed and bank” and an ordinary high water mark in the channel were identified and delineated as jurisdictional streams. Drainage channels that do not exhibit an ordinary high water mark and/or defined bed and bank were regarded as non-jurisdictional drainages. Delineated resources are illustrated in Appendix A, Figure 6A. Jurisdictional determinations are made by the USACE; therefore, all determinations are preliminary until verified by the USACE.

Identified streams were evaluated using the methods outlined in *Biological Criteria for the Protection of Aquatic Life* (OEPA 1986; 2015). These approved assessment methods provide an empirical, quantified evaluation of streams as required by the State of Ohio for permitting and mitigation purposes. These classifications are regularly utilized to determine the level of compensatory mitigation that may be needed for impacts to waters of the U.S. Depending on the size of the stream’s drainage area, data collection for all potential streams includes completion of either the Ohio EPA Qualitative Habitat Evaluation Index (QHEI) or the Headwater Habitat Evaluation Index (HHEI) Data Form. Where coverage was available, the drainage area was calculated using automated basin characteristics from USGS StreamStats v 4.0: Ohio (USGS 2016b).

Following Ohio EPA guidance, streams with a drainage area of greater than 1.0 square mile (2.6 square kilometers), or which have pools with maximum depths over 15.8 inches (40.0 centimeters), as determined by measuring pool depth within the stream, were evaluated using the QHEI. Data on these streams were collected on the QHEI form provided by the Ohio EPA. The QHEI is composed of six principal metrics: substrate, instream cover, channel morphology, riparian zone and bank erosion, pool/glide and riffle-run quality, and map gradient. Each metric is scored separately and summed to obtain the total QHEI score. Narrative ranges vary slightly in smaller streams (<20 square miles; 52 square kilometers) compared to larger streams. For smaller streams: Excellent >70, Good 55-69, Fair 43-54, Poor 30-42, and Very Poor <30; for larger streams: Excellent >75, Good 60-74, Fair 45-59, Poor 30-44, and Very Poor <30.

The HHEI was utilized to score streams with a drainage area of less than 1.0 square mile (2.6 square kilometers). Data on these streams were collected on the HHEI forms, provided by the Ohio EPA. Observational data regarding the physical nature of the stream corridor including stream flow, riparian zone land use and buffer width, and channel modification were recorded. Measurements included bankfull width, maximum pool depth and substrate composition. A biological survey was conducted if deemed necessary using best professional judgment.

Using the scoring method associated with these forms, a Class I, II, or III was assigned to each stream (with Class I being the least protected and Class III being the most protected). Streams that exhibited a major change in morphology were scored at multiple representative locations. QHEI and HHEI scores are considered preliminary until verified by the Ohio EPA. Appendix E provides completed Ohio EPA Stream Data Sheets (QHEI and HHEI Data Forms). The delineated streams and QHEI and HHEI scores are illustrated in Appendix A, Figure 6B.

The Study Area was investigated for other waters of the U.S. that are considered “open water” by the USACE. For this project, open water was considered to be “an area that, during a year with normal patterns of precipitation, has standing or flowing water for sufficient duration to establish an ordinary high water mark, where aquatic vegetation is either non-emergent, sparse, or absent” (USACE no date (n.d.)). When identified, the derived open water (pond) boundaries were surveyed through the use of a GPS receiver capable of sub-meter accuracy (model GeoHX handheld, Trimble, Sunnyvale, California). Delineated open waters are labeled (e.g., *Delineated Stream 1*, *Delineated Stream 2*, etc.) and areas are mapped as polygons.

3.0 RESULTS

During the investigations identified within this Report, one (1) wetland and five (5) streams were identified and delineated within the Study Area (Tables 3.1, 3.2.1, and 3.2.2).

Table 3.1 Potential Wetlands and Other Waters of the U.S. Investigated and Jurisdictional Determinations within the Study Area

Resource ID	Field Survey Date	Location (Latitude, Longitude)	Provisional Determination	Acreage (Hectares) of Jurisdictional Waters in Study Area and Cowardin Classification ¹
<i>Wetland A</i>	12/21/17	39.2496, -82.4593	Water of the U.S., Wetland	0.37 (0.15) /PEM, PSS
<i>Stream 1</i>	12/21/17	39.2496, -82.4593	Water of the U.S., Stream	0.37(0.15)/R5
<i>Stream 2</i>	12/21/17	39.2492, -82.4581	Water of the U.S., Stream	0.03(0.012)/R4
<i>Stream 3</i>	12/21/17	39.2498, -82.4583	Water of the U.S., Stream	0.01(0.004)/R5
<i>Stream 4</i>	12/21/17	39.2494, -82.4574	Water of the U.S., Stream	0.01(0.004)/R6
<i>Stream 5</i>	12/21/17	39.2496, -82.2500	Water of the U.S., Stream	0.002(0.0008)/R6

¹ PEM	= Palustrine Emergent
PSS	= Palustrine Scrub/Shrub
R4	= Intermittent Stream
R5	= Perennial Stream
R6	= Ephemeral Stream

3.1 Background Resources

3.1.1 USGS Topographic Map

Based on desktop review, the Study Area contains no wetland features according to the Zaleski, Ohio (1985) and McArthur (1961) 7.5 minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1). The terrain is relatively flat to steeply sloping. Elevation ranges from approximately 700 to 920 feet (213 to 280 meters) above mean sea level and increases moving east from Elk Fork toward Vinton Solar Energy Center.

3.1.2 Soils

According to the soil dataset acquired from the NRCS Web Soil Survey for Vinton County, Ohio, the Study Area was underlain by four different soil types; three (3) soil types are mapped as non-hydric and one (1) (SkP1AF) soil type is mapped as hydric (USDA 2016) (Table 3.1.2 and Appendix A, Figure 2).

Table 3.1.2 Soils Mapped within the Study Area

Soil Code	Soil Name	Percent (%) in Study Area	Hydric Status
Om1B1	Omulga silt loam, 2 to 6 percent slopes	17.8	Non-Hydric
SkP1AF	Stokly-Philo silt loams, 0 to 3 percent slopes, frequently flooded	9.6	Hydric
StF	Steinsburg-Gilpin Association, very steep	47.79	Non-Hydric
WhL1E1	Wharton-Latham Silt Loams, 25 to 40 percent slopes	24.9	Non-Hydric

3.1.3 National Wetlands Inventory

According to the USFWS NWI (USFWS 2016), no wetlands are mapped within the Study Area (Appendix A, Figure 3).

3.1.4 National Hydrography Database

The USGS NHD (USGS 2017) Downloadable Data Collection from The National Map (TNM) is a comprehensive set of digital spatial data that encodes information about naturally occurring and constructed bodies of surface water (lakes, ponds, and reservoirs), paths through which water flows (canals, ditches, streams, and rivers), and related entities such as point features (springs, wells, stream gages, and dams). Only one (1) waterbody (Stream 1, Elk Fork), within the Study Area, was identified in the National Hydrography Dataset (Appendix A, Figure 3).

3.1.5 Ohio EPA Stream Eligibility for Nationwide Permit Program

All streams identified as part of this Project are located within Eligible areas as according to Ohio EPA's Stream Eligibility for Nationwide Permit Program (Ohio EPA 2017) and are therefore eligible for coverage under the 401-WQC for Nationwide Permits (Appendix A, Figure 4). TRC asserts that the Project, as proposed, will have a minimal impact on water quality and that an individual state water quality certification or Director's Authorization are not necessary.

3.1.6 FEMA Flood Hazard

According to the FEMA Flood Hazard mapping (Community-Panel Number 390553 0005 A, Map Revised January 9, 1981), the Study Area is located within a FEMA Flood Zone A (FEMA 2016) (Appendix A, Figure 5).

3.1.7 Water Quality Standards

One (1) stream within the Study Area has a Designated Use from Ohio EPA according to OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017). Elk Fork is listed as State Resource Water (SRW) and Warmwater Habitat (WWH) from the headwaters of Elk Fork downstream to the confluence with Puncheon Fork, south of the Town of McArthur, Ohio. Both designations are based on the results of a biological field assessment performed by the Ohio EPA.

3.2 DETAILED DELINEATIONS

TRC performed wetland and other waters of the U.S. identification and delineation on December 21, 2017. Weather conditions were seasonably warm, reaching a high of 54 degrees Fahrenheit (12 degrees Celsius) with no rain or snow, and clear and sunny skies. The investigation was performed outside of the normal growing season; however, established vegetation allowed for positive species identification. The presence of apparent hydrology and hydric soil indicators, as well as identifiable plant species within the wetland area, allowed for positive wetland determinations. The USACE maintains the final authority that determines jurisdiction; therefore, statements about jurisdiction within this Report are preliminary and subject to final determination by the USACE and Ohio EPA.

3.2.1 Wetlands

During the course of this investigation one (1) wetland was identified and delineated within the Study Area. The wetland is listed in Table 3.2.1, described below and shown in Appendix A on Figures 6A and 6B. The completed USACE Wetland Determination Data Forms-Eastern Mountains and Piedmont Region are presented in Appendix C.

Table 3.2.1 Wetland Delineated within the Study Area

Wetland ID	Vegetation Class ¹	Extends Offsite?	Acres (Hectares) ²	ORAM Score ³	ORAM Category ³	Jurisdictional Status ⁴
A	PEM/PSS	No	0.37 (0.15)	43	2	Jurisdictional
¹ PEM = palustrine emergent PSS = palustrine scrub/shrub ² Represents delineated acreage within Study Area ³ Preliminarily assigned. Not considered final until verified by Ohio EPA ⁴ Preliminarily assigned. Not considered final until verified by the USACE						

All wetlands and streams within the Study Area display a physical connectivity or adjacency to Elk Fork. Elk Fork flows to Raccoon Creek, a relatively permanent water (RPW) with continuous flow, which directly connects to the Ohio River. The Ohio River is considered a Traditional Navigable Waterway (TNW) by the USACE (2007), giving the USACE jurisdiction over the Ohio River and all connected tributaries. As

such, delineated features with a direct connection or significant nexus to unnamed tributaries to Elk Fork or Elk Fork have been determined jurisdictional by the USACE for the reasons outlined above.

Wetland A

Wetland A is a 0.37 acre (0.15 hectares) PEM/PSS wetland complex dominated by common rush (*Juncus effusus*), green bulrush (*Scirpus atrovirens*), shallow sedge (*Carex lurida*), and rice cutgrass (*Leersia oryzoides*). Portions of this vegetation have been clear cut. The sample point is located approximately 250 feet (76 meters) east of Township Road 11 (Morgan Road) to the east of Elk Fork. The wetland is preliminarily assigned an ORAM score of 43, corresponding to a Category 2 wetland (moderate quality). The determination of a Category 2 wetland was based on size and hydrology (i.e. groundwater, precipitation, seasonal/intermittent surface water, and perennial surface water). The score was limited by disturbances to the hydrology, substrate, and habitat of Wetland A (i.e. upslope farming, clearcutting, selective cutting, and tiling).

Wetland A abuts Stream 1 (Elk Fork) on the left bank, facing downstream. Based on review of the Based on the location, proximity and connectivity to Elk Fork, Wetland A is considered preliminarily jurisdictional.

3.2.2 Other Waters of the U.S.

A. Streams

Five (5) streams with defined bed and bank and ordinary high water mark were identified within the Study Area. Delineated streams within the Study Area are within the Headwaters Elk Fork (12-Digit HUC: 050901010302) drainage basin. The streams are listed in Table 3.2.2, described below and shown in Appendix A on Figures 6A and 6B. Historic mining, pasturing, and clear cutting within the surrounding area has influenced channel morphology, increased embeddedness, reduced sinuosity and flow regime, and affected water quality of the streams (some streams exhibit visible acid mine drainage). Therefore, streams which exhibit any or all of these modifications are recorded as “Modified” channels. Table 3.2.2. below, provides flow regime, drainage area, preliminary HHEI and QHEI scores, and HHEI class and QHEI ratings for streams identified in the Study Area. Completed Ohio EPA stream assessment forms are provided in Appendix E. All jurisdiction determinations are preliminary until the USACE makes the final determination.

Table 3.2.2 Other Waters of the U.S. Delineated within the Study Area

Stream ID	Flow Regime	Length ¹ (ft; m)	Drainage Area (sq mi; sq km) ²	HHEI (H) /QHEI (Q) Score ^{3, 4}	HHEI Class/ QHEI Rating
1	Perennial	411 (125)	14.1 (36.5)	56 (Q)	WWH
2	Intermittent	435 (133)	0.01 (<0.001)	47 (H)	Modified Class II
3	Perennial	607 (185)	0.01 (<0.001)	24 (H)	Modified Class I
4	Ephemeral	164 (50)	0.01 (<0.001)	29 (H)	Class I
5	Ephemeral	51 (16)	0.01 (<0.001)	22 (H)	Class I
<hr/>					
1	Represents delineated length, in feet, and meters within Study Area				
2	Where within coverage, drainage area was calculated using automated basin characteristics from USGS StreamStats v 4.0: Ohio (USGS 2016b).				
3	Primary Headwater Habitat Evaluation Index, for streams with drainage areas of less than 1.0 square mile and a max pool depth of less than 40 centimeters.				
4	Qualitative Habitat Evaluation Index (QHEI), for larger streams with greater than 1.0 square mile.				

Stream 1

Stream 1 (Elk Fork) is a perennial stream with a drainage area of approximately 14.1 square miles (36.5 square kilometers). The stream flows north to south through the Study Area for approximately 411 feet (125 meters). Stream 1 (Elk Fork) drains to Raccoon Creek, and as such, is preliminarily determined to be a jurisdictional waters of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of sand and silt; instream cover (i.e. undercut banks, overhanging vegetation, shallows, pools, aquatic macrophytes, and logs or woody debris) is sparse; channel sinuosity is low to moderate, development is fair to good, channelization is recovering, and stability is low; bank erosion is heavy to moderate; riparian width is narrow to moderate; floodplain quality is forest/swamp and shrub or old field; maximum pool depth is greater than 39.0 inches (1.0 meter); and bank full width is 25.0 feet (7.6 meters). Macroinvertebrates were not sampled or observed during the time of delineation. Elk Fork (Stream 1) has an Ohio EPA designated use of WWH. This stream has been preliminarily assigned a QHEI score of 56; therefore, categorized as in the Good QHEI narrative range.

Stream 2

Stream 2 is a modified intermittent stream with a drainage area of approximately 0.01 square mile (<0.001 square kilometer). The stream flows west and north through the Study Area for approximately 435 feet (133 meters). Stream 2 drains to Wetland A which directly abuts Elk Fork, and, as such, Stream 2 is preliminarily determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are comprised of cobble and gravel, maximum pool depths is 2.0 inches (5.1 centimeters) and

bank full width is 3.5 feet (1.1 meter). Consequently, this stream has been preliminarily assigned an HHEI score of 47; therefore, categorized as a Modified Class II PHWH.

Stream 3

Stream 3 is a modified perennial stream originating within the Study Area with a drainage area of less than 0.01 square mile (<0.001 square kilometer). The stream flows southwest through the Study Area for approximately 607 feet (185 meters). Stream 3 drains to Wetland A which directly abuts Elk Fork, and, as such Stream 3 is preliminary determined to be jurisdictional. Stream 3A, as seen on Figure 6A and 6B, is a divided channel of Stream 3 that is present due to heavy erosion and unstable substrates on this hillslope. Based on the HHEI assessment methods, the dominant substrates are comprised of sand and silt, maximum pool depths is 2.0 inches (5.1 centimeters) and a bank full width is 2.5 feet (0.8 meter). This stream has been preliminarily assigned an HHEI score of 24; therefore, categorized as a Modified Class I PHWH.

Stream 4

Stream 4 is an ephemeral stream originating within the Study Area with a drainage area of 0.01 square mile (<0.001 square kilometer). The stream flows southwest through the Study Area for approximately 164 feet (50 meters). Stream 4 drains to an unnamed tributary to Elk Fork (Stream 2), which drains to Wetland A. Wetland A directly abuts Elk Fork, and, as such Stream 4 is preliminary determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are gravel and sand, maximum pool depth is 2.0 inches (5.1 centimeters) and bank full width is 2.0 feet (0.6 meter). This stream has been preliminarily assigned an HHEI score of 29; therefore, categorized as a Class I PHWH.

Stream 5

Stream 5 is an ephemeral stream originating within the Study Area with a drainage area of 0.01 square mile (<0.001 square kilometer). The stream flows southwest through the Study Area for approximately 51 feet (16 meters). Stream 5 drains to an unnamed tributary to Elk Fork (Stream 4), which connects to another unnamed tributary to Elk Fork (Stream 2). Stream 2 drains to Wetland A which directly abuts Elk Fork, and, as such Stream 5 is preliminary determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are gravel and sand, maximum pool depth is 0.0 inches (0.0 centimeters) and bank full width is 1.5 feet (0.5 meter). This stream has been preliminarily assigned an HHEI score of 22; therefore, categorized as a Class I PHWH.

B. Open Waters (Ponds)

The Study Area was investigated for areas that are considered “open water” by the USACE. Field investigations did not identify any potentially jurisdictional open water resources (ponds) within the Study Area.

4.0 LITERATURE CITED

- (2016), NWPL. 2016. "USACE - NWPL - National Wetland Plant List." *Eastern Mountains and Piedmont - 2016 Regional Wetland Plant List*, April.
- Braun, E Lucy. 1967. *The Vascular Flora of Ohio, Volume 1-The Monocotyledoneae: Cattails to Orchids*. Columbus, OH: The Ohio State University Press.
- . 1969. *The Woody Plants of Ohio: Trees, Shrubs, and Woody Climbers Native, Naturalized, and Escaped*. Columbus, OH: Ohio State University Press.
- Braun, Lucy E. 1967. *The Vascular Flora of Ohio, Volume 1-The Monocotyledoneae: Cattails to Orchids*. Columbus, OH: The Ohio State University Press.
- . 1969. *The Woody Plants of Ohio: Trees, Shrubs, and Woody Climbers Native, Naturalized, and Escaped*. Columbus, OH: Ohio State University Press.
- Cowardin, Lewis M, Virginia Carter, Francis C Golet, and Edward T LaRoe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." Office of Biological Services, U.S. Fish and Wildlife Service, Washington, D.C., 103.
- Cowardin, V Carter, F C Golet, and E T LaRoe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." Office of Biological Services, U.S. Fish and Wildlife Service, Washington, D.C., 103.
- FEMA. 2016. *FEMA Flood Map Service Center*. <https://msc.fema.gov/portal>.
- Gleason, Henry A, and Arthur Cronquist. 1991. *Manual of the Vascular Plants of Northeastern United States and Adjacent Canada*. 2nd. Bronx, NY: The New York Botanical Press.
- Holmgren, Noel H. 1998. *Illustrated Companion to Gleason and Cronquist's Manual: Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada*. Bronx, NY: The New York Botanical Garden.
- Lichvar, R W, D L Banks, W N Kirchner, and N C Melvin. 2016. *The National Wetland Plant List: 2016 Ratings*. Phytoneuron 2016-30.
- Lichvar, R W, N C Butterwick, N C Melvin, and W N Kirchner. 2016. "Eastern Mountains and Piedmont 2014 Regional Wetland Plant List." Cold Regions Research and Engineering Laboratory, U.S. Army Corps of Engineers, 43.
- Mack, John J. 2001. "Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0." Ohio EPA Technical Bulletin Wetland/2001-1-1, Division of Surface Water, 401 Wetland Ecology Unit, Ohio Environmental Protection Agency, Columbus, OH, 72.
- Mohlenbrock, Robert H. 2006. *Illustrated Flora of Illinois, Flowering Plants: Flowering Rush to Rushes*. 2nd. Carbondale, IL: Southern Illinois University Press.
- . 2002. *Illustrated Flora of Illinois, Grasses: Bromus to Paspalum*. 2nd. Carbondale, IL: Southern Illinois University Press.

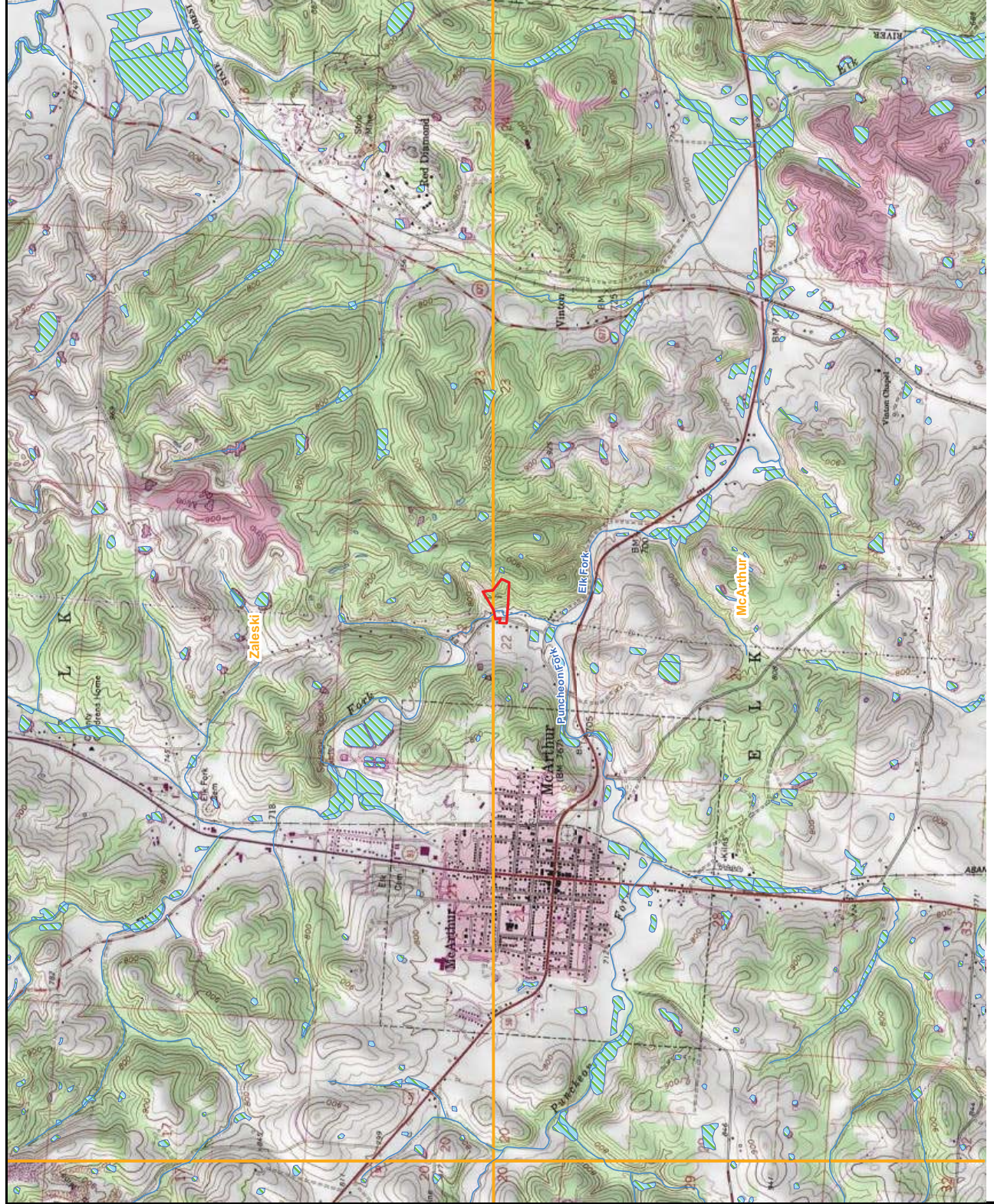
- . 2011. *Illustrated Flora of Illinois, Sedges: Carex*. 2nd. Carbondale, IL: Southern Illinois University Press.
- . 2001. *Illustrated Flora of Illinois, Sedges: Cyperus to Scleria*. 2nd. Carbondale, IL: Southern Illinois University Press.
- . 2001a. *Illustrated Flora of Illinois, Grasses: Panicum to Danthonia*. 2nd. Carbondale, IL: Southern Illinois University Press.
- . 2001. *Illustrated Flora of Illinois, Grasses: Panicum to Danthonia*. 2nd. Carbondale, IL: Southern Illinois University Press.
- Munsell Color. 2009. *Munsell Soil Color Book*. 2013. Grand Rapids, MI.
- Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Company.
- ODNR. 2017. *Ohio Department of Natural Resources*. December 22. <http://ohiodnr.gov/>.
- OEPA. 1986; 2015. "The Biological Criteria for the Protection of Aquatic Life, Volumes I-III." Division of Surface Water, Ohio Environmental Protection Agency, Columbus.
- OEPA. 1986; 2015. "The Biological Criteria for the Protection of Aquatic Life, Volumes I-III." Division of Surface Water, Ohio Environmental Protection Agency, Columbus.
- Ohio EPA. 2017. *401 Water Quality Certification for Nationwide Permits Stream Eligibility Web Map*. October 19. Accessed December 22, 2017. <http://www.epa.ohio.gov/dsw/401/permitting.aspx>.
- . 2017. *Water Quality Standards Program*. February 6. Accessed December 22, 2017. http://www.epa.ohio.gov/dsw/rules/3745_1.aspx.
- Rhoads, Ann Fowler, and Timothy A Block. 2007. *The Plants of Pennsylvania*. 2nd. Philadelphia, PA: University of Pennsylvania Press.
- Rothrock, Paul E. 2009. *Sedges of Indiana and the Adjacent States: The Non-Carex Species*. Indianapolis, IN: Indiana Academy of Science.
- Stein, John, Denise Binion, and Robert Acciavatti. 2003. *Field Guide to Native Oak Species of Eastern North America*. Morgantown, WV: U.S. Department of Agriculture, Forest Service.
- US EPA. 2013. "Level III Ecoregions of the Conterminous United States." U.S. EPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEEL) , U.S. Environmental Protection Agency, Corvallis, OR.
- . 2010. *U.S. Environmental Protection Agency*. Accessed May 4, 2015. ftp://ftp.epa.gov/wed/ecoregions/pubs/CEC_LEVEL_III_Descriptions_US_May2010.doc.
- USACE. 1987. *Corps of Engineers Wetlands Delineation Manual*. Vicksburg, MS: Environmental Laboratory U.S. Army Corps of Engineers, Waterways Experiment Station, Wetlands Research Program Technical Report Y-87-1.
- . no date (n.d.). *Definition of Terms*. Accessed April 7, 2017. <http://www.nap.usace.army.mil/Missions/Regulatory/FAQs/definitions.aspx>.

- USACE. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont (Version 2.0)*. U.S. Army Corps of Engineers, Vicksburg: U.S. Army Engineer Research and Development Center Environmental Laboratory, 176.
- USACE. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*. U.S. Army Corps of Engineers, Vicksburg: U.S. Army Engineer Research and Development Center, 154, 176.
- USACE. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*. U.S. Army Corps of Engineers, Vicksburg: U.S. Army Corps Research and Development Center, 154.
- USACE/USEPA. 2008. "Memorandum Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell V. United States*."
- USDA. 2010. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0*. Natural Resources Conservation Service, U.S. Department of Agriculture, In Cooperation with the National Technical Committee for Hydric Soils, 43 pp.
- USDA. 2010. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0, 2010*. Natural Resources Conservation Service, U.S. Department of Agriculture, In Cooperation with the National Technical Committee for Hydric Soils, 43 pp.
- USDA. 2015. "National Hydric Soils List." Excel spreadsheet, Natural Resources Conservation Service, U.S. Department of Agriculture. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>.
- USDA. 2017. "National Hydric Soils List." Excel spreadsheet, Natural Resources Conservation Service, U.S. Department of Agriculture. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>.
- . 2016. *Web Soil Survey 3.0*. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- . 2016. *Web Soil Survey 3.0*. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- USDA/NRCS. 2013. *Watershed Boundary Dataset*. Accessed April 7, 2017. <https://datagateway.nrcs.usda.gov/GDGOrder.aspx>.
- . 2013. *Watershed Boundary Dataset*. Accessed April 7, 2017. <https://datagateway.nrcs.usda.gov/GDGOrder.aspx>.
- USFWS. 2016. *National Wetlands Inventory Online Mapper v 2.0*. <https://www.fws.gov/wetlands/data/mapper.HTML>.
- USGS. 2017. *National Hydrography Dataset*. <https://nhd.usgs.gov/data.html>.
- . 2017. *National Hydrography Dataset*. <https://nhd.usgs.gov/data.html>.
- . 2017. *National Hydrography Dataset*. December 11. Accessed December 22, 2017. <https://nhd.usgs.gov/data.html>.
- . 2016b. *StreamStats, v 3.0*. U.S. Geological Survey. Accessed December 21, 2016. https://streamstatsags.cr.usgs.gov/v3_beta/viewer.htm.

- USGS. 1994. "Topographical Quadrangle Maps (7.5-minute series)." U.S. Geological Survey.
- Voss, Edward G, and Anton A Reznicek. 2012. *Field Manual of Michigan Flora*. Ann Arbor, MI: University of Michigan Press.
- Weakley, Alan S, J. Christopher Ludwig, and John F Townsend. 2013. *Flora of Virginia*. 2nd. Edited by Bland Crowder. Foundation of the Flora of Virginia Project, Inc. and Botanical Research Institute of Texas.
- Wilken, Ed, Francisco Jiménez Nava, and Glenn Griffith. 2011. *North American Terrestrial Ecoregions Level III*. Commission for Environmental Cooperation, Canada.
http://www.cec.org/Atlas/Files/Terrestrial_Ecoregions_L1/TerrestrialEcoregions_L1_GeoPDF.zip.
- Wilkin, E, F J Nava, and G Griffith. 2011. *North American Terrestrial Ecoregions Level III*. Commission for Environmental Cooperation, Canada.
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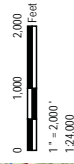
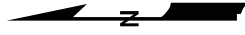
Appendix A

Figures



LEGEND

- Study Area
- National Hydrography Dataset (NHD) Streams
- National Wetlands Inventory (NWI) Wetlands
- United States Geological Survey 24K Quad



PROJECT
**VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER ROW PROJECT
CONFIDENTIAL BUSINESS INFORMATION**

USGS TOPOGRAPHIC MAP

DRAWN BY	A. RENAUDIN	PROJ. NO.	276895.000.0000
CHECKED BY	M. GILMER		
APPROVED BY	T. JENGE		
DATE	DECEMBER 2017		

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921 Eastwood Drive, Suite 122
Westerville, OH 43081
Phone: 614.425.8334
www.ctrcinc.com

FILE NO.

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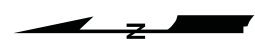


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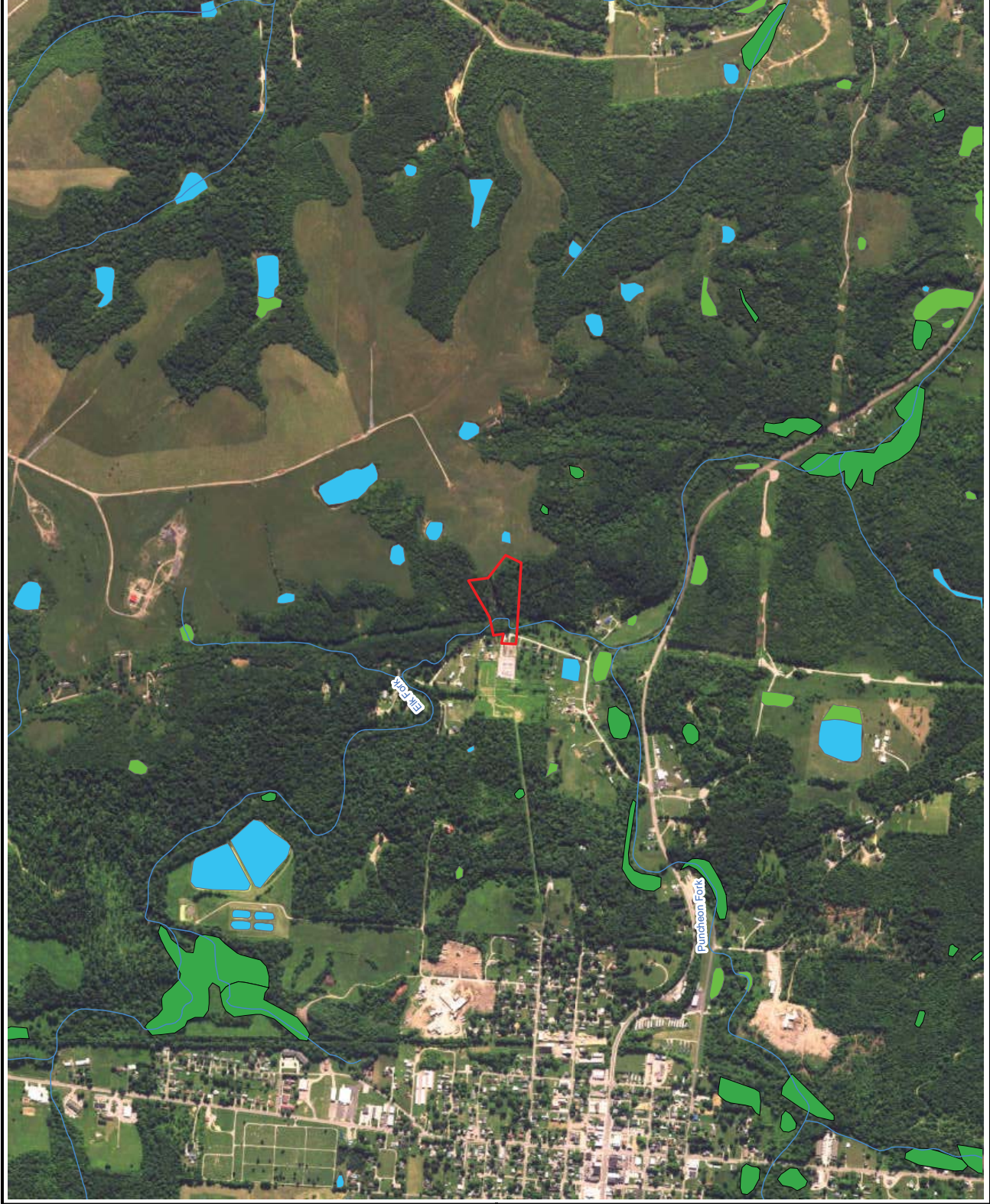
- Study Area
- National Hydrography Dataset (NHD) Streams

Soils

- Omu1B1: Omu1B1 silt loam, 2 to 6 percent slopes: Non Hydric
- Skp1AF: Skp1AF silt loams, 0 to 3 percent slopes, frequently flooded: Hydric
- StF: Steinsburg-Gilpin association, very steep: Non Hydric
- WhL1E1: Wharton-Latham silt loams, 25 to 40 percent slopes: Non Hydric



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APPROVED BY:	T. ENGLE		
DATE:	JANUARY 2018		
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971 Eastwood Drive, Suite 122 Vinton, Ohio 44783 Phone: 614.423.6334 www.trcsolutions.com			
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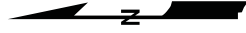


Area

— National Hydrography Dataset (NHD) Streams

National Wetlands Inventory (NWI) Types

- Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine



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TITLE
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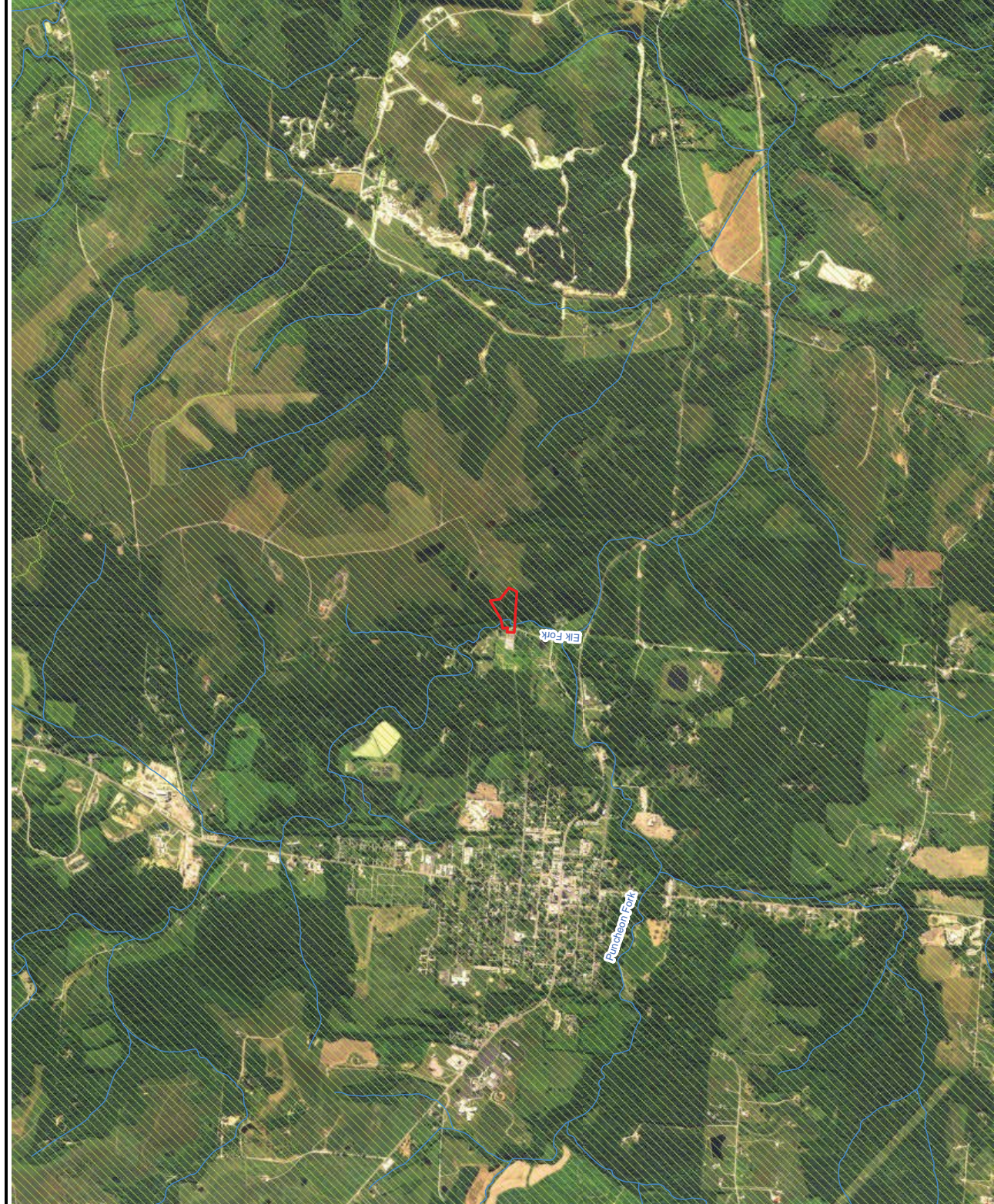
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DATE:	JANUARY 2018		



921 Eastwind Drive, Suite 122
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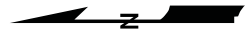
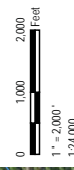
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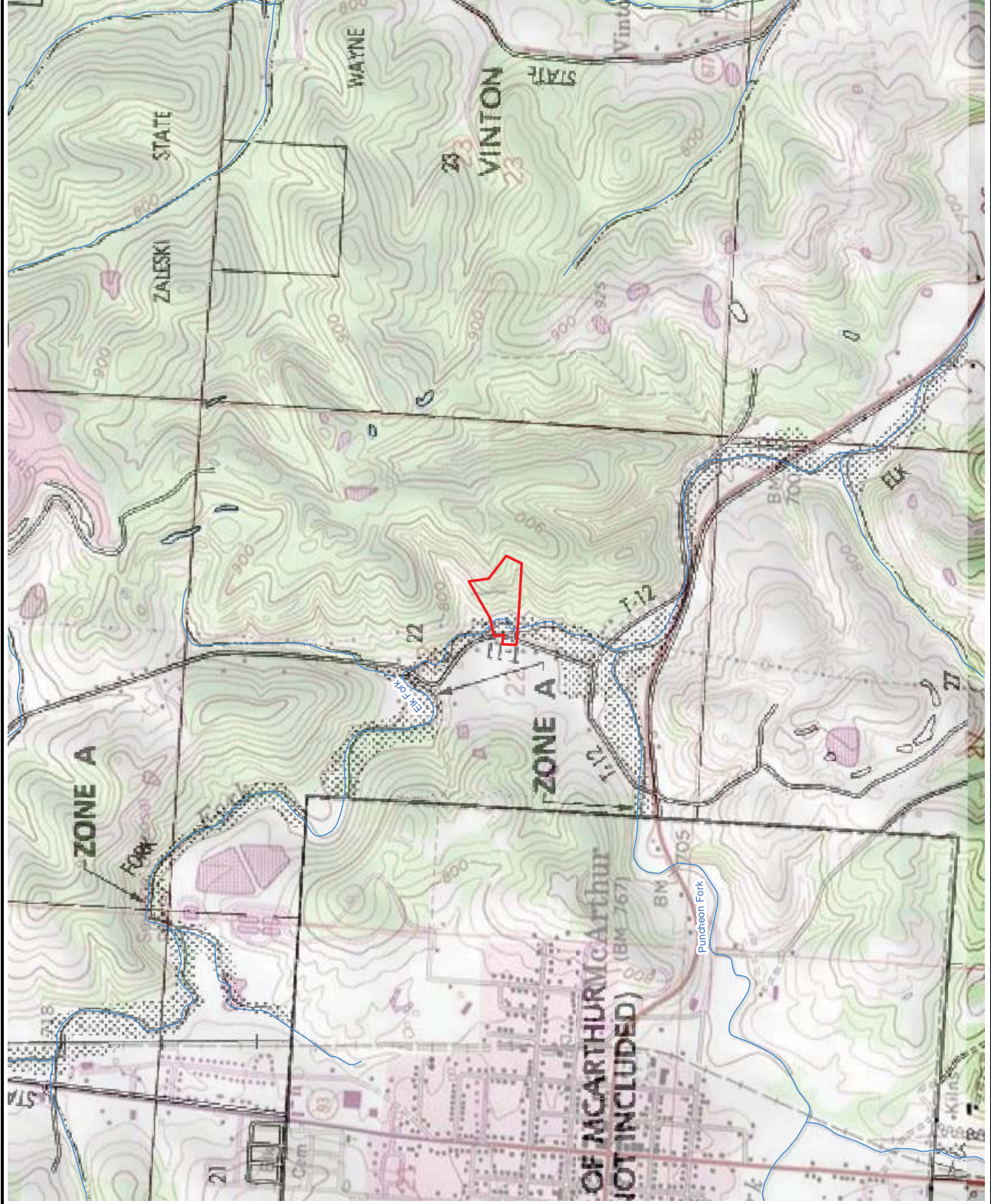
LEGEND

- Study Area
- National Hydrography Dataset (NHD) Streams
- NWP Stream Eligibility
 - Eligible
 - Ineligible
 - Possibly Eligible



PROJECT		VINTON SOLAR ENERGY, LLC VINTON SOLAR ENERGY CENTER ROW PROJECT CONFIDENTIAL BUSINESS INFORMATION	
TITLE			
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APPROVED BY	T. ENGLE		
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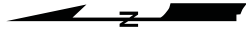
- Study Area
- National Hydrography Dataset (NHD) Streams

SPECIAL FLOOD HAZARD
AREA

ZONE A

NOTES

- FEMA Amendment from October 13, 2009** The National Flood Insurance Program map affecting this property depicts a Special Flood Hazard Area that was determined using the best flood hazard data available to FEMA, but without performing a detailed engineering analysis. The flood elevation used to make this determination is based on approximate methods and has not been formalized through the standard process for establishing base flood elevations published in the Flood Insurance Study. This flood elevation is subject to change.



VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER ROW PROJECT
CONFIDENTIAL BUSINESS INFORMATION

FEDERAL EMERGENCY MANAGEMENT AGENCY
FLOOD HAZARD MAP

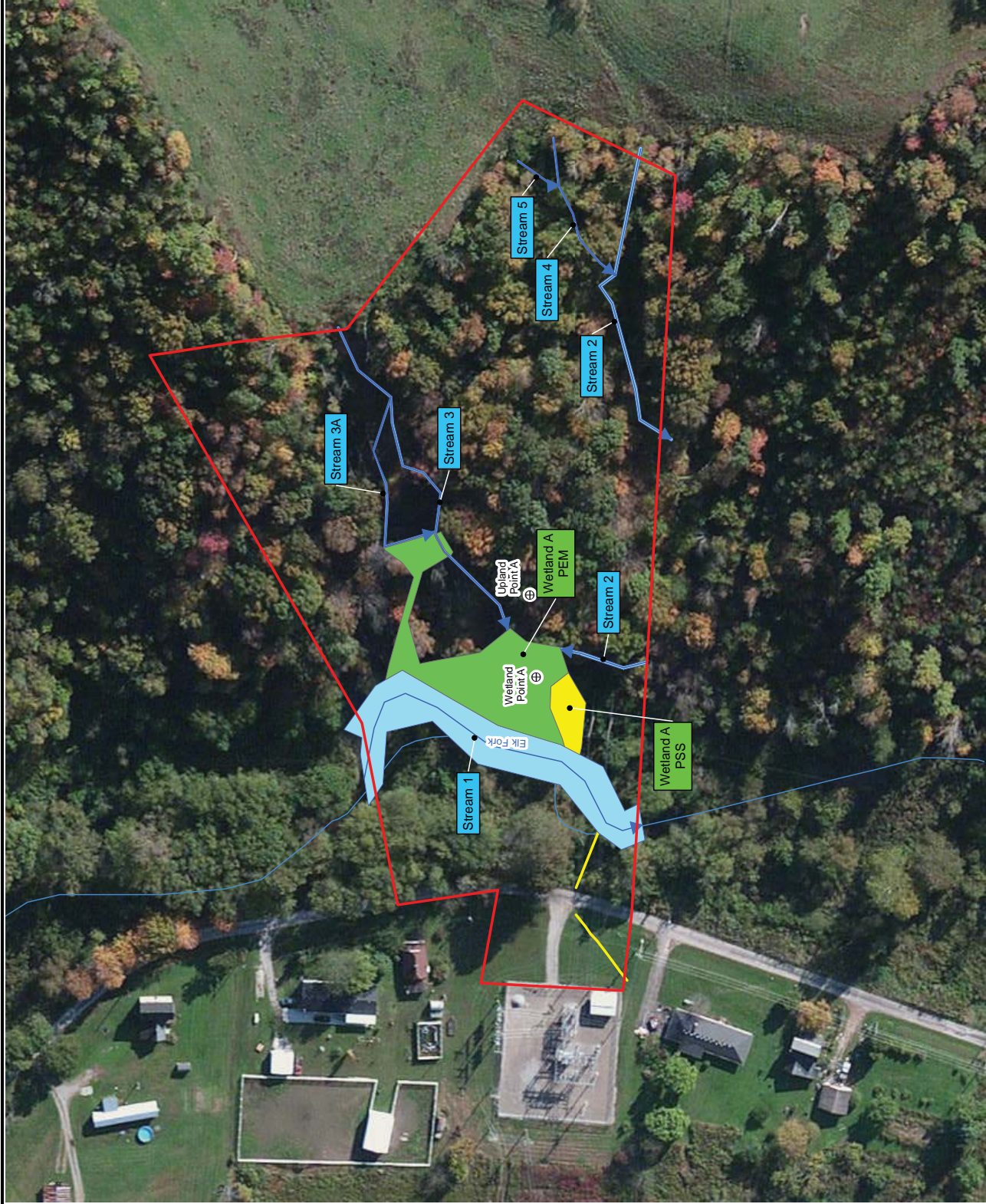
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DATE	DECEMBER 2017		

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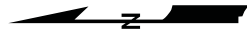
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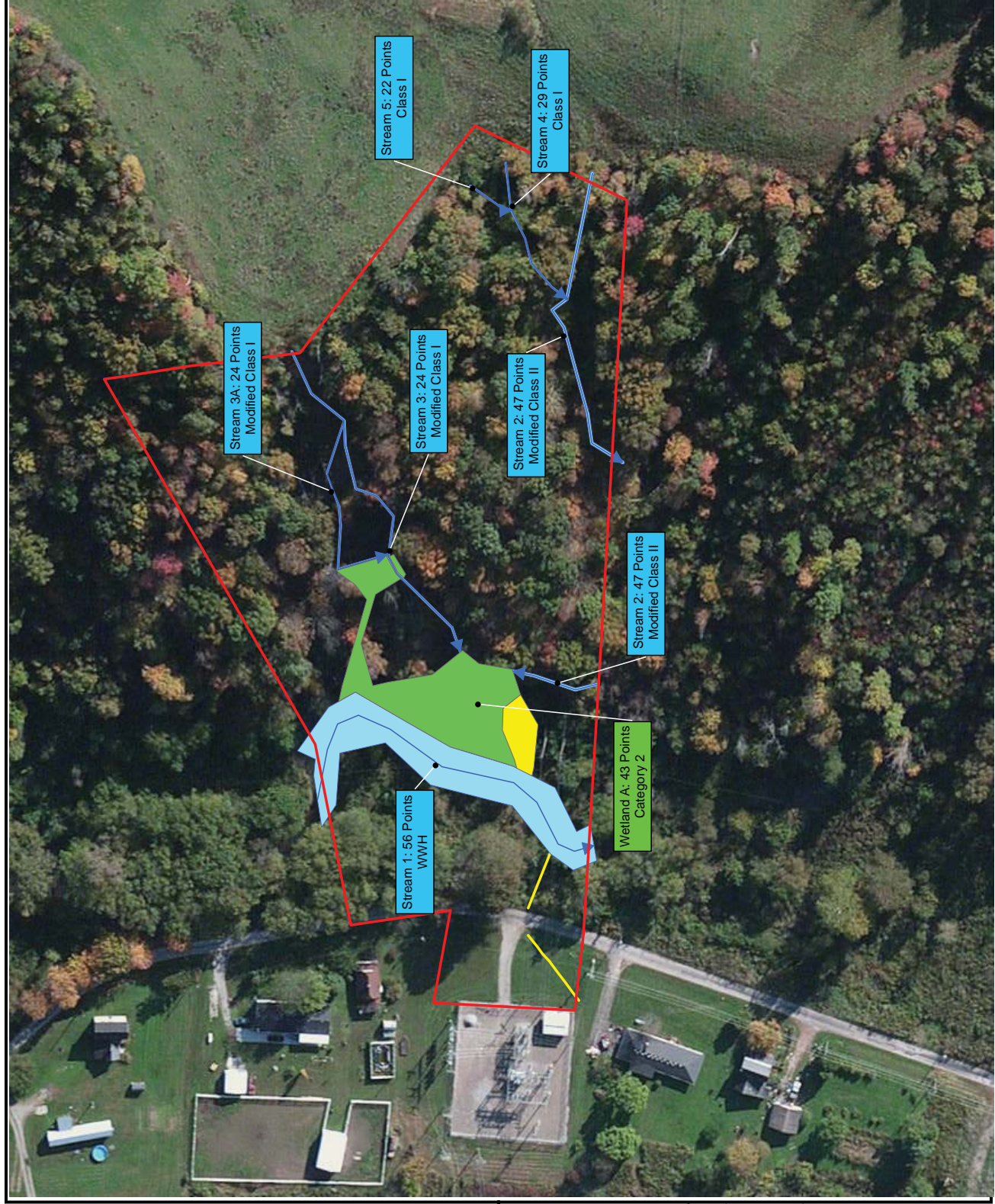


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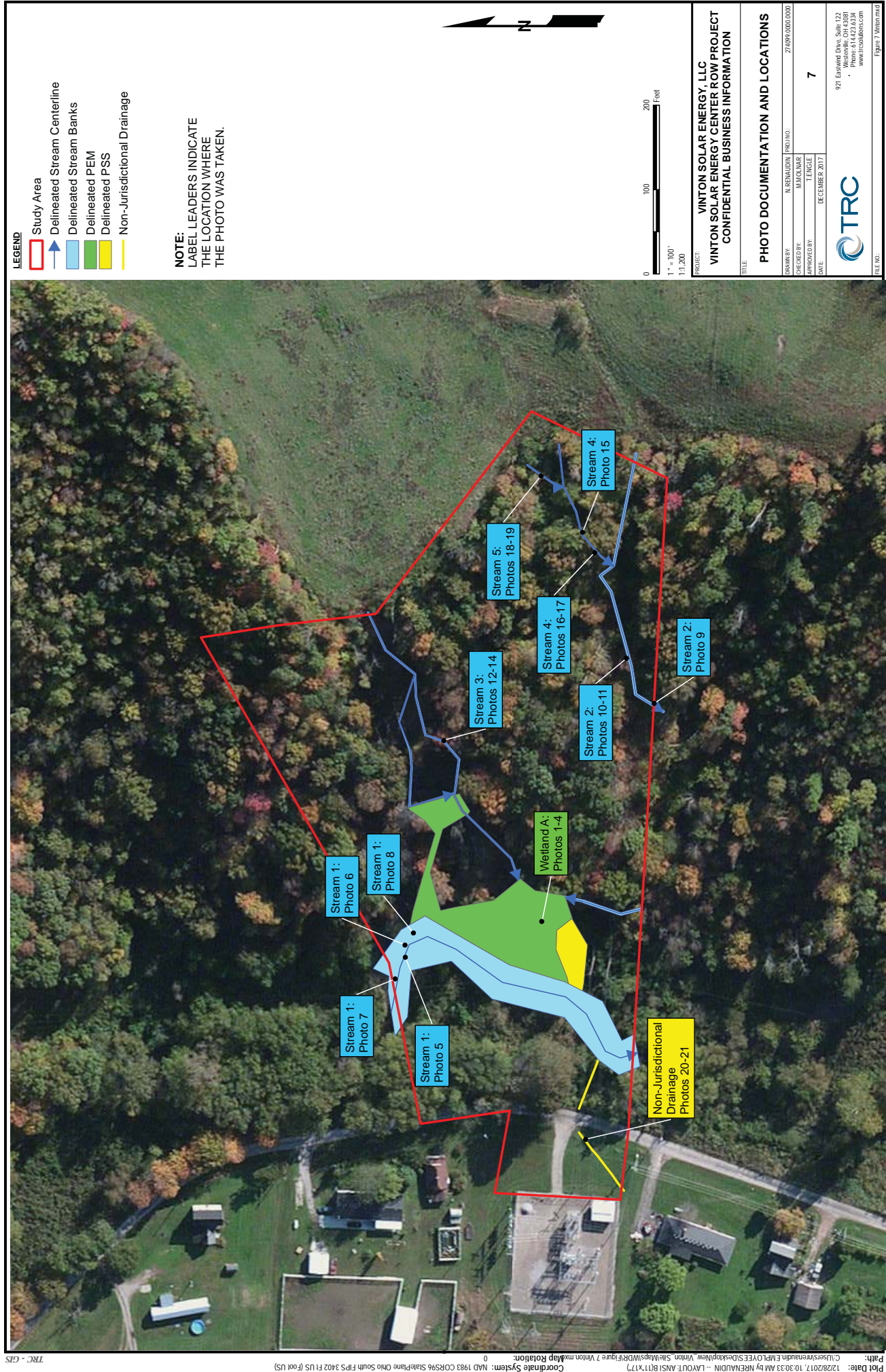
- Study Area
- National Hydrography Dataset (NHD) Streams
- Delineated Stream Centerline
- Delineated Stream Banks
- Delineated Wetlands
- PEM
- PSS
- Sample Point
- Non-Jurisdictional Drainage



PROJECT		VINTON SOLAR ENERGY, LLC	
VINTON SOLAR ENERGY CENTER ROW PROJECT		CONFIDENTIAL BUSINESS INFORMATION	
TITLE			
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DRAWN BY	N. REMAUDIN	PROJ NO.	274991.000.000
CHECKED BY	M. MOULDER		
APPROVED BY	T. ENGLE		
DATE	DECEMBER 2017		
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Vinton, VA 22640			
Phone: 614.423.6334			
www.trcsolutions.com			
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Appendix B

Photographic Log

WETLAND RESOURCE PHOTOGRAPHS





Vinton Solar Energy, LLC.		State: Ohio	County: Vinton
Project Name: Vinton Solar Energy Center ROW Project			
Photo ID: Photo #1			
Date: 12-21-2017			
Feature: Wetland A			
Comments: Photo of Wetland A facing south.			
Photo ID: Photo #2			
Date: 12-21-2017			
Feature: Wetland A			
Comments: Photo of Wetland 2 facing west toward Stream 1 (Elk Fork).			

Photo ID: Photo #3	
Date: 12-21-2017	
Feature: Wetland A	
Comments: Photo of Wetland A facing north.	
Photo ID: Photo #4	
Date: 12-21-2017	
Feature: Wetland A	
Comments: Photo of Wetland A facing east.	

OTHER WATERS OF THE U.S. RESOURCE PHOTOGRAPHS

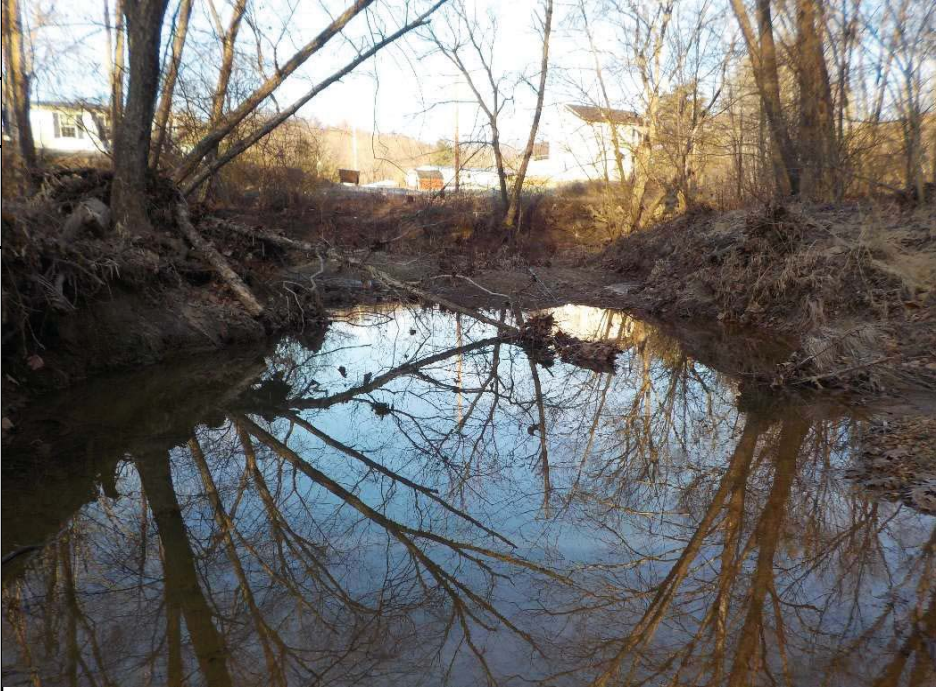

Vinton Solar Energy, LLC.		State: Ohio	County: Vinton
Project Name: Vinton Solar Energy Center ROW Project			
Photo ID: Photo #5			
Date: 12-21-2017			
Feature: Stream 1 (Elk Fork)			
Comments: Photo of Stream 1 facing upstream north.			
Photo ID: Photo #6			
Date: 12-21-2017			
Feature: Stream 1 (Elk Fork)			
Comments: Photo of Stream 1 facing downstream south.			



Photo ID: Photo #7	
Date: 12-21-2017	
Feature: Stream 1	
Comments: Photo of Stream 1, substrate in riffle.	
Photo ID: Photo #8	
Date: 12-21-2017	
Feature: Stream 1	
Comments: Photo of Stream 1, substrate in sand bar.	



Photo ID: Photo #9	
Date: 12-21-2017	
Feature: Stream 2	
Comments: Photo of Stream 2 facing downstream west.	
Photo ID: Photo #10	
Date: 12-21-2017	
Feature: Stream 2	
Comments: Photo of Stream 2 facing upstream east.	



Photo ID: Photo #11	
Date: 12-21-2017	
Feature: Stream 2	
Comments: Photo of Stream 2 substrate.	
Photo ID: Photo #12	
Date: 12-21-2017	
Feature: Stream 3	
Comments: Photo of Stream 3 downstream west.	



Photo ID: Photo #13	
Date: 12-21-2017	
Feature: Stream 3	
Comments: Photo of Stream 3 facing upstream east.	
Photo ID: Photo #14	
Date: 12-21-2017	
Feature: Stream 3	
Comments: Photo of Stream 3 substrate.	



Photo ID: Photo #15	
Date: 12-21-2017	
Feature: Stream 4	
Comments: Photo of Stream 4 facing upstream northeast.	
Photo ID: Photo #16	
Date: 12-21-2017	
Feature: Stream 4	
Comments: Photo of Stream 4 facing downstream southwest.	



Photo ID: Photo #17	
Date: 12-21-2017	
Feature: Stream 4	
Comments: Photo of Stream 4, substrate.	
Photo ID: Photo #18	
Date: 12-21-2017	
Feature: Stream 5	
Comments: Photo of Stream 5 facing upstream southwest.	




Photo ID: Photo #19	
Date: 12-21-2017	
Feature: Stream 5	
Comments: Photo of Stream 5, substrate.	
Photo ID: Photo #20	
Date: 12-21-2017	
Feature: Non-Jurisdictional Ditch	
Comments: Photo of Non-Jurisdictional Ditch upslope west.	

Photo ID: Photo #21	
Date: 12-21-2017	
Feature: Non-Jurisdictional Ditch	
Comments: Photo of Non-Jurisdictional Ditch downslope northeast.	

Appendix C

USACE Wetland Determination Data Forms

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: VINTON SOLAR ROW City/County: VINTON Co. Sampling Date: 12/21/17
 Applicant/Owner: INVENERGY State: OH Sampling Point: WET-A
 Investigator(s): MAGGIE MOLNAR / JUSTIN PITTS Section, Township, Range: S22, T11N, R17W
 Landform (hillside, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): .5%
 Subregion (LRR or MLRA): N Lat: 39.24956 Long: -82.45917 Datum: WGS84
 Soil Map Unit Name: (SkP1AF) stony-phlo silty loams, 0-2% slopes, freq. flooded NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>		
Remarks: <u>All 3 wetland criterion have been met Area is a wetland.</u>			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <u> </u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u> </u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Saturation (A3) <u>X</u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u>X</u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u>X</u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)	
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u>N/A</u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u>N/A</u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u>N/A</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: <u>N/A.</u>			
Remarks: <u>wetland hydrology criterion has been met.</u>			

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET-A

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			

50% of total cover: 0 = Total Cover
20% of total cover: 0

Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Platanus occidentalis</u>	<u>5</u>	<u>✓</u>	<u>FACW</u>
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

50% of total cover: 2.5 = Total Cover
20% of total cover: 1

Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sarcopus atrovirens</u>	<u>25</u>	<u>✓</u>	<u>OBL</u>
2. <u>Juncus effusus</u>	<u>20</u>	<u>✓</u>	<u>FACW</u>
3. <u>Didantheleium clandestinum</u>	<u>5</u>		<u>FAC</u>
4. <u>Eupatorium perfoliatum</u>	<u>5</u>		<u>FACW</u>
5. <u>Carex lurida</u>	<u>20</u>	<u>✓</u>	<u>OBL</u>
6. <u>Leersia oryzoides</u>	<u>25</u>	<u>✓</u>	<u>OBL</u>
7. <u>Sarcopus cyperinus</u>	<u>10</u>		<u>FACW</u>
8. <u>Typha angustifolia</u>	<u>5</u>		<u>OBL</u>
9.			
10.			
11.			

50% of total cover: 115 = Total Cover
20% of total cover: 23

Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			

50% of total cover: 0 = Total Cover
20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:

Multiply by:

OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals:	(A) (B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation criterion has been met.

SOIL

Sampling Point: WET-A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	25Y5/1	90	10YR 5/8	10	C	M/PL	silty clay	
6-18"	10YR 4/1	85	5YR 4/6	15	C	M/PL		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> 2 cm Muck (A10) (LRR N) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136) |
| <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) |
| <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148) |
| <input type="checkbox"/> Dark Surface (S7) | |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147, 148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Red Parent Material (F21) (outside MLRA 127, 147, 148)
- ☐ Very Shallow Dark Surface (F22)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ☒ No ☐

Remarks:

This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

Hydric soil criterion has been met.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: VINTON SOLAR ROW City/County: VINTON Co. Sampling Date: 12/21/17
 Applicant/Owner: INVENERGY State: OH Sampling Point: UPL-A
 Investigator(s): MAGGIE MOLNAR / JUSTIN PITTS Section, Township, Range: S22.T11N.R17W
 Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONVEX Slope (%): 5
 Subregion (LRR or MLRA): N Lat: 39.24942 Long: -82.45861 Datum: WGS84
 Soil Map Unit Name: (S+E) Stearnsburg-Tripoli association, very steep NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Y Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland?	Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>		
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>		

Remarks:

0 of 3 wetland criterion have been met. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

 Surface Water (A1)
 High Water Table (A2)
 Saturation (A3)
 Water Marks (B1)
 Sediment Deposits (B2)
 Drift Deposits (B3)
 Algal Mat or Crust (B4)
 Iron Deposits (B5)
 Inundation Visible on Aerial Imagery (B7)
 Water-Stained Leaves (B9)
 Aquatic Fauna (B13)

 True Aquatic Plants (B14)
 Hydrogen Sulfide Odor (C1)
 Oxidized Rhizospheres on Living Roots (C3)
 Presence of Reduced Iron (C4)
 Recent Iron Reduction in Tilled Soils (C6)
 Thin Muck Surface (C7)
 Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

 Surface Soil Cracks (B6)
 Sparsely Vegetated Concave Surface (B8)
 Drainage Patterns (B10)
 Moss Trim Lines (B16)
 Dry-Season Water Table (C2)
 Crayfish Burrows (C8)
 Saturation Visible on Aerial Imagery (C9)
 Stunted or Stressed Plants (D1)
 Geomorphic Position (D2)
 Shallow Aquitard (D3)
 Microtopographic Relief (D4)
 FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No X Depth (inches): N/A
 Water Table Present? Yes No X Depth (inches): N/A
 Saturation Present? Yes No X Depth (inches): N/A
 (includes capillary fringe)

Wetland Hydrology Present? Yes No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

N/A

Remarks:

Wetland hydrology criterion has been met.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: VPL-A

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus rubra</u>	<u>5</u>		<u>FACV</u>
2. <u>Quercus alba</u>	<u>5</u>		<u>FACV</u>
3. <u>Acer saccharum</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FACV</u>
4. <u>Acer rubra</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FAC</u>
5. <u>Prunus serotina</u>	<u>30</u>	<input checked="" type="checkbox"/>	<u>FACV</u>
6. <u>Fagus grandifolia</u>	<u>5</u>		<u>FACV</u>
7. _____			

50% of total cover: 75 = Total Cover
 20% of total cover: 15

Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer saccharum</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FACV</u>
2. <u>Acer rubra</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FAC</u>
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			

50% of total cover: 25 = Total Cover
 20% of total cover: 5

Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Polygonum acrostichoides</u>	<u>3</u>		<u>FACV</u>
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			

50% of total cover: 3 = Total Cover
 20% of total cover: _____

Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			

50% of total cover: 0 = Total Cover
 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation N
 2 - Dominance Test is >50% N
 3 - Prevalence Index is ≤3.0¹
 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain) _____

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation

Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation criterion has not been met.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	10YR 3/2	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> 2 cm Muck (A10) (LRR N) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> MLRA 136) |
| <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136) |
| <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) |
| <input type="checkbox"/> Dark Surface (S7) | <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148) |

Indicators for Problematic Hydric Soils³:

- | |
|--|
| <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) |
| <input type="checkbox"/> Coast Prairie Redox (A16) |
| <input type="checkbox"/> (MLRA 147, 148) |
| <input type="checkbox"/> Piedmont Floodplain Soils (F19) |
| <input type="checkbox"/> (MLRA 136, 147) |
| <input type="checkbox"/> Red Parent Material (F21) |
| <input type="checkbox"/> (outside MLRA 127, 147, 148) |
| <input type="checkbox"/> Very Shallow Dark Surface (F22) |
| <input type="checkbox"/> Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

 Type: Roots
 Depth (inches): 10"
Hydric Soil Present? Yes ☐ No ☒

Remarks:

This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

Hydric soil criterion has not been met.

Appendix D

Ohio EPA ORAM Data Forms

WETLAND A

Category 2

Site: Intenergy- Vinton Solar

Rater(s): MM, JP

Date: 12/21/17

2 2

Metric 1. Wetland Area (size).

PEM/PSS

max 6 pts.

subtotal

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☒ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☐ <0.1 acres (0.04ha) (0 pts)

9 11

Metric 2. Upland buffers and surrounding land use.

max 14 pts.

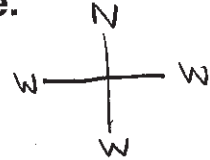
subtotal

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☒ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☒ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☒ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☒ LOW. Old field (>10 years), shrubland, young second growth forest (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)



20 31

Metric 3. Hydrology.

max 30 pts.

subtotal

3a. Sources of Water. Score all that apply.

- ☒ High pH groundwater (5)
- ☒ Other groundwater (3)
- ☒ Precipitation (1)
- ☒ Seasonal/intermittent surface water (3)
- ☒ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☒ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☒ Recovered (7)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☒ 100 year floodplain (1)
- ☒ Between stream/lake and other human use (1)
- ☒ Part of wetland/upland (e.g. forest), complex (1)
- ☒ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☒ Regularly inundated/saturated (3)
- ☒ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed

- ☒ ditch
- ☐ tile
- ☐ dike
- ☐ weir
- ☒ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☐ road bed/RR track
- ☐ dredging
- ☐ other _____

5 36

Metric 4. Habitat Alteration and Development.

max 20 pts.

subtotal

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☒ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☒ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☒ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☒ grazing
- ☒ clearcutting Recent
- ☐ selective cutting
- ☐ woody debris removal
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ sedimentation
- ☐ dredging
- ☒ farming
- ☐ nutrient enrichment

36

subtotal this page

Site: Invenergy-Vinton Solar

Rater(s): MM,JP

Date: 12/2/17

36

subtotal this page

0

36

Metric 5. Special Wetlands.

max 10 pts.

subtotal

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

7

43

Metric 6. Plant communities, interspersions, microtopography.

max 20 pts.

subtotal

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☒ Emergent
- ☒ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other

6b. horizontal (plan view) Interspersion.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☒ Moderate (3)
- ☒ Moderately low (2)
- ☐ Low (1)
- ☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☒ Sparse 5-25% cover (-1)
- ☒ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussucks
- ☒ Coarse woody debris >15cm (6in)
- ☒ Standing dead >25cm (10in) dbh
- ☐ Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

43

GRAND TOTAL(max 100 pts)

Appendix E

Ohio EPA Stream Data Forms

Stream & Location: Stream 1 - Elk Fork

RM: _____

Date: 12/21/17

Scorers Full Name & Affiliation: TRC-JP, MM

River Code: _____

STORET #: _____

Lat./ Long.: 39.2496 / 82.4593

Office verified location ☐1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;
estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE
<input type="checkbox"/> BLDG/SLABS [10]	0	<input type="checkbox"/> HARDPAN [4]	_____
<input type="checkbox"/> BOULDER [9]	0	<input type="checkbox"/> DETRITUS [3]	_____
<input type="checkbox"/> COBBLE [8]	0	<input type="checkbox"/> MUCK [2]	_____
<input type="checkbox"/> GRAVEL [7]	20	<input checked="" type="checkbox"/> SILT [2]	30
<input checked="" type="checkbox"/> SAND [6]	50	<input type="checkbox"/> ARTIFICIAL [0]	20
<input type="checkbox"/> BEDROCK [5]	_____		

ORIGIN

☐ LIMESTONE [1]

☐ TILLS [1]

☐ WETLANDS [0]

☐ HARDPAN [0]

☒ SANDSTONE [0]

☐ RIP/RAP [0]

☐ LACUSTURINE [0]

☐ SHALE [1]

☐ COAL FINES [2]

QUALITY

☐ HEAVY [-2]

☒ MODERATE [-1]

☐ NORMAL [0]

☐ FREE [1]

☒ EXTENSIVE [-2]

☒ MODERATE [-1]

☐ NORMAL [0]

☐ NONE [1]

Substrate

Maximum 20

6

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

6+2+0+0-1-1

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> UNDERCUT BANKS [1]	<input checked="" type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]
<input checked="" type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input checked="" type="checkbox"/> AQUATIC MACROPHYTES [1]
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input checked="" type="checkbox"/> ROOTMATS [1]		

☐ EXTENSIVE >75% [11]

☐ MODERATE 25-75% [7]

☒ SPARSE 5-<25% [3]

☐ NEARLY ABSENT <5% [1]

Cover

Maximum 20

10

Comments

1+1+1+2+1+3+1

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel

Maximum 20

0.5

Comments

2.5+1+3+1

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY	CONSERVATION TILLAGE
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input checked="" type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input checked="" type="checkbox"/> MODERATE [2]	<input checked="" type="checkbox"/> MODERATE 10-50m [3]	<input checked="" type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input checked="" type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s)
past 100m riparian.

Riparian

Maximum 10

6.5

Comments

1.5+2.5+2.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY)

☒ > 1m [6]

☐ 0.7-<1m [4]

☐ 0.4-<0.7m [2]

☐ 0.2-<0.4m [1]

☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

☒ POOL WIDTH > RIFFLE WIDTH [2]

☐ POOL WIDTH = RIFFLE WIDTH [1]

☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

☐ TORRENTIAL [-1]

☒ SLOW [1]

☐ VERY FAST [1]

☐ INTERSTITIAL [-1]

☒ FAST [1]

☐ INTERMITTENT [-2]

☐ MODERATE [1]

☒ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential

Primary Contact

Secondary Contact

(circle one and comment on back)

Pool / Current

Maximum 12

11

Comments

6+2+1+1+1

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle / Run

Maximum 8

2

Comments

1+1+9+0

6] GRADIENT

DRAINAGE AREA

(14.1 mi²)

☐ VERY LOW - LOW [2-4]

☒ MODERATE [6-10]

☐ HIGH - VERY HIGH [10-6]

%POOL: 60

%GLIDE: 10

%RUN: 10

%RIFFLE: 20

Gradient

Maximum 10

10

AJ SAMPLED REACH

Check ALL that apply

METHOD

- BOAT ☐ WADE ☐ L. LINE ☐ OTHER ☐
- STAGE
- 1st-sample pass-2nd
- HIGH ☐ UP ☐ NORMAL ☐ LOW ☐ DRY ☐
- CLARITY
- 1st-sample pass-2nd
- < 20 cm ☐ 20-40 cm ☐ 40-70 cm ☐ > 70 cm/CTB ☐
- SECCHI DEPTH ☐
- 0.5 Km ☐ 0.2 Km ☐ 0.15 Km ☐ 0.12 Km ☐ OTHER ☐
- DISTANCE
- 0.5 Km ☐ 0.2 Km ☐ 0.15 Km ☐ 0.12 Km ☐ OTHER ☐

Comment RE: Reach consistency/Is reach typical of stream? Recreation/Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

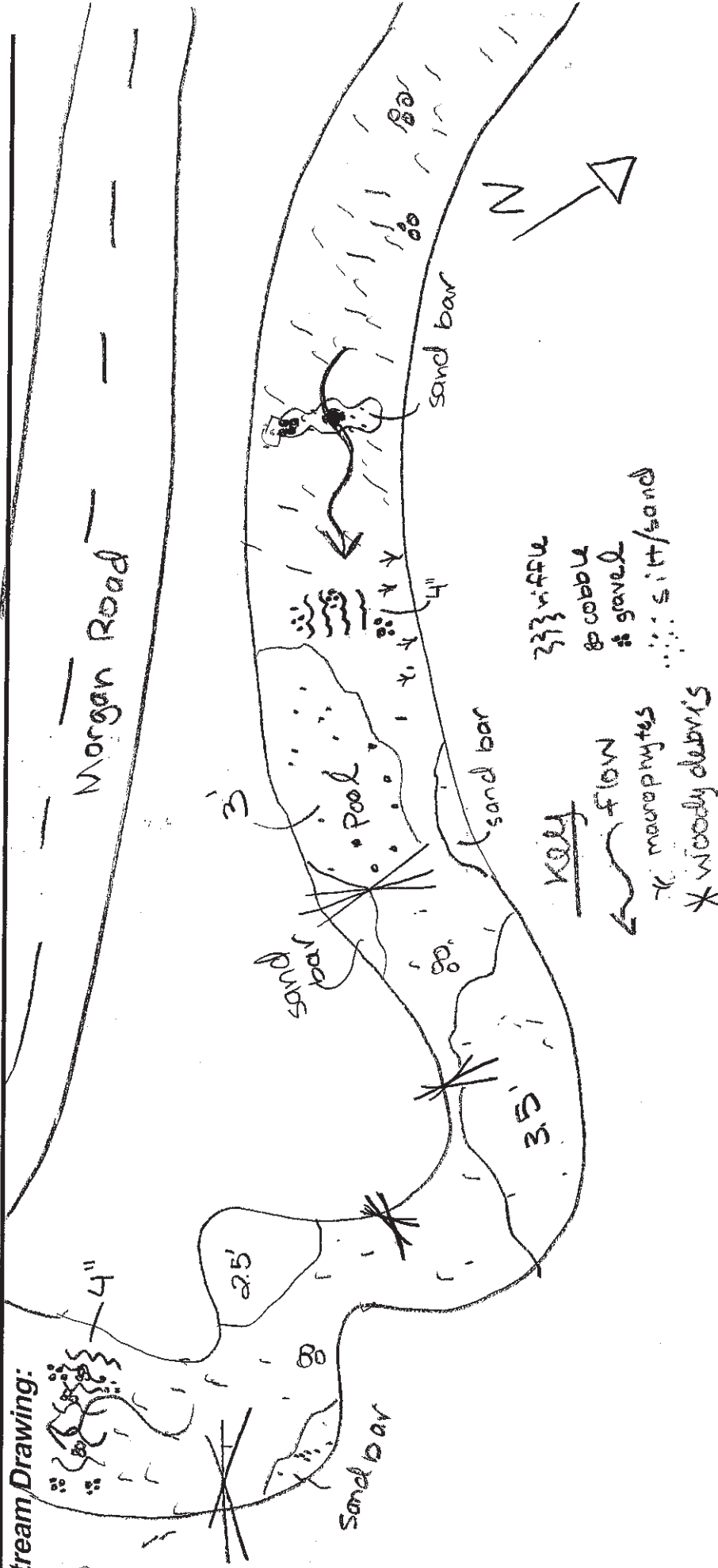
Left bank even numbering/right bank odd

TOB Depth 10ft BKF Depth 6ft OHWM Depth 4ft REW to 35ft

width 35ft width 25ft width 20ft, Lew 15ft

B/AESTHETICS		D/J MAINTENANCE		E/J ISSUES		F/J MEASUREMENTS	
<input type="checkbox"/> NUISANCE ALGAE	<input type="checkbox"/> PUBLIC / PRIVATE / BOTH / NA	<input type="checkbox"/> WWTP / CSO / NPDES / INDUSTRY	<input type="checkbox"/> \bar{x} width				
<input type="checkbox"/> INVASIVE MACROPHYTES	<input type="checkbox"/> ACTIVE / HISTORIC / BOTH / NA	<input type="checkbox"/> HARDENED / URBAN / DIRT&GRIME	<input type="checkbox"/> \bar{x} depth				
<input type="checkbox"/> EXCESS TURBIDITY	<input type="checkbox"/> YOUNG-SUCCESSION-OLD	<input type="checkbox"/> CONTAMINATED / LANDFILL	<input type="checkbox"/> max. depth				
<input type="checkbox"/> DISCOLORATION	<input type="checkbox"/> SPRAY / SNAG / REMOVED	<input type="checkbox"/> BMPs-CONSTRUCTION-SEDIMENT	<input type="checkbox"/> \bar{x} bankfull width				
<input type="checkbox"/> FOAM / SCUM	<input type="checkbox"/> MODIFIED / DIPPED OUT / NA	<input type="checkbox"/> LOGGING / IRRIGATION / COOLING	<input type="checkbox"/> bankfull \bar{x} depth				
<input type="checkbox"/> OIL SHEEN	<input type="checkbox"/> LEVEED / ONE SIDED	<input type="checkbox"/> BANK / EROSION / SURFACE	<input type="checkbox"/> W/D ratio				
<input type="checkbox"/> TRASH / LITTER	<input type="checkbox"/> RELOCATED / CUTOFFS	<input type="checkbox"/> FALSE BANK / MANURE / LAGOON	<input type="checkbox"/> bankfull max. depth				
<input type="checkbox"/> NUISANCE ODOR	<input type="checkbox"/> MOVING-BEDLOAD-STABLE	<input type="checkbox"/> WASH H ₂ O / TILE / H ₂ O TABLE	<input type="checkbox"/> floodprone \bar{x}^2 width				
<input type="checkbox"/> SLUDGE DEPOSITS	<input type="checkbox"/> ARMORED / SLUMPS	<input type="checkbox"/> ACID / MINE / QUARRY / FLOW	<input type="checkbox"/> entrench. ratio				
<input type="checkbox"/> CSOs/ISSOs/OUTFALLS	<input type="checkbox"/> ISLANDS / SCOURED	<input type="checkbox"/> NATURAL / WETLAND / STAGNANT	<input type="checkbox"/> Legacy Tree:				
<input type="checkbox"/> AREA DEPTH	<input type="checkbox"/> IMPOUNDED / DESICCATED	<input type="checkbox"/> PARK / GOLF / LAWN / HOME					
<input type="checkbox"/> POOL: <input type="checkbox"/> >100ft <input type="checkbox"/> >3ft	<input type="checkbox"/> FLOOD CONTROL / DRAINAGE	<input type="checkbox"/> ATMOSPHERE / DATA PAUCITY					

Stream Drawing:



Stream 2

Intermittent,
Modified Class II

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

47

SITE NAME/LOCATION UT to ELK FORKStream 2

SITE NUMBER

RIVER BASIN

ELK FORKDRAINAGE AREA (mi²)< 0.01LENGTH OF STREAM REACH (ft) 300LAT. 39.249LONG. -82.459

RIVER CODE

RIVER MILE

DATE 12/21/17SCORER MM, JP

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

MODIFICATIONS:

↳ DAMED (POND) UPSTREAM

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<u>10</u>	<input type="checkbox"/> SILT [3 pts]	<u>10</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>15</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>30</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>20</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>15</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Blkr Slabs, Boulder, Cobble, Bedrock55(A) 21(B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 4027

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

2"Pool Depth
Max = 305

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.5'Bankfull
Width
Max=3015

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)
 ☐ Flat to Moderate
 ☐ Moderate (2 ft/100 ft)
 ☒ Moderate to Severe
 ☐ Severe (10 ft/100 ft)

Stream 2

TOB W: 8'
D: 6'
BRF W: 5'
D: 3'

OWHM W: 3.5'
D: 1.5'

REW to W: 1.5'
LEW

isolated
pools

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Elk Fork Distance from Evaluated Stream 30 ft.
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Zaleski/McArthur NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Vinton Township / City: McArthur

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 30%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: May have acid mine drainage

BIOTIC EVALUATION

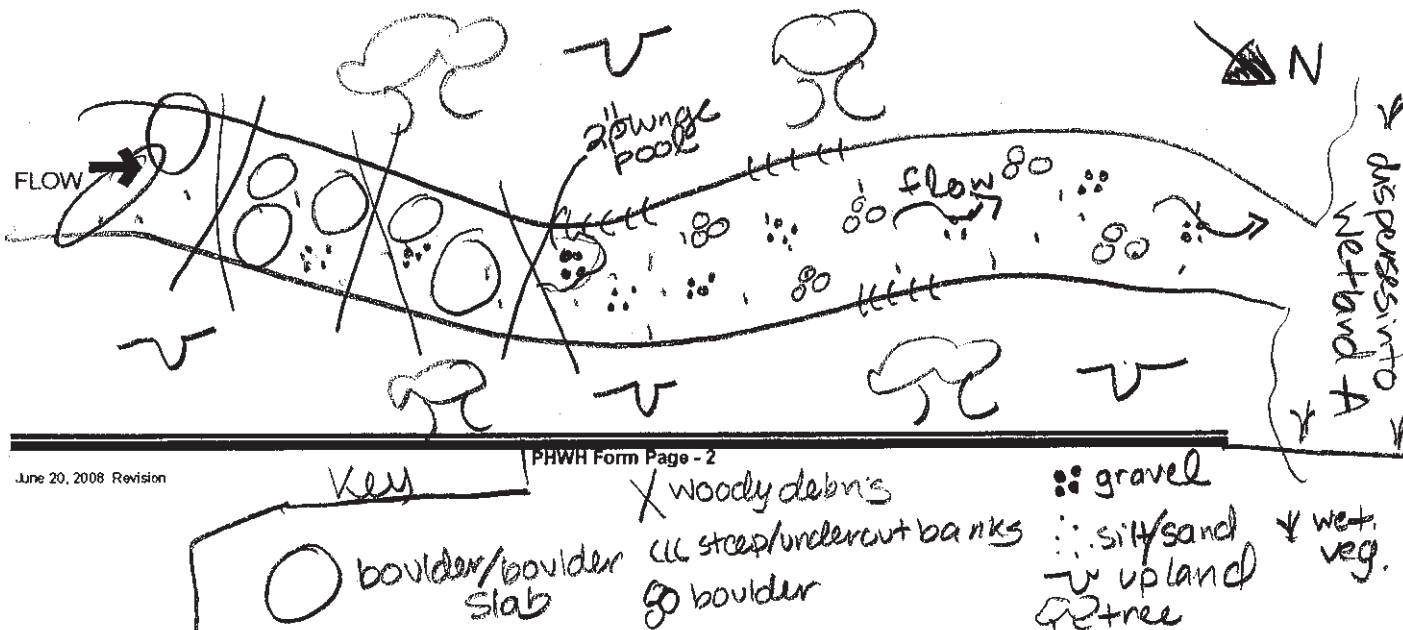
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N/A Salamanders Observed? (Y/N) N Voucher? (Y/N) N/A
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N/A Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N/A

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream 3 Modified
Perennial, class I



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

24

SITE NAME/LOCATION UP to Elk Fork

Stream 3

SITE NUMBER

RIVER BASIN

DRAINAGE AREA (mi²) 0.01

LENGTH OF STREAM REACH (ft) 300

LAT. 39.250

LONG. -82.458

RIVER CODE

RIVER MILE

DATE 12/21/17 SCORER JP, MM

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

Resumed acid-mined drainage/clearcutting

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

BLDR SLABS [18 pts]

☐

BOULDER (>256 mm) [16 pts]

☐

BEDROCK [16 pt]

☐

COBBLE (65-256 mm) [12 pts]

☐

GRAVEL (2-64 mm) [9 pts]

☒

SAND (<2 mm) [6 pts]

PERCENT

5

10

40

TYPE

☐

SILT [3 pt]

☐

LEAF PACK/WOODY DEBRIS [3 pts]

☐

FINE DETRITUS [3 pts]

☐

CLAY or HARDPAN [0 pt]

☐

MUCK [0 pts]

☐

ARTIFICIAL [3 pts]

PERCENT

30

20

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

5

(A) 9

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

14

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☐

> 5 cm - 10 cm [15 pts]

☒

< 5 cm [5 pts]

☐

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

2"

Pool Depth
Max = 30

5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

> 4.0 meters (> 13') [30 pts]

☐

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

☐

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

☒

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R

(Per Bank)

☒

Wide >10m

☐

Moderate 5-10m

☐

Narrow <5m

☐

None

☐

None

COMMENTS

L R

(Most Predominant per Bank)

☐

Mature Forest, Wetland

☒

Immature Forest, Shrub or Old

☐

Field

☐

Residential, Park, New Field

☐

Fenced Pasture

L R

☐

Conservation Tillage

☐

Urban or Industrial

☐

Open Pasture, Row

☐

Crop

☐

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

None

☐

0.5

☐

1.0

☒

1.5

☐

2.0

☐

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☒ Severe (10 ft/100 ft)

Stream 3

ADDITIONAL STREAM INFORMATION (This information must also be completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Elk Fork Distance from Evaluated Stream 100 ft.
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Zadogski/McArthur NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Vinton Township / City: McArthur

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 70

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts: Presumed acid mine drainage seep

BIOTIC EVALUATION

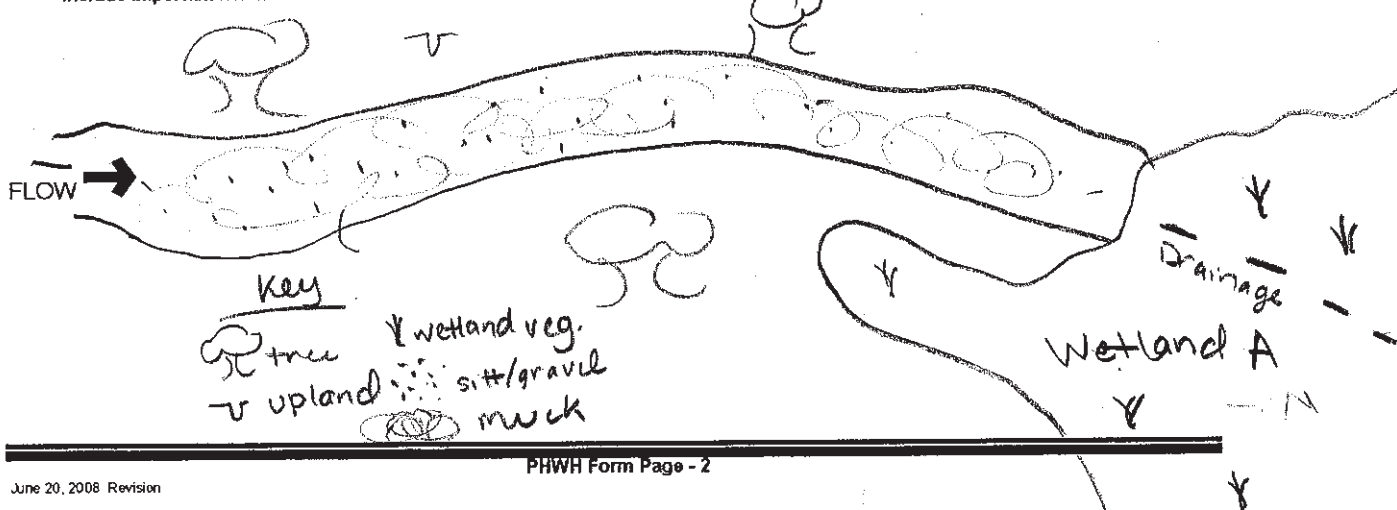
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N): N Voucher? (Y/N): N/A Salamanders Observed? (Y/N): N Voucher? (Y/N): N/A
 Frogs or Tadpoles Observed? (Y/N): N Voucher? (Y/N): N/A Aquatic Macroinvertebrates Observed? (Y/N): N Voucher? (Y/N): N/A

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

29

Stream 4,
Ephemeral, Class I

SITE NAME/LOCATION UT to Elk Fork
SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 40.01
LENGTH OF STREAM REACH (ft) 300 LAT. 39.249 LONG. 82.458 RIVER CODE _____ RIVER MILE _____
DATE 12/21/17 SCORER MMJP COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY
MODIFICATIONS: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	<u>15</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>15</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>40</u>	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	<u>25</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 10(A) 15(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

19

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

2"

Pool Depth
Max = 30

5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

feet
2'Bankfull
Width
Max=30

5

This Information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input checked="" type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	---	---	--	--

Stream 4

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Elk Fork Distance from Evaluated Stream 200
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Zaleski/McArthur NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Vinton Township / City: McArthur

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 30%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: cloudiness/iron covered substrate

BIOTIC EVALUATION

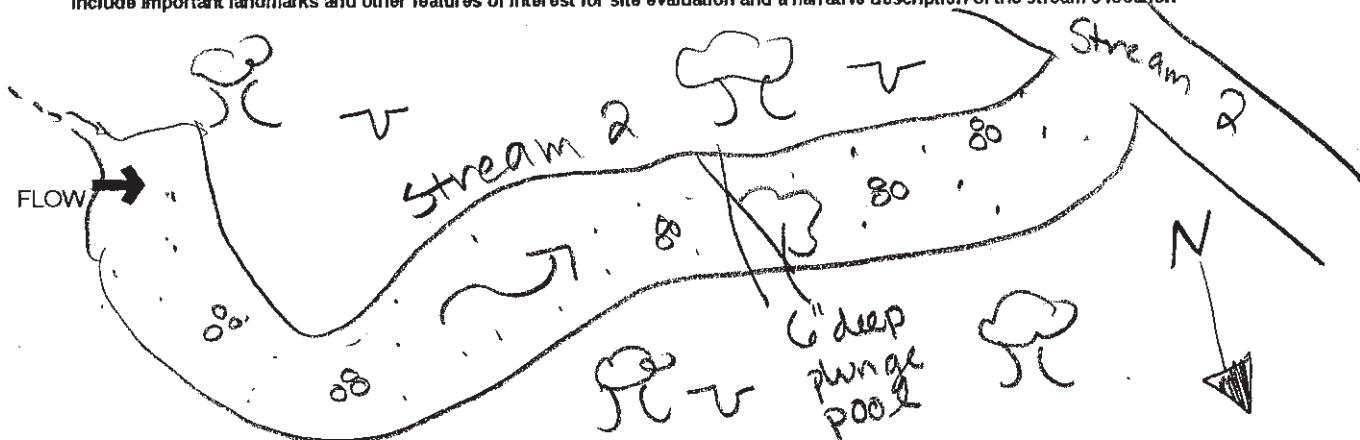
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N): N Voucher? (Y/N): _____ Salamanders Observed? (Y/N): N Voucher? (Y/N): _____
 Frogs or Tadpoles Observed? (Y/N): N Voucher? (Y/N): _____ Aquatic Macroinvertebrates Observed? (Y/N): N Voucher? (Y/N): _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



key
 ~ flow
 oo cobble
 :o gravel
 :o silt/sand
 tree
 upland

TOB W: 6'
 D: 3.5'
 BKF W: 4'
 D: 2.5'
 OHWM W: 2'
 D: 1'
 REW: 0.7"
 LEW

STREAM 5
EPIHEMERAL, CLASS I



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

22

SITE NAME/LOCATION UNT TO ELK FORK
STREAM 5 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi²) <0.01
 LENGTH OF STREAM REACH (ft) 51 LAT. 39.2496 LONG. -82.2500 RIVER CODE RIVER MILE
 DATE 12/21/17 SCORER MM JRP COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<u> </u>	<input type="checkbox"/> SILT [3 pts]	<u> </u>
<input type="checkbox"/> BOULDER (>256 mm) [15 pts]	<u> </u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u> </u>
<input type="checkbox"/> BEDROCK [16 pts]	<u> </u>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u> </u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u> </u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<u> </u>
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>40</u>	<input type="checkbox"/> MUCK [0 pts]	<u> </u>
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>60</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	<u> </u>

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 15

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

17

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 30

0

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

Bankfull
Width
Max=30

5

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPIARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPIARIAN WIDTH

FLOODPLAIN QUALITY

L R (Per Bank)

L R (Most Predominant per Bank)

L R

☐ Wide >10m

☐ Mature Forest, Wetland

☐ Conservation Tillage

☒ Moderate 5-10m

☒ Immature Forest, Shrub or Old Field

☐ Urban or Industrial

☐ Narrow <5m

☐ Residential, Park, New Field

☐ Open Pasture, Row Crop

☐ None

☐ Fenced Pasture

☐ Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☐ Stream Flowing

☐ Moist Channel, isolated pools, no flow (Intermittent)

☐ Subsurface flow with isolated pools (Interstitial)

☒ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐ None

☐ 1.0

☐ 2.0

☐ 3.0

☒ 0.5

☐ 1.5

☐ 2.5

☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: _____ ELK FORK Distance from Evaluated Stream 200
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: MCARTHUR/Zaluski NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: VINTON Township / City: MCARTHUR

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 30%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
 Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

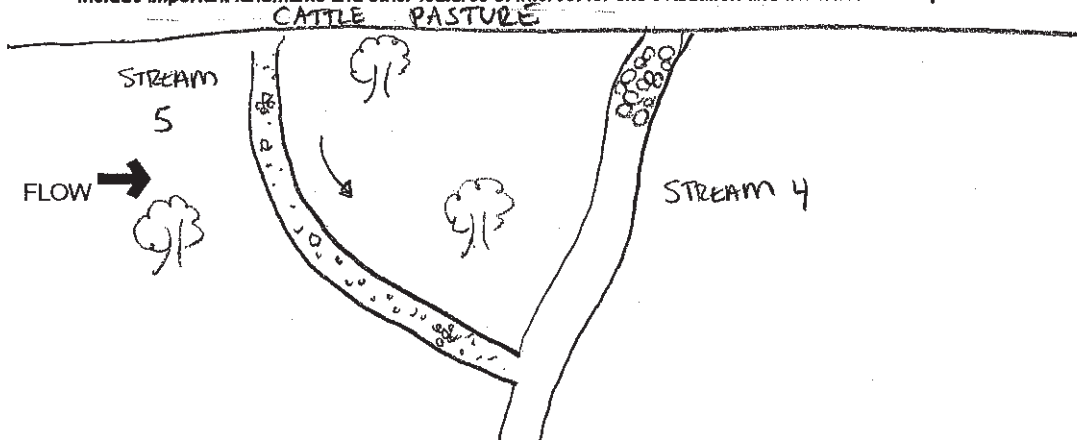


Exhibit I

Raptor Nest Survey Report June 2017

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Attorneys for Vinton Solar Energy LLC

RAPTOR NEST SURVEY REPORT

Vinton Solar Energy Center Project

Vinton County, Ohio

June 2017

TRC PROJECT NO. 274099.0000.0005



Prepared For:

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CONFIDENTIAL BUSINESS INFORMATION

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Appendices

Appendix A:	Representative Photographs of Raptor Nests	
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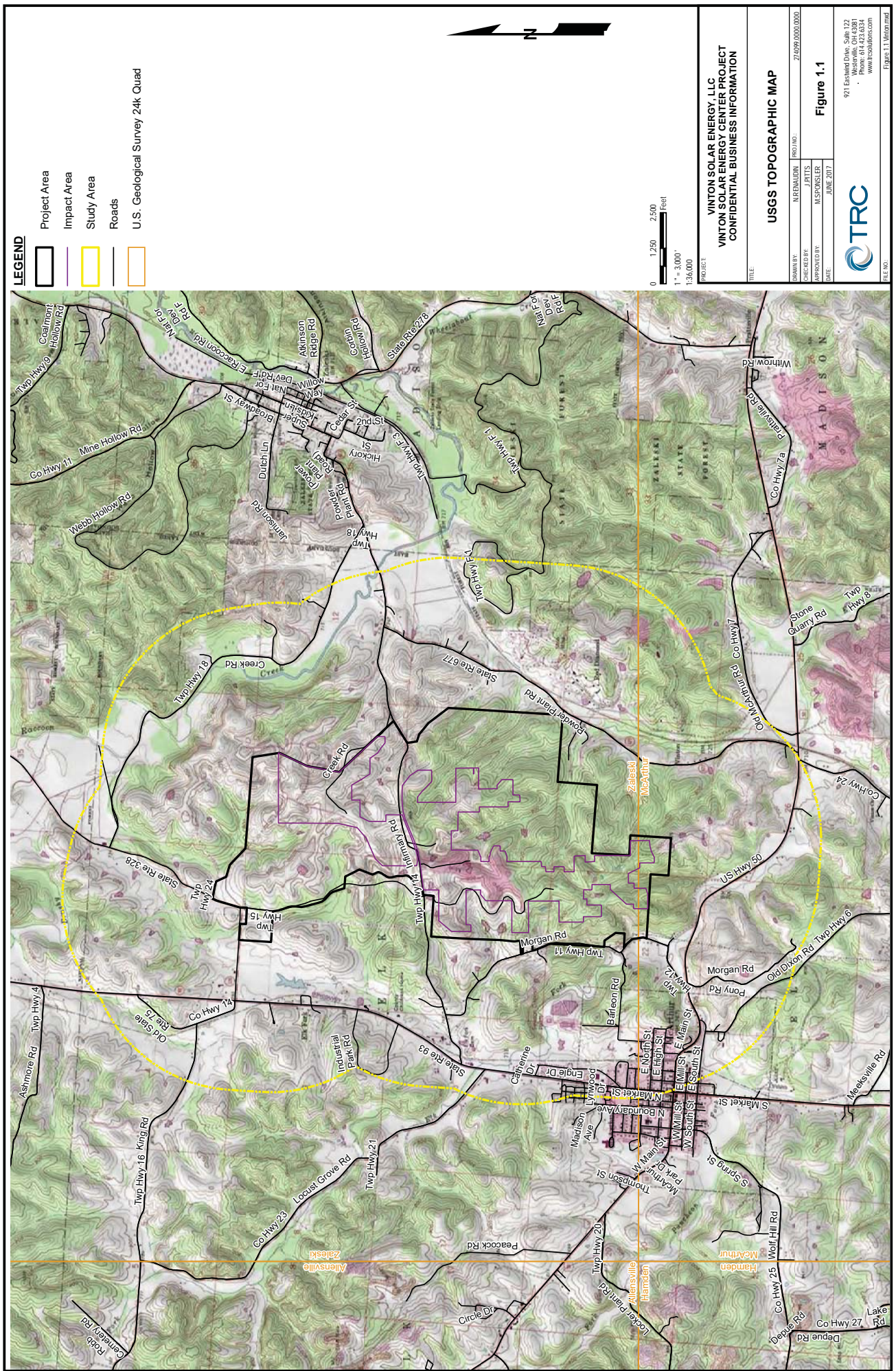
Acronyms

GPS	Global Positioning System
IPaC	USFWS Information for Planning and Conservation
MW	Megawatt
NLCD	National Land Cover Database
ODNR	Ohio Department of Natural Resources
TRC	TRC Environmental Corporation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VSE	Vinton Solar Energy, LLC

1.0 Introduction

On behalf of Vinton Solar Energy, LLC (VSE), TRC Environmental Corporation (TRC) has prepared this Raptor Nest Survey report as part of environmental studies conducted for the Vinton Solar Energy Center Project located in Vinton County, Ohio. The proposed solar facility will generate up to 125 megawatts (MW) of power. The Project Area is privately owned and located approximately 1.0 mile (1.6 kilometers) northeast of the Village of McArthur, in Elk Township, Vinton County, Ohio (Figure 1.1).

The objective of the survey described herein was to identify and map raptor nests within the Project Area and an additional surrounding buffer of 1.0 mile (1.6 kilometers) (Study Area), representing an area of 8,905 acres (3,602 hectares).



2.0 Methods

TRC conducted a ground-based survey for raptor nests within the Study Area on April 4, 2017. The Study Area for the Vinton Solar Energy Center Raptor Nest Survey is defined as the Project Area and an additional surrounding buffer of 1.0 mile (1.6 kilometers), representing a total area of 8,905 acres (3,602 hectares). Within the Project Area, the land anticipated to be disturbed for construction of the Vinton Solar Energy Center is defined as the Impact Area (Figure 1.1).

Prior to conducting the ground-based survey for raptor nests, TRC conducted agency consultation to identify existing records of nests in the Study Area (ODNR 2017, USFWS 2017a). TRC also visually inspected aerial photographs of the Study Area for potential raptor nesting habitat.

TRC biologists conducted the ground-based Raptor Nest Survey, via vehicle. One TRC biologist drove the vehicle, while the other biologists searched for nests using 10x magnification Nikon binoculars. At points during the study where sight lines were good, both biologists searched outside the vehicle. Both public and private roads within the Study Area were driven during the nest search. Woodlots with potential raptor nest trees in the Study Area were investigated from public locations. Incidental raptor observations were also recorded during the field survey.

TRC utilized protocols from the Ohio Department of Natural Resources (ODNR) On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio Protocol (ODNR 2009). During the study, trees suitable for raptor stick nest building were targeted within the deciduous forested areas. Based on the results of the desktop analysis, the areas with the greatest potential for raptor nests included deciduous forest. For each identified nest information was collected, including location, nest status (active or inactive), the number of adults and young present, and species occupying the nest site. Identified nest sites were photographed (Appendix A), recorded using global positioning system (GPS) coordinates and were marked in the field on a United States Geological Survey (USGS) 1:24,000 topographic quadrangles map.

3.0 Results

3.1 Desktop Analysis Data

Within the Study Area, elevations range from approximately 700 feet (213 meters) to 961 feet (293 meters) above mean sea level. Field observations, aerial photography and National Land Cover Database (NLCD 2017) maps indicate this landscape is predominately covered by deciduous forest (50 percent), hay/pasture (16 percent) and cultivated crops (16 percent) (Table 3.1). The remaining area is comprised of a combination of open space, herbaceous ground cover, some development, barren land and scrub/shrub (17 percent). Small amounts of each of the following cover types collectively comprise approximately one percent of the land within the Study Area: wetlands, forest and open water located within the Study Area buffer, but outside of the Impact Area (Figure 1.1).

Table 3.1 National Land Cover Database Land Cover Types within the Vinton Solar Energy Center Raptor Nest Study Area, Vinton County, Ohio, 2017

Cover Type	Acres	Hectares	Percent (%)
Deciduous Forest	4416	1787	50
Hay/Pasture	1452	588	16
Cultivated Crops	1397	565	16
Developed, Open Space	721	292	8
Herbaceous	236	95	3
Developed, Low Intensity	201	81	2
Barren Land	175	71	2
Scrub/Shrub	93	37	1
Developed, Medium Intensity	92	37	1
Evergreen Forest	62	25	< 1
Open Water	27	11	< 1
Developed, High Intensity	18	7	< 1
Emergent Herbaceous Wetlands	8	3	< 1
Woody Wetlands	6	2	< 1
Mixed Forest	1	< 1	< 1
Total	8,905	3,601	

3.2 Agency Consultation Data

No present or historic raptor nests were identified within the Study Area from the following sources: the Natural Heritage Database (ODNR 2017), a technical assistance letter from the United States Fish and Wildlife (USFWS) (USFWS 2017a), and the USFWS Information for Planning and Conservation (IPaC) tool (USFWS 2017b). The IPaC report did indicate that the Study Area is within the known range of the

bald eagle (*Haliaeetus leucocephalus*). During a telephone conversation Keith Lott, USFWS biologist, stated the nearest bald eagle nest record is associated with Lake Rupert, 2.6 miles (4.2 kilometers) to the southwest of the Study Area (USFWS 2017c).

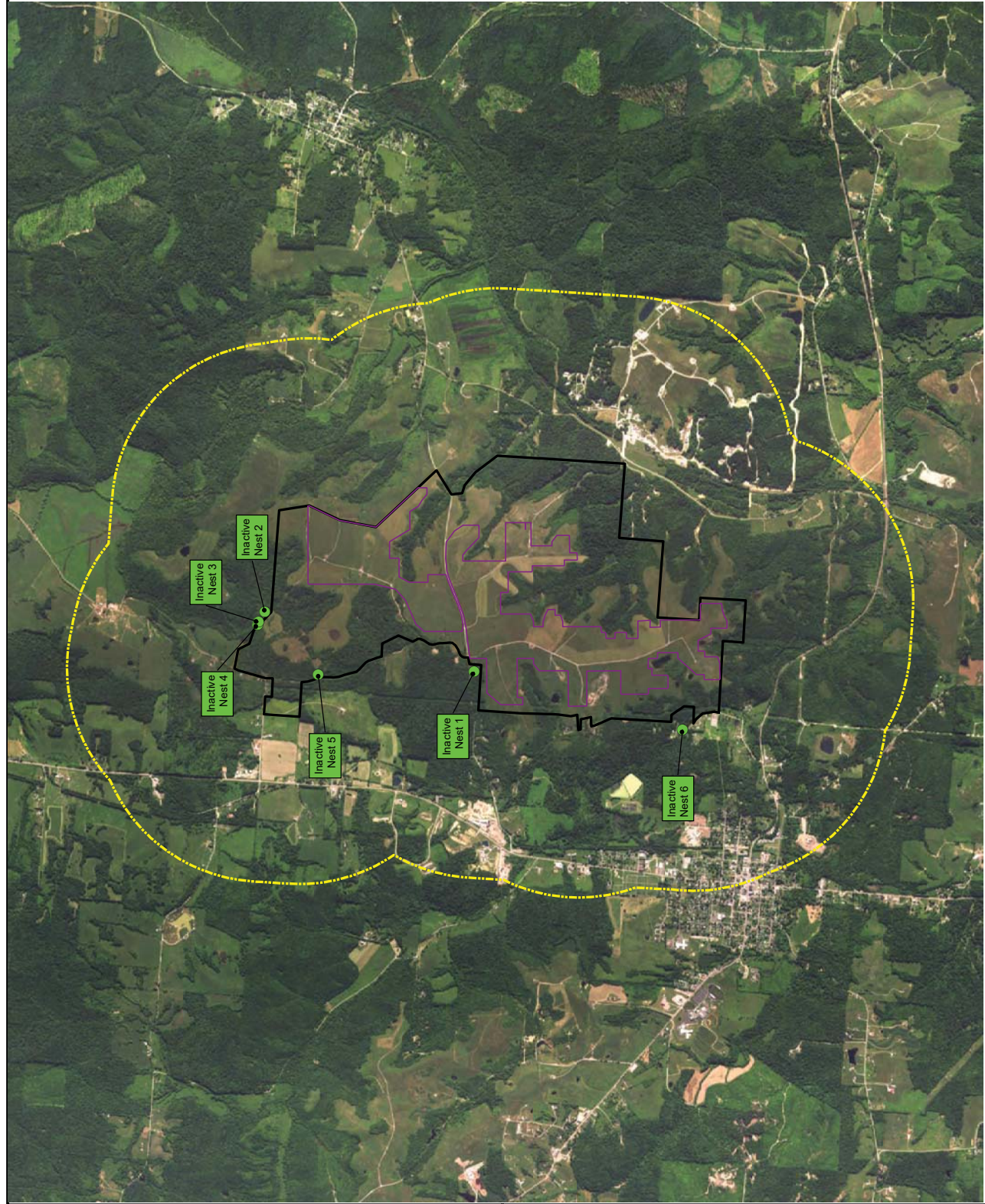
3.3 Raptor Nest Survey

No active nests were observed at the time of the Raptor Nest Survey. A total of six inactive raptor nests were identified within the Study Area (Table 3.2.). None of the six were located within the Impact area, three nests were located in the Project Area, and three were located in the one mile buffer zone. No raptors were observed on or near the nests. None of the nests showed signs of recent nest use (e.g. white washing beneath the nests, new stick placement, etc.). Due to the disrepair of the nests and lack of observed bird use, the species that last used the nests could not be determined.





Table 3.2. Raptor Nests Observed in Study Area of the Proposed Vinton Solar Energy Center, April 4, 2017

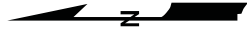
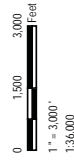
Nest Number	Status	Species	Location	Distance from Impact Area, feet (ft), meters (m)
1	Inactive	Undetermined	Buffer	273 ft (83 m)
2	Inactive	Undetermined	Buffer	969 ft (295 m)
3	Inactive	Undetermined	Project Area	1,367 ft (417 m)
4	Inactive	Undetermined	Project Area	1,530 ft (466 m)
5	Inactive	Undetermined	Project Area	6,572 ft (200 m)
6	Inactive	Undetermined	Buffer	1,208 ft (368 m)

Incidental observations of raptors identified in the Study Area were the American kestrel (*Falco sparverius*), broad-winged hawk (*Buteo platypterus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*). None of these raptors are listed as species of concern.



LEGEND

-  Project Area
-  Impact Area
-  Study Area
-  Nest Locations



VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER PROJECT
CONFIDENTIAL BUSINESS INFORMATION

RAPTOR SURVEY MAP

OWNER:	MRENAUDIN	PROJ NO.:	276091.0000.0000.
DRAWN BY:	J. JETTS		
APPROVED BY:	MSPONSER		
DATE:	JUNE 2017		

Figure 3.2



921 Eastwood Drive, Suite 122
Westerville, OH 43081
Phone: 614.422.6534
www.trcinc.com

FILE NO.

Figure 3.1 Vinton.mxd

4.0 Literature Cited

NLCD (2017). National Land Cover Database (NLCD). Retrieved from: LCS Program:

https://www2.usgs.gov/climate_landuse/lcs/projects/nlcd.asp).

ODNR (2009). Ohio Department of Natural Resources On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio (ODNR 2009) Protocol. An Addendum to the Ohio Department of Natural Resource's Voluntary Cooperative Agreement. "Ohio DNR Division of Wildlife. N.p., n.d. Web. 10 Apr. 2017.
<http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/species%20and%20habitats/windwildlifemonitoringprotocol.pdf>



ODNR (2017). Natural Heritage Database review response from Debbie Woischke dated April 13, 2017. Ohio Department of Natural Resources (ODNR) National Heritage Database (Wildlife, Ohio DNR Division of. "Ohio.gov / search." Ohio DNR Division of Wildlife. N.p., n.d. Web. 10 Apr. 2017. <http://wildlife.ohiodnr.gov/species-and-habitats/ohio-natural-heritage-database>).



USFWS (2017a). Technical Assistance Letter from Susan Zimmerman dated April 12, 2017. TAILS: 03E15000-2017-TA-1090.



USFWS (2017b). Information for Planning and Conservation (IPaC). Retrieved from USFWS: <https://ecos.fws.gov/ipac/>).

USFWS (2017c). Personal Communication with Keith Lott, USFWS biologist in discussion with TRC personnel Mike Sponsler on April 3, 2017.

REPRESENTATIVE PHOTOGRAPHS OF RAPTOR NESTS

Date: 04-04-2017	
Feature: Raptor Nest 1	
Comments: Representative photograph of Inactive Nest 1. The nest is located along a Township Road, adjacent to the Study Area.	
Date: 04-04-2017	
Feature: Raptor Nest 1	
Comments: Representative photograph of Inactive Nest 1 located in close proximity to a pond.	

Invenergy LLC		State: Ohio	County: Vinton
Project Name: Vinton Solar Energy Center Project			
Date: 04-04-2017			
Feature: Raptor Nest 4			
Comments: Representative photograph of a raptor nest, Inactive Nest 4, located within the forested area at the northern edge of the Project Area.			
Date: 04-04-2017			
Feature: Raptor Nest 4			
Comments: Representative photograph of a raptor nest, Inactive Nest 4. The nest is located adjacent to additional raptor nests, Inactive Nest 2 and 3.			

Date: 04-04-2017	
Feature: Raptor Nest 6	
Comments: Representative photograph of Inactive Nest 6 located outside the Project Area.	
Date: 04-04-2017	
Feature: Raptor Nest 6	
Comments: Representative photograph of Inactive Nest 6. The nest is located adjacent to residential housing and in close proximity to a stream.	

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

2/15/2019 4:23:11 PM

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Case No(s). 19-0393-EL-BLN

Summary: Application - Part 3 of 3 electronically filed by Christine M.T. Pirik on behalf of Vinton Solar Energy LLC