AMERICAN ELECTRIC POWER

BOUNDLESS ENERGY

Legal Department

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April 30, 2018

Chairman Asim Z. Haque
Ohio Power Siting Board
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Ohio Power Siting Board
Docketing Division
180 East Broad Street
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Re: Case No. 18-0033-EL-BTX
In the Matter of the Application of AEP Ohio Transmission Company, Inc. for a Certificate of Environmental Compatibility and Public Need for the Seaman-Sardinia 138kV Transmission Line Project (a/k/a the Sardinia Area Improvements Project)

Dear Chairman Haque,

Attached please find a copy of the Application of AEP Ohio Transmission Company, Inc. for a Certificate of Environmental Compatibility and Public Need ("Application") for the above-referenced project. This filing is made pursuant to O.A.C. 4906-5-01, *et seq*. and 4906-2-01, *et seq*.

Filing of this Application is effected electronically pursuant to O.A.C. 4906-2-02(A) and (D). Five printed copies and ten additional electronic copies (CDs) of this filing will also be submitted to the Staff of the Ohio Power Siting Board for its use.

The following information is included pursuant to O.A.C. 4906-2-04(A)(3):

(a) Applicant:
AEP Ohio Transmission Company, Inc.
c/o American Electric Power
Energy Transmission
700 Morrison Road
Gahanna, Ohio 43220

(b) Facilities to be Certified:

Seaman-Sardinia 138kV Transmission Line Project

(c) Applicant's Authorized Representative with respect to this Application:

Mike Deskin
Project Manager
700 Morrison Road
Gahanna, Ohio 43220

If you have any questions, please do not hesitate to contact me.

/s/ Christen M. Blend
Christen M. Blend (0086881), Counsel of Record
Hector Garcia (0084517)

Counsel for AEP Ohio Transmission Company, Inc.

Now comes Scott N. Smith and states that the information contained in the Application is complete and correct to the best of his knowledge, information, and belief.

Scott N. Smith
Senior Vice President – Transmission Field Services & Controls
American Electric Power Service Corporation, as agent for
AEP Ohio Transmission Company, Inc., an Ohio corporation.

Sworn to and subscribed before me this 23rd day of April, 2018.

Linda D. Craig
Notary Public

cc: Executive Director and Counsel, c/o Jon Pawley, OPSB Staff

Application for Certificate of Environmental Compatibility and Public Need

Seaman-Sardinia 138 kV Transmission Line Project (a/k/a Sardinia Area Improvements Project)

OPSB Case No. 18-0033-EL-BTX

Prepared for

AEP OHIO
An AEP Company
BOUNDLESS ENERGY

Submitted to

Ohio Power Siting Board

April 2018

JACOBS ch2m

BEFORE THE OHIO POWER SITING BOARD

Certificate Application for Electric Transmission Facilities

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Acronyms and Abbreviations

ACSR	aluminum conductor, steel-reinforced cable
AEP	American Electric Power
AEP Ohio Transco	AEP Ohio Transmission Company, Inc.
BMP	best management practice
cm	centimeter
DOW	Division of Wildlife
ELF	extremely low frequency
EMF	electric and magnetic field
FAA	Federal Aviation Administration
Field Survey Area	200 feet on either side of the centerline for the Preferred Route and 50-200 feet on either side of the centerline for the Alternate
GIS	geographic information system
HHEI	Headwater Habitat Evaluation Index
IARC	International Agency for Research on Cancer
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID	identification
IEEE	Institute of Electrical and Electronics Engineers
kcm	thousand circular mil
kV	kilovolt
kV/m	kilovolt per meter
mG	milligauss
MHz	megahertz
MSDS	Material Safety Data Sheet
NA	not applicable
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O.A.C.	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OHI	Ohio Historic Inventory
OHPO	Ohio Historic Preservation Office
OPSB	Ohio Power Siting Board
ORAM	Ohio Rapid Assessment Method
OSHA	Occupational Health and Safety Administration
PEM	palustrine emergent
PFO	palustrine forested

PHWH	Primary Headwater Habitat
Project	Sardinia Area Improvements Project
PSS	palustrine scrub/shrub
QHEI	Qualitative Habitat Evaluation Index
ROW	right-of-way
SWPPP	stormwater pollution prevention plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WHO	World Health Organization

4906-5-02 PROJECT SUMMARY AND APPLICANT INFORMATION

(A) PROJECT SUMMARY

American Electric Power Ohio Transmission Company, Inc. (AEP Ohio Transco) plans to construct a new 138-kilovolt (kV) electric transmission line from the existing Sardinia Substation to the existing Hillsboro-Maysville 138-kV electric transmission line, located in Brown County, Ohio. The project is referred to as the Sardinia Area Improvements Project (Project).

(1) General Purpose of the Facility

AEP Ohio Transco plans to upgrade an existing power source to the Brown County area's electric transmission grid and update the infrastructure to provide reliable electricity to customers. The existing transmission line has reached an age where it requires replacement. The modern facilities will provide local customers with greater electric service reliability.

The Seaman-Sardinia 138 kV Transmission Line Project ("Sardinia Area Improvements Project") is needed to address age-related asset health concerns on the 69 kV Seaman-Sardinia transmission line. The Project also resolves reliability concerns associated with the Sardinia Station being served by a single 11.9-mile radial line, which is presently the case. This 69 kV line will be retired, and a double circuit line designed and operated at 138 kV will be constructed.

Additional details can be found in this Application's Review of Need and Schedule, in Section 4906-5-03.

(2) General Location, Size, and Operating Characteristics

The proposed Project begins approximately 2.5 miles east of Sardinia, Ohio at the existing Sardinia Substation, located approximately 450 feet west of the intersection of Township Highway 171/Katterman Road and Five Points Mowrystown Road. The proposed Project terminates at the existing Hillsboro-Maysville 138-kV electric transmission line, which runs generally north to south through Brown County, Ohio. The proposed Project is approximately 3.7 to 4.5 miles in length depending on the route selected, will be constructed using primarily steel, single-pole structures, and will require a new, approximately 100-foot-wide permanent right-of-way (ROW). The actual width of the ROW required for any particular section of the transmission line could vary from the 100-foot planning width, dependent on several factors for a specific location. Figure 2-1 shows the Project vicinity, Sardinia Substation starting point, interconnecting points along the existing Hillsboro-Maysville 138-kV electric transmission line, the Preferred and Alternate Routes identified by AEP Ohio Transco, and the existing Seaman-Sardinia 69-kV transmission line that will be retired.

(3) Suitability of Preferred and Alternate Routes

AEP Ohio Transco and its siting team identified a Preferred and an Alternate Route (Figure 2-1, and detailed in Appendix 4-1) after conducting a detailed Siting Study. This study documents the route selection process and is discussed in detail in Section 4906-5-04 of this Application.

The goal of the Siting Study was to identify reasonable routes while avoiding or minimizing effects on sensitive land uses, ecological, and cultural features in the Project vicinity. Potential routes were evaluated and compared to aid the selection of a Preferred and an Alternate Route. The Preferred and Alternate Routes are both viable for construction and were selected by AEP Ohio Transco for consideration by the Ohio Power Siting Board (OPSB) in this Application.

(i) Preferred Route

The Preferred Route from the existing Sardinia Substation to the existing Hillsboro-Maysville 138-kV electric transmission line is approximately 3.7 miles in length.

The 3.7-mile route begins at the existing Sardinia Substation and runs southeast along Katterman Road for approximately 0.4 mile. The route then runs northeast for approximately 2.1 miles through largely agricultural land until it reaches Shitepoke Road. The route crosses over Shitepoke Road and continues northeast along the eastern edge of Shitepoke Road for approximately 0.5 mile until it reaches Stivers Road. The route then runs southeast along the southern edge of Stivers Road for 0.7 mile, crossing over State Route 62 and terminating at the interconnecting point along the existing Hillsboro-Maysville 138-kV electric transmission line.

(ii) Alternate Route

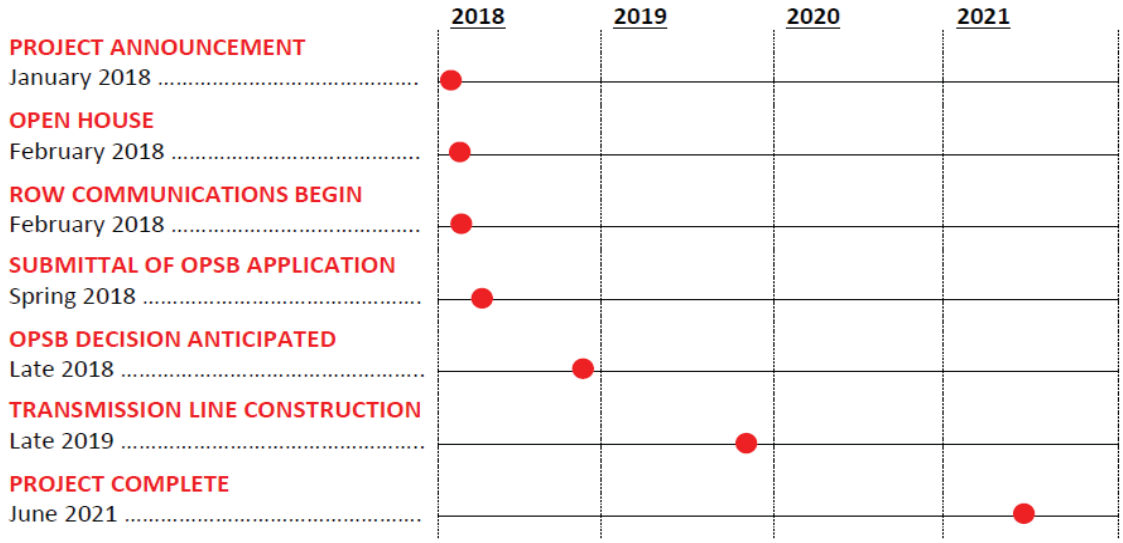
The Alternate Route from the existing Sardinia Substation to the existing Hillsboro-Maysville 138-kV electric transmission line is approximately 4.5 miles in length.

The 4.5-mile route begins at the existing Sardinia Substation and runs southwest then southeast for 0.3 mile until it reaches Kratz Road. The route then runs southeast along the western edge of Kratz Road for approximately 0.9 mile until it reaches State Highway 32. The route proceeds southeast along the northern edge of State Route 32 for approximately 3.3 miles, terminating at the interconnecting point along the existing Hillsboro-Maysville 138-kV electric transmission line.

(4) Schedule

The current Project schedule is illustrated in the diagram below.

PROJECT SCHEDULE



(B) APPLICANT DESCRIPTION

(1) Company History

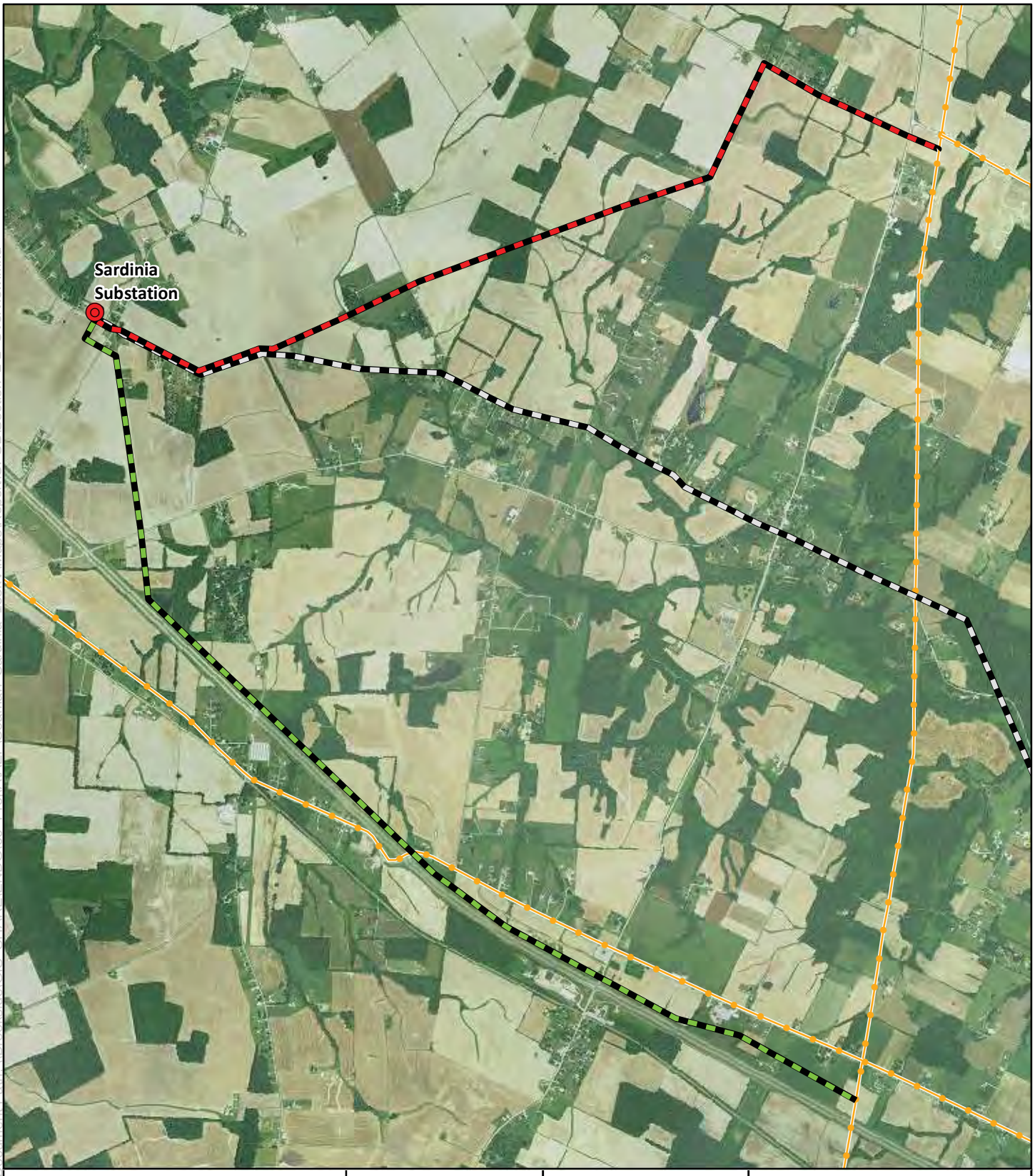
AEP Ohio Transco is a transmission-only company approved as a public utility in Ohio in 2010, in Case No. 10-245-EL-UNC.

(2) Current Operations and Affiliate Relationships

AEP Ohio Transco is an affiliate of American Electric Power ("AEP") and Ohio Power Company ("AEP Ohio"). AEP was originally incorporated in 1906 as the American Gas and Electric Company. The company's earliest utility properties provided electric, gas and other services in communities in New Jersey, New York, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois. The company became AEP in 1958 and merged with Central and Southwest Corporation in 2000.

AEP is one of the largest electric utilities in the United States, delivering electricity to nearly 5.4 million customers through 224,000 miles of distribution lines in 11 states. AEP owns the nation's largest electricity transmission system, which is a network comprised of more than 40,000 miles and includes more 765-kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP also ranks among the nation's largest generators of electricity, owning approximately 26,000 megawatts of generating capacity in the U.S. AEP's utility units operate as AEP Ohio, AEP Texas, Appalachian Power (in Virginia and West Virginia), Wheeling Power (West Virginia), AEP Appalachian Power (in Tennessee), Indiana Michigan Power Company, Kentucky Power, Public Service Company of Oklahoma, and Southwestern Electric Power Company (in Arkansas, Louisiana, and east Texas). News releases and other information about AEP can be found at www.AEP.com. AEP Ohio, the regulated electric distribution utility affiliate of AEP and AEP Ohio Transco operating in the state of Ohio, provides electricity to nearly 1.5 million distribution customers in Ohio. News and information about AEP Ohio can be found at www.AEPOhio.com.

Figures



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Legend

- Substation
- Preferred Route
- Alternate Route
- Seaman-Sardinia 69kV (To be Retired)
- Other Existing Electric Transmission Line

BASE MAP SOURCE: National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:32,500

April 11, 2018

LOCATOR MAP

FIGURE 2-1
Project Overview and Area Features

Sardinia Area Improvements Project
Brown County, OH

0 0.25 0.5
Miles

4906-5-03 REVIEW OF NEED AND SCHEDULE

(A) NEED FOR PROPOSED FACILITY

AEP Ohio Transco plans to upgrade an existing power source to the Brown County area's electric transmission grid and update the infrastructure to provide reliable electricity to customers. The existing transmission line has reached an age where it requires replacement. The modern facilities installed through this Project will provide local customers with greater electric service reliability; specifically, the Village of Sardinia will no longer be served by a single 11.9-mile radial 69 kV line and instead a double circuit 138 kV line will be constructed.

(1) Purpose of the Proposed Facility

The Project will provide a 138 kV transmission line between the Sardinia Substation and the existing Hillsboro-Maysville 138-kV transmission line. This greenfield line will provide a double circuit connection to the Sardinia Substation.

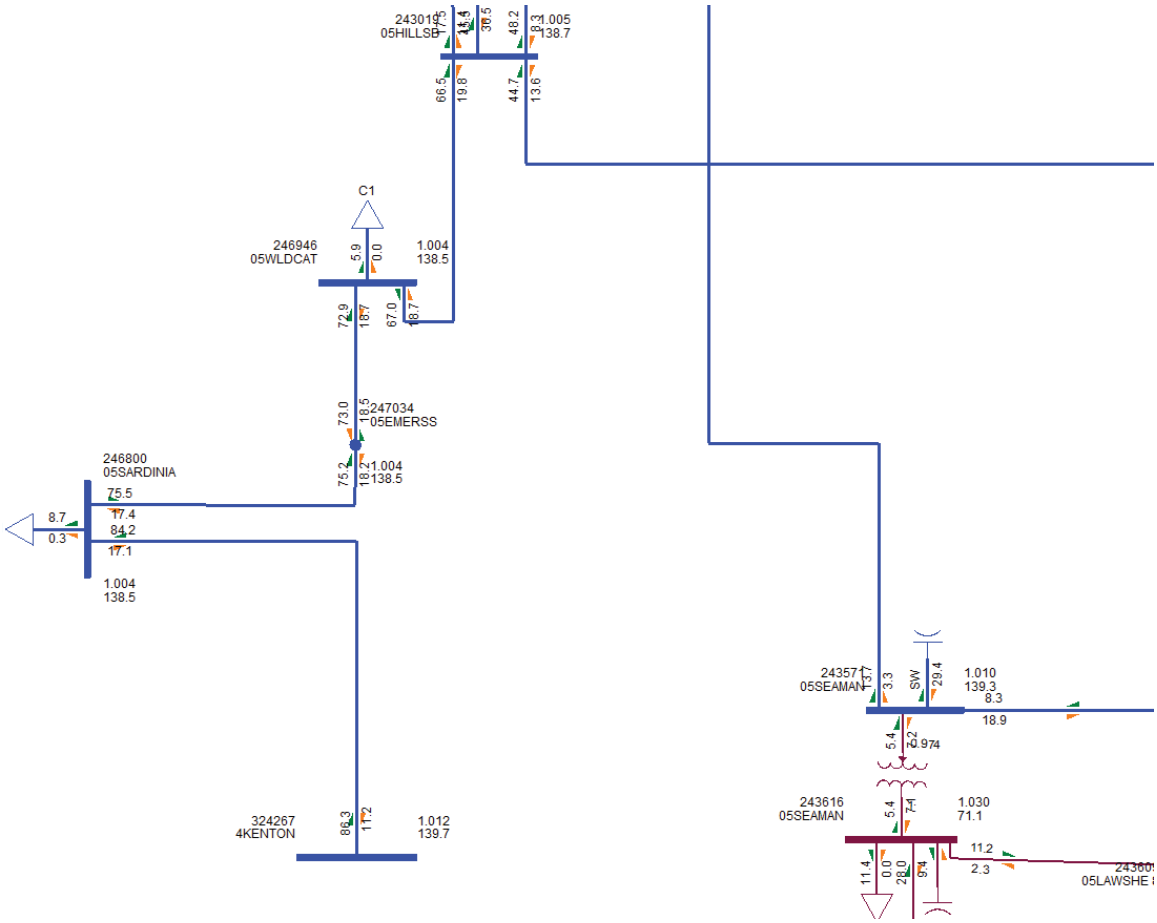
(2) System Conditions, Local Requirements, and Other Pertinent Factors

The existing 11.9-mile, 69 kV radial line section between Seaman and Sardinia was constructed in 1938 using wood pole structures with 336 ACSR conductor (60 MVA rating). There are 363 open conditions on the entire 20.3-mile line between Adams and Sardinia. The 11.9-mile radial line from Seaman to Sardinia has approximately 60 percent of those (217). There have been 64 momentary and 9 permanent outages on this circuit over the last 10 years. Removing the existing aged 69 kV radial line and constructing this Project will increase reliability in the surrounding service area.

(3) Load Flow Studies and Contingency Analyses

Network power flow simulations were conducted for this Project in accordance with FERC Form 715 requirements. The studies compare conditions before and after the proposed Project in order to determine the Project's benefit and demonstrate that no new problems are introduced resulting from the system changes.

(4) System Performance Transcription Diagrams



(B) REGIONAL EXPANSION PLANS

(1) Proposed Facility in Long-Term Forecast

(a) Reference in Recent Long-Term Forecast

The Project is referenced in AEP Ohio Transco's 2018 Long-Term Forecast Report to the Public Utilities Commission of Ohio, on PUCO Form FE-T9, on page 48. This page can be found in Appendix 5-1.

(b) Explanation if Not Referenced

Not applicable, see Section 4906-5-03(B)(1)(a) directly above.

(c) Reference in Regional Expansion Plans

The proposed Project was reviewed in the PJM RTEP meeting on March 16, 2018, but has not yet been assigned a supplemental Project number by PJM. More information can be found on www.pjm.com.

(C) SYSTEM ECONOMY AND RELIABILITY

The new line serving Sardinia will be decreased from 11.9 miles to approximately 4.5 miles, which in turn reduces the exposure to outages. The line will be constructed as a double circuit. The new proposed configuration was simulated with all area contingencies in accordance with NERC TPL-001-4 reliability standards.

(D) OPTIONS TO ELIMINATE THE NEED FOR THE PROPOSED PROJECT

The following alternatives were considered before proceeding with this Project. The proposed alternatives were not selected to meet the Project need, as explained below.

Alternative 1:
Rebuild the 11.9-mile line from Seaman as a 69 kV double circuit. This alternative would provide the town of Sardinia with a redundant circuit, similar to the proposed Project. This alternative eliminates the rehabilitation issue but was not selected because it would require significant outages to accomplish. This alternative also adds potentially habitable structures that are currently outside the existing ROW into the expanded ROW, as the ROW width will expand due to the increased pole height.

Alternative 2:
To increase reliability, the Sardinia extension can be designed with two independent lines looping into Sardinia. This would require constructing approximately 4 miles of new single circuit 138 kV line from the north near Emerald Station to Sardinia, and then continuing the loop to a new tap point. The 138 kV line between the new tap points and the 69 kV line would then be retired. This alternative was not selected due to its increased cost.

Alternative 3:
Build approximately 4.5 miles of new double circuit 138 kV line from Wildcat Substation. Wildcat could be expanded to terminate the Sardinia circuits with circuit breakers, and the Seaman-Sardinia 69 kV line would be retired. This option was not selected due to the increased cost associated with the Wildcat Substation work, including fence expansion and of the installation of 138 kV equipment.

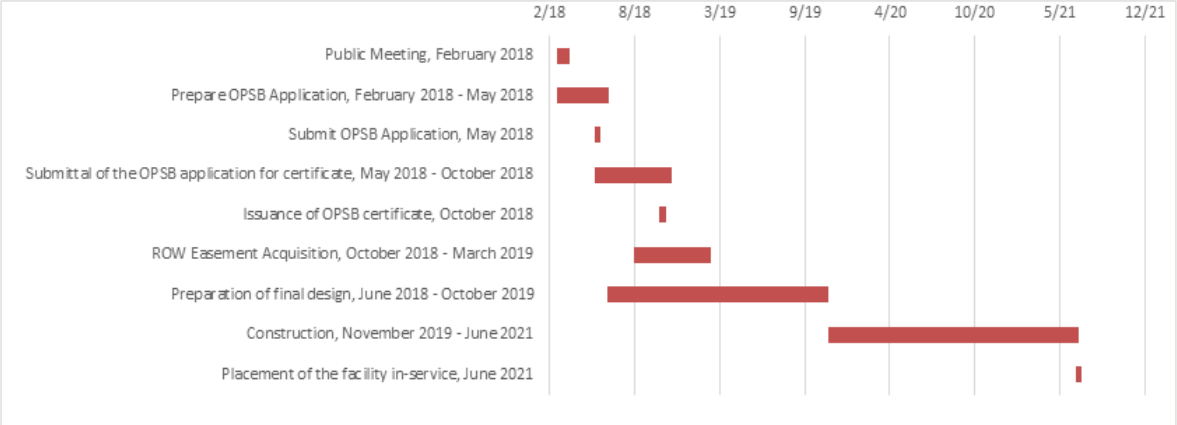
(E) FACILITY SELECTION RATIONALE

The proposed Project meets the Project need as it reduces overall line length and limits the amount of 138 kV components to be purchased and installed at other existing facilities. The Project as proposed is the most appropriate option for the Project, as it satisfies the need in considering costs.

(F) PROJECT SCHEDULE

(1) Gantt Schedule Bar Chart

A schedule for the proposed Project is presented below.



(2) Impact of Critical Delays

Delaying the Project will mean an increase in the probability of outages at Sardinia from equipment failure on the Seaman-Sardinia line.

4906-5-04 ROUTE ALTERNATIVES ANALYSIS

(A) ROUTE SELECTION STUDY

AEP Ohio Transco's siting team, consisting of staff from AEP Ohio Transco and CH2M HILL Engineers, Inc. (CH2M) (now part of Jacobs Engineering Group), conducted the transmission line Siting Study for the Project (Appendix 4-1). The goal of the Siting Study was to identify transmission routes while avoiding or minimizing effects on sensitive land uses, ecological features, and cultural features in the Project vicinity. Several alternative routes were evaluated in detail and compared to aid the selection of a Preferred and an Alternate Route.

Sensitive areas identified in the Siting Study included residential parcels, a church, cemeteries, schools, historic structures and places, and ecological resources. As the study area is rural, the number of residential structures within the study area was generally low; therefore, this criterion did not significantly limit the placement of alternative routes for study. Previously identified cultural resource sites were concentrated in the southern part the study area along State Highway 32. Anticipated impacts to cultural resources also did not significantly limit the placement of route alternatives. Ecologically sensitive areas include specific locales of streams, wetlands, and forest habitat throughout the study area. West Fork Ohio Brush Creek runs through the southern portion of the study area and several of its tributaries begin in the northern section of the study area.

At the public informational meeting (open house forum), AEP Ohio Transco presented 18 study segments. The siting team made these route selections based on both quantitative (e.g., locations of individual residences, area of forested lands crossed, existing transmission lines paralleled) and qualitative (such as public and landowner input, feasibility of construction, operations, maintenance) comparative evaluations. Following the meeting, segments were reviewed by the siting team with respect to landowner's comments. Several segments were retained for continued analysis such as field ecological and cultural studies while others were removed from consideration due to having more difficult construction access, minimizing the length of transmission line across individual property owners, and having potential ecological impacts due to removal of forested corridors resulting from new ROW clearing. Eventually, the Siting Team compiled the study segments into four alternative routes, conducted further analyses for comparison of the alternatives, and finally selected a Preferred and Alternate Route after detailed evaluation of the results from the field wetland delineation and consideration of impacts to landowners.

(1) Study Area Description and Rationale

The Project is located in Brown County, Ohio, approximately 2.5 miles east of Sardinia, Ohio. Review of the U.S. Geological Survey (USGS) 7.5-minute topographic maps of the area (USGS, 1962; USGS, 1975; USGS, 1976; USGS, 1982) indicate that West Fork Ohio Brush Creek is the prominent drainage feature in the Project area. The area is characterized by mostly flat land with some sloped terrain near drainages, ranging in elevation from approximately 990 feet to over 1,060 feet above mean sea level. The Project area is mainly open land (pasture, residential parcels,

farm land, etc.) with pockets of mature upload forests within the West Fork Ohio Brush Creek valley and along State Route 62.

AEP Ohio Transco utilized the geographic area encompassing the existing Sardinia Substation and interconnecting points along the existing Hillsboro-Maysville 138-kV transmission line to define a focused study area for the Project. Various constraints and factors such as existing transportation corridors, existing utility corridors, and the Brown County line were considered to define the study area.

(2) Study Area Map

Figures 1 and 2 in Attachment A of the Siting Study report (Appendix 4-1) illustrate the approximate boundary of the study area and the various types of data (opportunities and constraints) reviewed for the study.

(3) Map of Study Area, Routes, and Sites Evaluated

Figures 3a, 3b, and 4 in Attachment A of the Siting Study report (Appendix 4-1) illustrate the boundary of the study area, study segments, and the alternative routes that were evaluated to guide the siting team in the selection of a Preferred and Alternate Route.

(4) Siting Criteria

The list of all quantitative siting constraints and opportunities utilized in the siting study are presented in Section 3.2 of the Siting Study report (Appendix 4-1). Specific evaluation criteria utilized to assess the alternative routes are presented in Sections 4.1 (Natural Resources), 4.2 (Land Use), and 4.3 (Constructability) of the report. The quantitative siting criteria consists of constraint and attribute data, including but not limited to, locations of individual residences, property boundaries, agricultural district land, forested lands, wetlands, streams, existing transmission lines, roads, and other land use features.

The qualitative criteria considered by the siting team in the selection of the Preferred and Alternate Routes included overall constructability factors (terrain and access) and landowner feedback.

(5) Siting Process for Preferred and Alternate Routes

After the study area, siting opportunities, and siting constraints were established, conceptual routes were drawn based on the siting team's evaluation of the various opportunity and constraint data. The intent when placing these conceptual routes was to maximize the use of opportunities and minimize constraints. Where two or more of these conceptual routes intersected, study segments were formed between two common nodes or points of intersection. Together, the assemblage of study segments and their intersecting nodes are referred to as the study segment network.

Various siting criteria were quantified for each study segment and study segments were compared and refined. Eventually, alternative routes were developed by assembling the study

segments that best meet the siting guidelines into individual routes for analysis. Alternative routes were compared and assessed using the various criteria quantities for land use, natural and cultural resources, and engineering and construction. Ultimately, through a quantitative and qualitative analysis and comparison of the alternate routes, the siting team identified a Preferred Route and an Alternate Route.

The entire siting process, methodology, and results are described in further detail in the Siting Study report in Appendix 4-1.

(6) Route Descriptions and Rationale for Selection

The Preferred Route from the existing Sardinia Substation to the existing Hillsboro-Maysville 138-kV electric transmission line is approximately 3.7 miles long.

The Preferred Route has the following favorable characteristics compared to other alternative routes:

- Shorter in length, thus impacting less overall acreage
- Fewer ecological features, namely forested areas and significantly lower wetland acreage
- Parallels existing road ROW thus reducing impacts on agricultural crop production and provides simpler access for construction and maintenance.

The Alternate Route is approximately 4.5 miles long. This route has less than 20 percent in common with the Preferred Route.

The Alternate Route has the following favorable characteristics compared to other alternative routes:

- Parallels an existing road corridor (Ohio DOT ROW) and edge of property boundaries for most of the route
- Fewer landowners crossed
- Fewer residences within 250 feet of centerline.

(B) COMPARISON TABLE OF ROUTES, ROUTE SEGMENTS, AND SITE

Tables 1, 3, and 4 of the Siting Study report (Appendix 4-1) summarize the natural resources, land use, and constructability opportunities and constraints of each alternative route.

(C) PUBLIC INVOLVEMENT

AEP Ohio Transco conducted a public information program to communicate Project planning details, seek feedback from landowners and residents, the media and local elected officials, and generally raise awareness of the Project. The program involved conducting a public informational meeting to seek feedback from the community on the Project and the routes being considered. Prior to the public informational meeting, AEP Ohio Transco mailed invitation letters to residents,

tenants, and officials, and issued a newspaper public notice. A Project website was also created with Project mapping and a summary description (available at www.aeptransmission.com/ohio/Sardinia). At the public informational meeting, AEP Ohio Transco representatives were available to answer questions, listen, and receive feedback from the public. A summary of the public informational meeting is provided below.

(1) Public Informational Meeting

An open house was held on February 1, 2018, at Sardinia Elementary School in Sardinia, Ohio. Eighteen study segments were presented for public comment, along with other Project information during the meeting. Detailed maps of the study segments were presented that included property boundaries with unique parcel identification (ID) numbers referenced to a list of property owners. This allowed attendees to identify their property on aerial photographs and observe the location of the proposed alignment with respect to their property. Thirty-one people attended the meeting.

Thirteen comment cards were received from attendees. Comments included concerns about reducing disturbance to farmland, property resale value, and rating the importance of specific routing factors. Attendees indicated that the most important factors were maximizing distance from homes, minimizing the number of agricultural fields crossed, minimizing the number of parcels crossed, maximizing rebuild in existing centerline and using existing easements, maximizing length along roads, and minimizing crossing of forested land. AEP Ohio Transco's siting team reviewed each of the landowners' comments and fully considered the concerns and/or recommendations expressed to aid in the selection of the Preferred and Alternate Routes.

Following the public informational meeting, a minor refinement was made to the Preferred Route and Alternate Route to maximize paralleling of property boundaries to minimize impacts to agricultural fields.

Appendix 4-1
Siting Study

Siting Study

Sardinia Area Improvements Project
Case No. 18-0033-EL-BTX

Prepared for

AEP OHIO TRANSMISSION COMPANY
An AEP Company
BOUNDLESS ENERGY™

Submitted to:

Ohio Power Siting Board

Prepared by:

CH2M HILL Engineers, Inc.
400 East Business Way, Suite 400
Cincinnati, Ohio 45241

JACOBS ch2m

April 2018

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Tables

Figures

Attachments

KEY TERMINOLOGY

alternative route(s)	An assemblage of study segments that form a route for analysis and comparison.
conceptual route(s)	Initial Project route that adheres to a series of general siting and technical guidelines.
constraint	Specific area that should be avoided to the extent reasonably practical during route development and site selection.
distribution line	An electric line that delivers power from a substation to households and businesses.
endpoint	The project starting and ending point(s), which may include substations, switch stations, tap points, or other locations defined by the Company's planners and engineers.
opportunity	Area where the transmission line may have less disruption to area land uses and the natural and cultural environment.
Proposed (Preferred) Route	The alignment on which the applicant/Siting Team proposes to construct a transmission line. The Proposed (Preferred) Route (1) reasonably minimizes adverse impacts on area land uses and the natural and cultural environment; (2) minimizes special design requirements and unreasonable costs; and (3) can be constructed and operated in a timely, safe, and reliable manner.
Siting Team	A multidisciplinary team of experts in transmission line routing, impact assessment for a wide variety of natural resources and the human environment, impact mitigation, engineering, and construction management.
Study Area	The territory in which line alternative routes can be sited to feasibly meet the Project's functional requirements and, at the same time, minimize environmental impacts and Project costs.
study segment	A study segment is partial alignments that when combined form a complete route.
substation	An enclosed assemblage of equipment (for example, switches, circuit breakers, buses, and transformers) through which electric energy is passed for the purpose of switching or modifying its characteristics.
tap point	The location where power is tapped from an existing transmission line to source a substation or customer.
transmission line	An electric line that moves bulk electric power from a generating plant to a substation or between substations.

ACRONYMS

AEP	American Electric Power
AEP Ohio Transco	American Electric Power Ohio Transmission Company
Certificate	Certificate of Environmental Compatibility and Public Need
CH2M	CH2M HILL Engineers, Inc.
ESRI	Environmental Systems Research Institute
GIS	geographic information system
GNIS	geographic names information system
kV	kilovolt
NAIP	National Agricultural Imagery Project
NHD	National Hydrography Dataset
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
ODNR	Ohio Department of Natural Resources
OHI	Ohio Historical Inventory
OPSB	Ohio Power Siting Board
PEM	palustrine emergent
PFO	palustrine forested
Project	Sardinia Area Improvements Project
PSS	palustrine scrub-shrub
ROW	right-of-way
SHPO	State Historic Preservation Office
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 PROJECT OVERVIEW

American Electric Power (AEP) Ohio Transmission Company (AEP Ohio Transco) is proposing to construct a new 138-kilovolt (kV) electric transmission line from the existing Sardinia Substation to the existing Hillsboro-Maysville 138-kV electric transmission line, located in Brown County, Ohio. The Project is referred to as the Sardinia Area Improvements Project (Project; **Figure 1**). The Project length will be approximately 4 miles. In Ohio, a project of this scope requires a Certificate of Environmental Compatibility and Public Need (Certificate) from the Ohio Power Siting Board (OPSB), which is part of the Public Utilities Commission of Ohio. As part of the Certification application process, transmission developers are required to complete a route selection study and report the results to the OPSB. Among other requirements, the application rules require the transmission developer to evaluate "all practicable alternatives." This report outlines the process used by the Siting Team, comprising CH2M HILL Engineers, Inc. (CH2M, and now part of Jacobs Engineering Group) and AEP Ohio Transco staff, to identify and evaluate practical Project transmission alternatives.

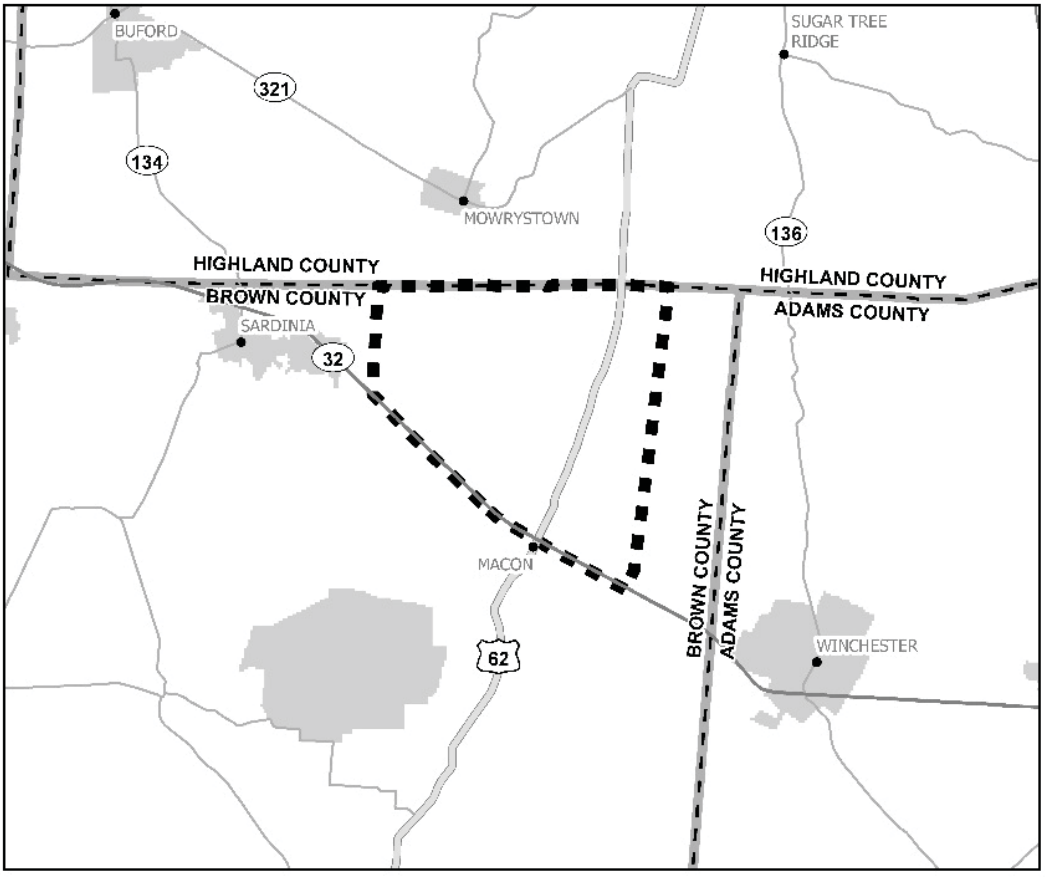

Figure 1. Project Location Map

1.1 Project Purpose and Need Summary

AEP Ohio Transco plans to upgrade an existing power source to the Brown County area's electric transmission grid and update the infrastructure to provide reliable electricity to customers. The existing transmission line has reached an age where it requires replacement. The modern facilities provide local customers with greater electric service reliability.

The Sardinia Area Improvements Project is needed to address age-related asset health concerns on the 69-kV Seaman-Sardinia transmission line. The Project also resolves reliability concerns of having Sardinia served by a single 11.9-mile radial line. This 69-kV line will be retired, and a line designed and operated at 138-kV will be constructed.

1.2 Project Characteristics

1.2.1 Project Endpoints and Improvement Description

The Project begins at the Sardinia Substation site, located approximately 450 feet west of the intersection of Township Highway 171/Katterman Road and Five Points Mowrystown Road in Eagle Township, Brown County, Ohio. The Project proceeds east approximately 4 miles to the existing Hillsboro-Maysville 138-kV electric transmission line, which runs generally north to south through Brown County, Ohio. The Study Area is wholly located in Eagle Township, Brown County, Ohio. No municipalities are located within the Study Area.

1.2.2 Transmission Line and Substation Design and Right-of-Way Requirements

The Project will likely be constructed using mostly steel, single-pole structures with an estimated aboveground height of 110 feet (**Figure 2**), although the final design is not yet complete. The Project will be a double circuit line with a 100-foot-wide permanent right-of-way (ROW), the majority of which would require new easements. The only existing easement held by Ohio Power Company is immediately surrounding the Sardinia Substation and along the existing 69-kV line. The Project will begin at the existing Sardinia Substation and terminate at the intersection with the existing Hillsboro-Maysville 138-kV electric transmission line. No new substations are required for the Project; however, the Sardinia Substation will be expanded.

Figure 2. Representative Single-Pole Steel Transmission Line Structure

1.2.3 Construction and Maintenance Considerations

This proposed transmission line Project will require land surveying, ROW vegetation clearing, foundation installation, structure assembly and erection, conductor and shield wire installation, and restoration upon completion. Construction operations will be conducted with attention to preserving and enhancing the natural habitat and conserving natural resources where practical. The following practices will be used to attain this goal, and these criteria could be adjusted according to the rules and judgments of any public agencies whose lands may be crossed by the proposed line; construction activities should be conducted in accordance with all applicable local, state, and federal permits:

- Disturbance of construction areas and laydown yards will be minimized to the extent practicable. These areas will be graded in a manner that will minimize erosion and conform to the natural topography.
- Soil excavated during construction and not used for other purposes will be evenly backfilled onto a cleared area. Backfilled soil will be sloped gradually to conform to the terrain and adjacent land.
- Erosion control devices will be constructed where necessary to reduce soil erosion in the ROW.
- If any new roads are necessary, then they will not be constructed on unstable slopes. Where feasible, service and access roads will be constructed jointly.

- Clearing and construction activities near streambeds will be performed so that damage to the area's natural condition is minimized. Stream banks will be restored as necessary to minimize erosion.
- Concerted and diligent effort will be made to prevent accidental oil spills and other types of pollution, particularly while performing work near streams, lakes, and reservoirs.
- Precautions will be taken to prevent the possibility of accidentally starting fires.
- Tension stringing of conductors will be employed, which may reduce the amount of vegetation clearing necessary.
- Precautions will be taken to protect natural features and cultural resources (identified by site-specific studies of the Project) along the ROW, if any are found.
- If federal protected species or habitat is present, then guidance from the U.S. Fish and Wildlife Service (USFWS) will be obtained prior to clearing or construction activities.
- Soil disturbance during construction will be kept to a minimum, and restorative measures will be taken in a reasonable length of time.

1.3 Project Timeline and Overview of Regulatory Approvals

AEP Ohio Transco initiated the transmission siting process in September 2017. Study segments were developed, evaluated, and refined through February 2018 and then presented to the public during a public information meeting on February 1, 2018. Following the information meeting, AEP Ohio Transco narrowed down the study segments to four alternative routes. The routes were then slightly adjusted based on landowner comments and engineering design constraints; Preferred and Alternate Routes were then selected. AEP Ohio Transco proceeded with the selected Preferred and Alternate Routes and prepared a Certificate application to OPSB. Pending approval from OPSB, construction is expected to begin in early 2019 to meet a mid-2021 in-service date.

1.4 Goal of the Siting Study

The goal of this siting study is to gain an understanding of the opportunities and constraints in the Study Area to facilitate developing the alternative routes, evaluate potential impacts associated with each alternative route, and identify a Proposed (Preferred) Route and Alternate Route(s). The Proposed (Preferred) Route is the route that will accomplish the following goals: (1) reasonably minimize adverse impacts on area land uses and the natural and cultural environment; (2) minimize special design requirements and unreasonable costs; and (3) can be constructed and operated timely, safely, and reliably.

2.0 ROUTE AND SITE DEVELOPMENT PROCESS

2.1 Route Development Process Summary and Methodology

The route development process is inherently iterative with frequent modifications made throughout the study because of the identification of new constraints; input from agencies, landowners, and other stakeholders; periodic reassessment of routes with respect to the siting criteria; and adjustments to the overall route network. Because of the evolving nature of this process, the Siting Team (Section 2.2) uses specific vocabulary to describe the routes at their different development stages.

The initial route development efforts started with identifying large area constraints and opportunity features within the **Study Area**, which encompasses the Project endpoints and areas in between (**Figure 3**, **Step 1**). These areas are typically identified using a combination of readily available public data sources. The Siting Team uses this information to first develop an array of **conceptual routes** for the Project that adhere to a series of general siting and technical guidelines (**Step 2**). Where two or more of these conceptual routes intersect, **study segments** are formed between two common nodes or points of intersection. Together, the assemblage of study segments and their intersecting nodes are referred to as the **study segment network** (**Step 3**).

As the route development process progresses, the Siting Team continues to evaluate new data and modifies, if necessary, the study segments in the network to develop a **refined study segment network** (**Step 4**). Eventually, formal **alternative routes** are developed by assembling the study segments that best meet the siting guidelines into individual routes for analysis (**Step 5**). The alternative routes are assessed and compared with land uses, natural and cultural resources, and engineering and construction concerns. Ultimately, through quantitative and qualitative analyses and alternative route comparison, the Siting Team identifies a **Proposed (Preferred) Route** and an **Alternate Route** for submittal to OPSB for approval (**Step 6**).

2.2 Siting Team Members

A multidisciplinary Siting Team performed the siting study. Team members were selected based on their abilities to bring a wide range of experiences to the study so that all aspects of route development can be thoroughly reviewed. Siting Team members have experience in transmission line siting, impact assessment for a wide variety of natural and cultural resources and the human environment, impact mitigation, engineering, and construction management.

The team worked together during the siting study to define the Study Area, develop siting criteria, identify siting constraints and opportunities, collect and analyze environmental and design data, solicit public input and concerns, consult with natural resource and permitting agencies, develop and revise the siting alternatives, and analyze and report on the selection of a Proposed (Preferred) Route.

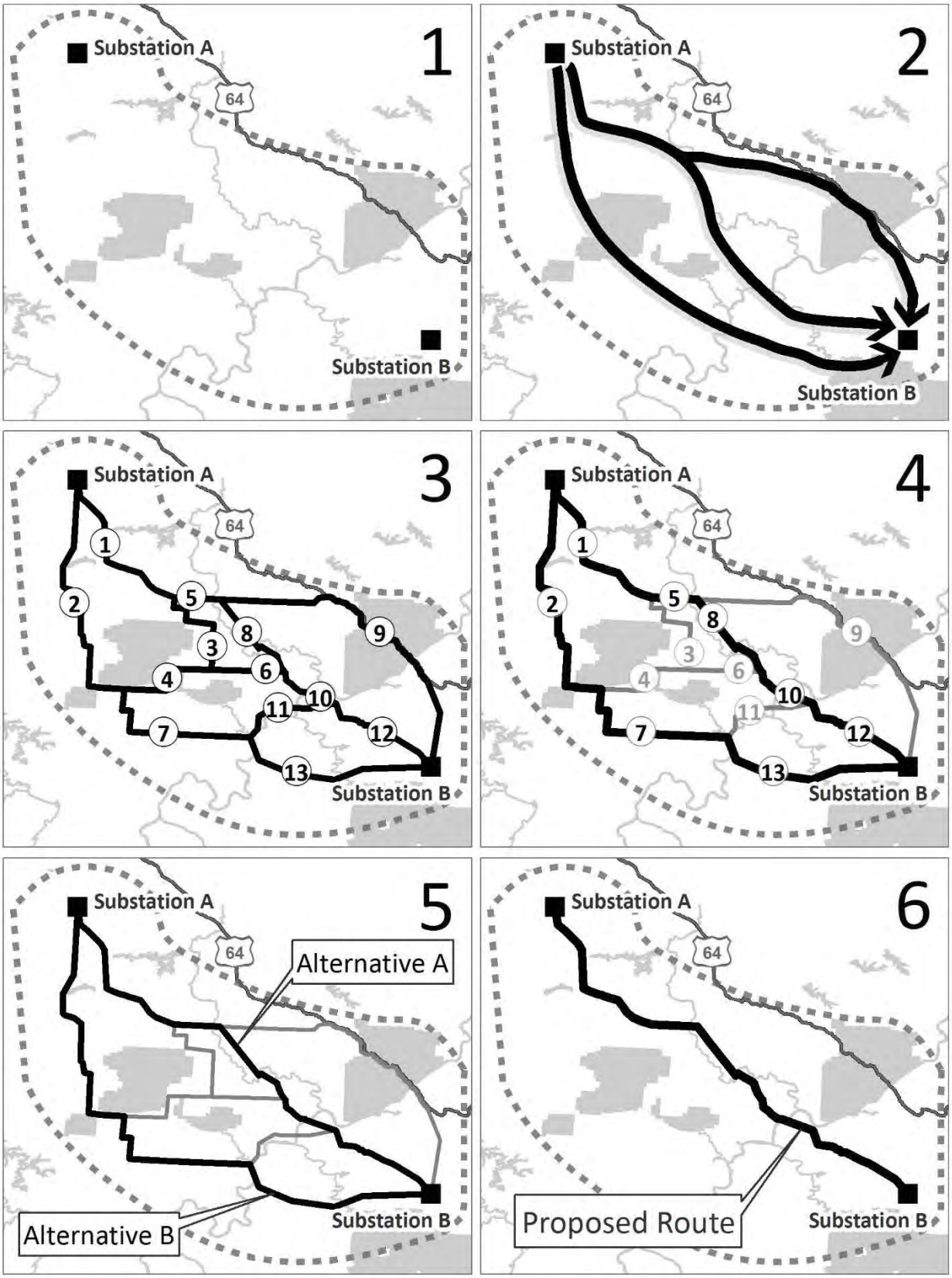

Figure 3. Typical Route Development Process Steps

2.3 Data Collection

This section describes the sources of information that were used to develop data for the siting study. A detailed table of data sources is provided in **Attachment B**.

2.3.1 Geographic Information System Data Collection

Aerial photography is an important tool for route selection. The primary sources of aerial imagery used to identify, analyze, and select the alternative routes include the following:

- National Agricultural Imagery Program, 2015
- Ohio Statewide Imagery Program, 2014

Updated information, such as the location of new residences and other constraints, was annotated to the photography by either paper maps (at the public meetings) and transferred into the geographic information system (GIS) or digitized directly into the GIS as identified during field reviews. Electronic maps were obtained for the Study Area and examined as part of the siting process. These included U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps.

The study made extensive use of information in existing GIS data sets that were obtained from many sources, including federal, state, and local governments. Much of this information was obtained through official agency GIS data access websites; some was provided directly by government agencies; and the Siting Team created some by digitizing information from paper-based maps, aerial photograph interpretation, interviews with stakeholders, and field inspections.

GIS data sources vary with respect to their accuracy and precision. For this reason, GIS-based calculations and maps presented throughout this study should be considered reasonable approximations of the resource or geographic feature they represent and not absolute measures or counts. The data and calculations presented in this study allow for relative comparisons among Project alternatives, with the assumption that any inherent errors or inaccuracies would be generally equal across all alternatives. Field reconnaissance is conducted to verify certain features (for example, locations of residential, commercial, and industrial buildings). **Attachment B** presents a list of the GIS data sources used for this study.

2.3.2 Field Reconnaissance

Siting Team members conducted field inspections throughout the Study Area. The team members examined study segments by automobile from public roads and other points of public access, and correlated observed features to information shown on aerial photography, USGS 7.5-minute topographic maps, road maps, and the range of GIS sources compiled. Prior to fieldwork, some key features such as residences, outbuildings, places of worship, cemeteries, and commercial and industrial areas were identified and mapped in GIS. These features were then field-verified and

added to the GIS database using laptops or tablets running GIS software supported by real-time global positioning system during field reconnaissance efforts.

2.3.3 Federal, State, and Local Government Coordination

The Siting Team obtained information from or contacted various federal, state, and local agencies and/or officials to inform them of the Project and request data for the route planning process. The agencies contacted are listed below; copies of agency correspondence are included as **Attachment C**:

- Federal agencies

— USFWS

- State agencies

— Ohio Department of Natural Resources – Division of Wildlife (ODNR)
— Ohio Historic Preservation Office

- Local agencies and/or officials

— Brown County Auditor's Office (for land parcel and use information)

2.3.4 Other Stakeholders

Private landowners and business owners along the alternative routes were invited to the public information meeting to provide comments.

2.4 Siting Guidelines

2.4.1 General Guidelines

As previously stated, the primary goal for this siting effort was to identify a route for the Project that reasonably minimizes adverse impacts on area land uses and the natural and cultural environment; minimizes special design requirements and unreasonable costs; and can be constructed and operated in a timely, safe, and reliable manner. Although no Proposed (Preferred) Route can optimally minimize impacts across all area resources, the Siting Team used a series of general siting guidelines to direct route development, evaluation, and selection toward this overall goal. The following guidelines were considered for this effort:

- Consider parallel alignments along existing ROW or other infrastructure.
- Maximize the separation distance from and/or minimize impact on dwellings, schools, daycare facilities, hospitals, and other community facilities.
- Consider stakeholder input as practicable.

- Avoid or minimize visibility from populated areas, scenic roadways, and designated scenic resources.
- Minimize interference with economic activities, including agricultural and natural gas activities.
- Avoid or minimize conflict with existing and proposed future development and land uses.
- Avoid crossing or minimize conflict with designated public resource lands such as national and state forests and parks, large camps, and other recreation lands, designated battlefields, nature preserves, or other designated historic resources and sites, and conservation areas.
- Avoid or minimize new crossings of large lakes, rivers, and large wetland complexes; critical habitat; and other unique or distinct natural resources.
- Minimize habitat fragmentation and impacts on designated areas of biodiversity concern.

2.4.2 Technical Guidelines

Technical guidelines are driven by the physical characteristics and engineering limitations of the structures and lines themselves, and the design criteria necessary to meet AEP Ohio Transco design standards, North American Electric Reliability Corporation reliability standards, National Electric Safety Code, and industry best practices for construction. The technical guidelines were informed by the following resources: (1) technical expertise of engineers and other industry professionals responsible for the reliable, safe, and economical construction, operation, and maintenance of electric system facilities; (2) North American Electric Reliability Corporation reliability standards as implemented by PJM, and (3) industry best practices.

2.5 Public Involvement Process

2.5.1 Public Information Meeting

A public information meeting was held for the Project on February 1, 2018, at Sardinia Elementary School located at 7742 Tri-County Highway in Sardinia. The Siting Team set up stations and provided information related to structures engineering and design, Project need, real estate and ROW issues, and the siting process. The community was notified about the meeting time and location. All property owners with land crossed by the proposed study segments, as well as immediately adjacent landowners, were contacted via the following means:

- Letters notifying landowners and public officials of the public information meeting were mailed via first class mail on January 11, 2018.
- Post card reminders of the public information meeting were mailed to landowners and public officials on January 25, 2018.

- Meeting information was posted on the Project website (Section 2.5.2).
- A public notice ran in the *Hillsboro Times-Gazette* and the *Georgetown News Democrat* (Brown County) on January 11, 2018, and complied with OPSB specifications.

Printed maps at a scale of 1 inch = 250 feet, in addition to tablet computers with the same maps, were available at the public information meeting for the public to review and were used to record written comments from landowners concerning sensitive areas or resources in the Study Area. Members of the Siting Team greeted meeting attendees, answered questions about the Project, and aided attendees in locating their property or other features of concern on aerial maps showing the alternative routes under consideration. Participants were encouraged to document the location of their property, places of business, suggested re-routes, or other sensitive resources on the printed maps. Siting Team members were available to assist the public as necessary. After the public information meeting, handwritten comments were digitized and entered into the GIS database.

Comment cards were distributed to all meeting attendees. Attendees were asked to provide comments and contact information. The Siting Team read and considered all attendee comments with respect to requests for moving (or eliminating) the alignment of study segments or avoiding specific areas. Comment sheets were scanned and stored in the Project database as a record of meeting attendance and public comments. The official public information meeting on February 1, 2018, was attended by 31 people, and 13 comments were collected.

2.5.2 Project Website

A website was created for the Project[1] that provides a description, map, fact sheet, and timeline of the Project. The website also provides an online form to submit comments regarding the Project. A contact number to AEP Ohio Transco's Project Outreach Specialist is also provided.

2.5.3 Consideration of Public Input

Comments from the initial public information meeting, and comments that AEP has received via phone calls, U.S. mail, email, and Project website were cataloged and reviewed. Comments included concern for reducing disturbance to farmland, concern about property resale value, and preference to a specific study segment. The Siting Team staff reviewed all comments and, where applicable, incorporated the information when reviewing, revising, and comparing alternative routes. Attendees indicated that the most important factors were maximizing distance from homes, minimizing the number of agricultural fields crossed, minimizing the number of parcels crossed, maximizing rebuild in existing centerline and using existing easements, maximizing length along roads, and minimizing crossing of forested land.

[1] http://aeptransmission.com/ohio/Sardinia

3.0 ALTERNATIVE ROUTE IDENTIFICATION

3.1 Study Area Description

The transmission line endpoints (beginning and end) must be identified before route development can begin. These could include substations, switch stations, and tap points. Endpoints are identified by the AEP Ohio Transco's planners and engineers (for example, based on load growth, engineering criteria, or existing infrastructure) or in combination with the Siting Team.

The Study Area is the territory in which the alternative routes can be sited to meet the Project's functional requirements and, at the same time, minimize environmental impacts and Project costs. The Study Area boundaries were determined by the geographic area encompassing the Sardinia Substation and tap points along the existing Hillsboro-Maysville 138-kV transmission line. The Study Area intends to encompass all reasonable conceptual routes between these connection points. Given these considerations, the Siting Team identified a Study Area encompassing approximately 8,639 acres (13.5 square miles) in Brown County, Ohio (**Map 1** in **Attachment A**).

The northern extent of the Study Area is limited to the Brown County line. The southern boundary is defined by State Highway 32 (Appalachian Highway). No hard boundary or geographic barrier defines the western portion of the Study Area. The Siting Team believed that extending the Project west of the Sardinia Substation would add unnecessary length without any significant benefit. The eastern portion of the Study Area was defined by the existing Hillsboro-Maysville 138-kV line that runs generally north to south through Brown County. Extending the Project past the Hillsboro-Maysville 138-kV line would also add unnecessary length without significant benefit.

3.2 Opportunities and Constraints

The Siting Team identified and mapped siting constraints and opportunities within the Study Area, and these are described in the following subsections.

3.2.1 Siting Constraints

Constraints are specific areas that should be avoided to the extent practicable during the route development and selection process. The Siting Team initially identified larger constraints during the conceptual siting process. As the Siting Team developed specific siting alignments, smaller constraints were identified and avoided where practicable. The following are general large constraints:

- Urban areas, including towns, small villages, and other high concentrations of residential, commercial, and industrial development areas
- National Register of Historic Places and adjacent areas
- Recreational areas such as parks and large recreational reservoirs

- Large streams, wetlands, flood zones, or unique natural resource features and critical habitat areas
- Designated federal or state forests, parks, state game lands, and other natural and conservation areas
- Large mining areas
- Large gas-processing plants or compressor stations

As the Siting Team developed specific alignments, smaller constraints were identified. These constraints encompass other feature types found within smaller geographic areas or site-specific locations. Through the iterative process of route development described above, the routes were adjusted to avoid the following small constraints where feasible:

- Individual residences (for example, houses, mobile homes, and multi-family buildings)
- Commercial and industrial buildings
- Outbuildings and barns
- Cemeteries
- Churches
- Schools
- Hospitals
- Recorded sites of designated historic buildings and archaeological sites
- Wetlands, ponds, and paralleling waterways for long distances
- Specific recreational sites, facilities, and trails
- Radio and communications towers
- Designated scenic vista points

3.2.2 Siting Opportunities

The Siting Team defined siting opportunities as locations where the proposed transmission line might be located while reasonably minimizing adverse impacts. Siting opportunities typically include other linear infrastructure and utility corridors, such as the existing electric and gas transmission network, rail lines, and roads, but may also include reclaimed mine lands, or unused portions of industrial or commercial areas. Following are siting opportunities identified within the Study Area; these are also presented on **Map 1** in **Attachment A**:

- Transmission/distribution lines—69-kV Line along southern portion of Study Area
- Interstate or state highways—State Highway 32

Long-term benefits are provided for maintenance access when routes parallel existing roads or are adjacent to existing transmission and/or distribution lines. State Highway 32 runs along much of the

southern edge of the study area, providing good parallel siting options through the southern portion of the Study Area.

3.3 Routing Concepts

The main routing concept used to develop the study segments was to maximize the siting opportunities and minimize the siting constraints. Key siting opportunities included paralleling roadways that would minimize vegetation clearing and habitat fragmentation. Key siting constraints included avoiding residences, reducing ecological impacts, and avoiding churches/cemeteries. The study segment concepts that were considered are shown on **Map 2** in **Attachment A.**

3.4 Study Segments

3.4.1 Description of Study Segments

The Siting Team developed a series of study segments based on the siting process and criteria developed in Section 2.0. Study segments are partial alignments developed on the basis of the routing concepts (**Figure 3**). As the siting effort evolved, study segments were revised, removed, or added. These eliminations or adjustments were based on the likelihood of impacts on residential, commercial, industrial, agricultural, and natural areas. **Map 3a** in **Attachment A** shows the resulting network of study segments evaluated by the Siting Team.

3.4.2 Study Segment Evaluation

Based on the siting process, the Project started with 31 study segments that resulted in 18 preliminary routes. Project sections that had numerous study segments in the same area were reviewed and compared to determine which segments would be carried forward to create alternative routes.

The alignment of the existing Seaman-Sardinia 69-kV transmission line was assessed for feasibility as a re-build. However, due to the number of residential homes within 100 feet of the original alignment and number of stream crossings, the routing team decided to explore other options for the new route alignment. Ultimately, the Siting Team decided to not pursue the central route options due to the high number of landowner and ecological impacts.

The northern routes were compared in similar geographic areas. Segments S-2 and S-3 were shifted to the west to avoid woodlots at the intersection of Segments S-2, S-3, and S-5. Segment S-5 was adjusted using shallow angles (less than 5 degrees) to avoid woodlots as much as possible and extended to connect with S-9. The route that included Segment S-10 was not carried forward because it passed between two residences (built on narrow parcels east of Shitepoke Road), required two turn angles over a short distance to minimize forest impacts, and crossed three streams over a short span (west of Shitepoke Road). Segment S-15 was extended to connect with Segment S-9. This segment extension created a route alternative that would parallel road ROW (Katterman Road) then

extend in nearly a straight line (with a few slight angles) to reach the endpoint. The Siting Team retained Segments S-1 through S-9, S-12, and S-15 for presentation at the public information meeting. All other segments were eliminated due to constructability and/or engineering constraints.

Near the southern end of the Study Area, Segments S-31 and S-30 were compared, and Segment S-30 was removed from consideration because it has a greater acreage of woodlots within the 100-foot ROW, crossing over several steep, forested ravines; crosses a greater distance of agricultural land; and has shorter distance paralleling existing linear infrastructure. Segment S-31 was carried forward, along with the northern study segments mentioned previously, to the first public information meeting on February 1, 2018 (**Map 3b** in **Attachment A**).

3.4.3 Study Segment Refinements

Following the public information meeting, Segments 2, 3, 5, 7, 9 11, 12, 13, 14, 15, 16, 19, and 20 were retained for continued analysis, landowner coordination, and field studies. These segments were selected because they represent routes that offer options to use near-road ROW alignments (Shitepoke and Stiver Roads), minimize diagonal crossing of a parcel (Segment 12), and minimize ecological impacts through reduced tree clearing, as well as fewer stream and riparian impacts. Segments 1, 4, 6, 8, 10, and 17 were removed from consideration after the public information meeting because the segments lack existing construction access, minimize the length of the transmission line across an individual property owner, and have ecological impacts caused by removal of forested corridors for the new ROW.

3.5 Alternative Routes

The Siting Team met or collaborated frequently throughout the route development and review process, continually reviewing, modifying, and eliminating select study segments based on additional field observations, analysis, and stakeholder input. At the end of the process, the Siting Team compiled the study segments into four alternative routes for analysis and comparison. These alternative routes are described in the following sections and are shown in more detail on **Map 4** in **Attachment A.**

3.5.1 Alternative Route A

Alternative Route A is approximately 3.7 miles long and located within Eagle Township in Brown County. Alternative Route A exits south from the Sardinia Substation, crosses Katterman Road, then continues east paralleling Katterman Road along the northern route option. It then turns east and crosses over Five Points Mowrystown, Kratz, and Katterman Roads. Alternative Route A then proceeds northeast to the first route intersection point. At the first route intersection, Alternative Route A proceeds north-northeast and runs parallel to Shitepoke Road before turning southeast at Stivers Road where it continues to the intersection with the Hillsboro-Maysville 138-kV electric transmission line.

3.5.2 Alternative Route B

Alternative Route B is approximately 3.5 miles long and one of the northern route options located within Eagle Township in Brown County. Alternative Route B follows the same route as Alternative Route A until after the crossing of Shitepoke Road. Like Alternative Route A, Alternative Route B proceeds north-northeast, but turns southeast approximately 0.25 mile south of Stivers Road. Alternative Route B then proceeds southeast toward the intersection with the Hillsboro-Maysville 138-kV electric transmission line

3.5.3 Alternative Route C

Alternative Route C is approximately 3.4 miles long and located within Eagle Township in Brown County. Alternative Route C exits south from the Sardinia Substation then heads southeast, ultimately taking the northern route option. At the intersection of the routes beyond Shitepoke Road, Alternative Route C continues northeast to the Hillsboro-Maysville 138-kV electric transmission line.

3.5.4 Alternative Route D

Alternative Route D is approximately 4.5 miles long, the longest of the alternative routes, and located within Eagle Township in Brown County. Alternative Route D exits from the northern side of the Sardinia Substation then heads south paralleling Kratz Road before turning southeast paralleling State Highway 32 and heading to the intersection with the Hillsboro-Maysville 138-kV electric transmission line.

4.0 ALTERNATIVE ROUTE COMPARISON

This section further discusses the alternative routes and quantitatively and qualitatively evaluates potential impacts on local communities and residents, the environment, and cultural resources. The alternative routes were reviewed in detail and compared using a combination of information collected in the field, GIS data sources, public input, supporting documents, and the collective knowledge and experience of the Siting Team.

4.1 Natural Resources

Natural resource impacts include potential impacts on vegetation and habitat, surface waters, threatened and endangered species, and conservation and recreation lands. Potential impacts discussed in this section are based on publicly available maps and data, as well as consultation with federal and state agencies. **Table 1** compares the natural environment considerations for each alternative route.

Table 1. Natural Resource Evaluation Criteria					
ALTERNATIVE ROUTE	**UNIT**	**A**	**B**	**C**	**D**
General					
Length	miles	3.7	3.5	3.4	4.5
Water Resources					
Total streams crossed (NHD)	count	3	4	4	3
Exceptional streams crossed	count	0	0	0	0
Riparian area within ROW	acres	0.4	0.7	0.6	0.8
Forested wetlands in the ROW (NWI)	count	0	0	0	0
Forested wetlands in the ROW (NWI)	acres	0	0	0	0
PEM/PSS wetlands in the ROW (NWI)	count	0	0	0	0
PEM/PSS wetlands in the ROW (NWI)	acres	0	0	0	0
Geological, Topographical, and Soil Resources					
Karst topography in the ROW	acres	0	0	0	0
Known caves or mines in the ROW	count	0	0	0	0
Wildlife and Habitat					
Tree clearing required in the ROW (digitized based on aerial photography)	acres	3.7	4.0	4.7	3.9
Federal or state endangered and/or threatened species records within ROW	count	0	0	0	0
Federal or state endangered and/or threatened species records between ROW and 1,000 feet	count	0	0	0	0

NHD National Hydrography Dataset
NWI National Wetlands Inventory
PEM palustrine emergent/
PSS palustrine scrub-shrub
ROW right-of-way

4.1.1 Water Resources

Resource Characteristics

The Study Area is in the Till Plains Section of the Central Lowland Province, specifically the Illinoisan Till Plain of south-central Ohio. The area is described as rolling ground moraine of older till generally lacking ice-constructional features such as moraines, kames, and eskers; it contains many buried valleys and modern valleys alternating between broad floodplains and bedrock gorges. Elevation generally ranges from 600 feet to 1,100 feet with moderately low relief (Ohio Division of Geological Survey, 1998). The elevations in the Study Area have a smaller range, typically between 990 and 1,060 feet.

The Study Area in northern Brown County is characterized by a broad plain that is dissected by numerous streams. Local high ridges are divided by numerous steep, narrow stream valleys that eventually drain into the Ohio River. The Study Area is located with the headwaters of the West Fork

Ohio Brush Creek watershed. The Ohio Environmental Protection Agency has established water quality designations for high-quality waters throughout Ohio as outlined in the Ohio Administrative Code 3745-1-07. No high-quality or exceptional streams are crossed by any of the alternative routes. NWI and NHD were the only data sources used in the alternative route assessment. Water resources are identified on **Map 5** in **Attachment A**.

Alternative Route Comparison

Based on desktop reviews, no major differences in water resources exist among the four alternative routes, based solely on NWI and NHD data for wetlands and streams, respectively. All alternative routes cross roughly the same number of NHD streams (three or four). No alternative route crosses NWI wetlands. Note: Once the alternative routes were chosen in consideration as the Preferred and Alternate Routes, a field ecological survey was performed to delineate and assess the quality of wetlands and streams along the routes. This detailed resource information was evaluated by the Siting Team to aid in the selection of the Preferred and Alternate Routes as discussed in Section 5.2.

4.1.2 Wildlife Habitat and Sensitive Species

Resource Characteristics

General habitat in the Study Area includes young and mature upland forests, old fields, pastures, scrub-shrub fields or slopes, agricultural land, residential landscaped areas, and stream and/or wetland areas. Based on consultation with the USFWS and ODNR, seven federal-listed and 22 state-listed species are known to occur, or have the potential to occur, within the Study Area. Wildlife and habitat resources are identified in **Table 2** and on **Map 6** in **Attachment A**.

Table 2. Threatened and Endangered Species

Species Name	Status	Habitat Type	Note
Mammals			
Indiana bat (*Myotis sodalis*)	Federally endangered	Hibernacula are caves and mines; maternity and foraging habitat comprise small stream corridors with well-developed riparian woods and upland forests [a]	Habitat present and species likely in the Study Area
northern long-eared bat (*Myotis septentrionalis*)	Federally threatened	Hibernates in caves and mines; swarms in surrounding wooded areas in autumn; during late spring and summer, roosts and forages in upland forests [a]	Habitat present and species likely in the Study Area
Mussels			
rayed bean (*Villosa fabalis*)	Federally and state endangered	Generally known to occur in small headwater creeks, but can exist in large rivers; found in or near shoal or riffle areas and in shallow wave-washed areas of glacial lakes [b]	Habitat present in Study Area, but no in-water work proposed; Project not likely to affect species

Table 2. Threatened and Endangered Species			
Species Name	**Status**	**Habitat Type**	**Note**
sheepnose (*Plethobasus cyphyus*)	Federally and state endangered	Considered a large-river species, but can inhabit medium-size rivers; associated with riffles and gravel/cobble substrates [b]	Habitat not present in Study Area; Project not likely to affect species
fanshell (*Cyprogenia stegaria*)	Federally and state endangered	Found in medium to large rivers; buries itself in sand or gravel in deep water or moderate currents [c]	Habitat not present in Study Area; Project not likely to affect species
pink mucket (*Lampsilis orbiculate*)	Federally and state endangered	Found in mud and sand in shallow riffles and shoals swept free of silt in major rivers and tributaries; buries itself in sand or gravel. [d]	Habitat not present in Study Area; Project not likely to affect species
snuffbox (*Epioblasma triquetra*)	Federally and state endangered	Found in small- to medium-sized creeks, associated with areas with swift currents; buries itself in sand, gravel, or cobble substrates [e]	Habitat not present in Study Area; Project not likely to affect species
washboard (*Megalonaias nervosa*)	State endangered	Large river species, inhabits slow current areas with sand, gravel, and mud substrates [f]	Habitat not present in Study Area; Project not likely to affect species
ebonyshell (*Fusconaia ebena*)	State endangered	Inhabits large rivers and prefers swift water and stable sandy or gravelly shoals [b]	Habitat not present in Study Area; Project not likely to affect species
butterfly (*Ellipsaria lineolata*)	State endangered	Found in large rivers in stretches with pronounced currents and coarse sand and gravel substrate [b]	Habitat not present in Study Area; Project not likely to affect species
elephant-ear (*Elliptio crassidens crassidens*)	State endangered	Inhabits muddy sand, sand, and rocky substrates in moderate currents; most common in large creeks to rivers with moderate to swift currents [b]	Habitat not present in Study Area; Project not likely to affect species
yellow sandshell (*Lampsilis teres*)	State endangered	Inhabits large-sized rivers with fine sediments; can also be occur in course substrates, and in slow or moving currents [f]	Habitat not present in Study Area; Project not likely to affect species
Ohio pigtoe (*Pleurobema cordatum*)	State endangered	Primarily inhabits large rivers but also can occur in medium-sized rivers; found in or immediately above riffles with gravel, cobble, and boulder substrates [b]	Habitat not present in Study Area; Project not likely to affect species
little spectaclecase (*Villosa lienosa*)	State endangered	Typically inhabits small creeks to medium-sized rivers, along bank in slow currents; more common in tributary streams than main channels; occurs in sandy or muddy substrates [b]	Habitat not present in Study Area; Project not likely to affect species
monkey face (*Quadrula metanevra*)	State endangered	Medium to large rivers and stream with mixed sand and gravel substrates [b]	Habitat not present in Study Area; Project not likely to affect species
wartyback (*Quadrula nodulata*)	State endangered	Can occur in medium to large rivers on sand and mud substrates [b]	Habitat not present in Study Area; Project not likely to affect species

Table 2. Threatened and Endangered Species			
Species Name	**Status**	**Habitat Type**	**Note**
threehorn wartyback (*Obliquaria reflexa*)	State threatened	Typical of large rivers with moderately strong currents and gravel, sand, and mud substrates [b]	Habitat not present in Study Area; Project not likely to affect species
fawnsfoot (*Truncilla donaciformis*)	State threatened	Occurs in medium- and large-sized rivers with moderate currents; found in varying depths from less than 3 feet to 18 feet; preferred substrates include sand or mud [b]	Habitat not present in Study Area; Project not likely to affect species
Fish			
northern madtom (*Noturus stigmosus*)	State endangered	Typical habitat includes large creeks and small rivers with clear to turbid waters and moderate currents [b]	Habitat present in Study Area, but no in-water work proposed; Project not likely to affect species
shovelnose sturgeon (*Scaphirhynchus platorynchus*)	State endangered	Deep channels and embayments of large turbid rivers, sand mixed with gravel or muddy substrates, and strong currents [b]	Habitat not present in Study Area; Project not likely to affect species
goldeye (*Hiodon alosoides*)	State endangered	Habitat includes quiet turbid waters of medium to large lowland rivers, small lakes, ponds, and marshes, and muddy shallows of larger lakes [b]	Habitat not present in Study Area; Project not likely to affect species
mountain madtom (*Noturus eleutherus*)	State threatened	Small to large rivers in fast-flowing, clear water, found in sand, gravel, and rubble substrates near vegetation [b]	Habitat present in Study Area, but no in-water work proposed; Project not likely to affect species
paddlefish (*Polyodon spathula*)	State threatened	Slow-moving large- and medium-sized rivers, river-margin lakes, channels, oxbows, backwaters, and impoundments with access to spawning areas [b]	Habitat not present in Study Area; Project not likely to affect species
bigeye shiner (*Notropis boops*)	State threatened	Flowing pools in moderately clear creeks to medium-sized rivers; preferred substrates consist of clear sand, gravel, or rock; often found at stream margin in beds of emergent vegetation [b]	Habitat present in Study Area, but no in-water work proposed; Project not likely to affect species
river darter (*Percina shumardi*)	State threatened	Large rivers and lower sections of tributaries; found in deep chutes and riffles where currents are swift and bottom substrate is coarse gravel or rock [b]	Habitat not present in Study Area; Project not likely to affect species
channel darter (*Percina copelandi*)	State threatened	Habitat includes warm water with low and moderate gradient rivers and large creeks with moderate current; usually found in sand and gravel substrates [b]	Habitat present in Study Area, but no in-water work proposed; Project not likely to affect species
Birds			

Table 2. Threatened and Endangered Species			
Species Name	**Status**	**Habitat Type**	**Note**
loggerhead shrike (*Lanius ludovicianus*)	State endangered	Typically inhabits hedgerows, thickets, and fencerows; they hunt over hayfields, pastures, and other grasslands [a]	Habitat present in Study Area and Project within the species range; April 1 to August 1 species nesting timing restriction
Insects			
Kramer's cave beetle (*Psuedanophthalmus krameri)*	State endangered	Found in caves only [a]	Habitat not present in Study Area; Project not likely to affect species
Ohio cave beetle (*Pseudanophthalmus ohioensis*)	State endangered	Found in caves only [a]	Habitat not present in Study Area; Project not likely to affect species
[a] ODNR (2017) [b] NatureServe Explorer (2018) [c] USFWS (2018a) [d] USFWS (2018b) [e] USFWS (2018c) [f] Minnesota Department of Natural Resources (2018)			

Alternative Route Comparison

According to USFWS, the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) are assumed to be present wherever suitable habitat occurs throughout the state of Ohio unless presence and/or absence surveys have been performed to document absence. The USFWS recommends trees greater than or equal to 3 inches in diameter at breast height be saved where possible. If tree clearing is not avoidable, then USFWS recommends tree clearing between October 1 and March 31 to avoid adverse effects to Indiana and northern long-eared bats.

According to ODNR, the Study Area is within the range of five federally and state-endangered, nine state-endangered, and two state-threatened mussels (**Table 2**). The ODNR recommends no in-water work in streams with the potential presence of federally listed mussel species. Stream impacts will be avoided as no in-stream work will be performed and towers will be located outside of floodplains, as feasible.

Other aquatic species that are within the range of the Study Area include three state-endangered and five state-threatened fish (**Table 2**). ODNR recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat; however, as stated above, in-water work will be avoided. Therefore, no impacts on these species are anticipated.

Habitat for listed avian species that can likely be found within the Study Area includes state-endangered loggerhead shrike (*Lanius ludovicianus*). This species typically inhabits hedgerows, thickets, and fencerows and forages over hayfields, pastures, and grasslands. The ODNR requires that if dense shrubbery will be removed or disturbed, this work should be performed outside of the April 1 to August 1 period to minimize impacts to the loggerhead shrike's nesting activity.

Potential impacts on wildlife habitat and sensitive species within the Study Area can generally be assessed by comparing each alternative route with respect to the anticipated impacts on forest and stream habitat. Based on a review of aerial imagery, Alternative Routes A, B, and D would require from 3.7 to 4.0 acres of tree clearing within the ROW, with essentially similar impacts. In comparison, Alternative Route C would require 4.7 acres of tree clearing, which would be a moderately higher impact to forest habitat. These differences are not substantial; however, Alternative Route C would have a higher potential to affect Indiana and northern long-eared bats than with Alternative Routes A, B, and D, resulting in lower potential impacts. No caves, mines, or karst topography is known within the Study Area, so winter habitat for the Indiana and northern long-eared bats would not be affected by the Project.

As discussed in Section 4.1.1, direct impacts on water resources will be minimized or avoided by spanning water resources where feasible. Therefore, there would be little to no difference in potential impacts on state-listed species among the alternative routes.

4.2 Land Use

Land use impacts include direct and indirect impacts on existing residential, commercial, and industrial areas and future development; institutional uses (for example, schools, places of worship, cemeteries, and hospitals); cultural resources; and land use. Constructing a new transmission line could result in changes to land use and aesthetic impacts from the point of view of residents, commuters and travelers, employees, and recreational users. **Table 3** compares the land use considerations for the alternative routes. Land use within the Study Area is shown on **Map 7** in **Attachment A.**

Table 3. Land Use Evaluation Criteria

ALTERNATIVE ROUTE	UNIT	A	B	C	D
General					
Length	miles	3.7	3.5	3.4	4.5
Landowners within ROW	count	36	36	36	34
Residential					
Residences within ROW	count	0	0	0	0
Residences within 100 feet of centerline	count	4	3	3	0
Residences within 250 feet of centerline	count	14	9	9	5

Table 3. Land Use Evaluation Criteria					
ALTERNATIVE ROUTE	**UNIT**	**A**	**B**	**C**	**D**
Residences within 1,000 feet of centerline	count	40	29	29	77
Non-Residential					
Non-residences within the ROW	count	0	0	0	3
Non-residences within 100 feet of the centerline	count	3	2	2	3
Non-residences within 250 feet of the centerline	count	13	7	7	8
Non-residences within 1,000 feet of the centerline	count	70	54	54	123
Agricultural					
Tree farms and/or orchards crossed in ROW	acres	0	0	0	0
Ohio Agricultural District Lands in the ROW	acres	0	0	0	6.3
Community/Recreational Facilities					
Schools within 1,000 feet of centerline	count	1	1	1	1
Hospitals within 1,000 feet of centerline	count	0	0	0	0
Designated places of worship within 1,000 feet of centerline	count	1	1	1	1
Cemeteries within 100 feet of centerline	count	0	0	0	1
Parks and recreation areas crossed by the ROW	count	0	0	0	0
Scenic byways crossed	count	0	0	0	0
Protected Land					
Federal land crossed by centerline	miles	0	0	0	0
State land crossed by centerline	miles	0	0	0	0
Cultural Resources					
NRHP-listed sites within 1,000 feet of the centerline	count	0	0	0	0
Listed archaeological sites within 100 feet of centerline	count	0	0	0	3
Ohio Historical Inventory Historic Structures within 1,000 feet of centerline	count	0	0	0	2
NRHP National Register of Historic Places					

4.2.1 Agricultural and Forestry Resources

Resource Characteristics

The Study Area primarily comprises agricultural lands (that is, corn and soybean crops, hay, and pasture), with areas of deciduous forested lots surrounded by agricultural land. The Study Area is in the Southern Illinois and Indiana Thin Loess and Till Plain major land resource area.

Alternative Comparison

All alternative routes cross areas of agricultural and forest resources. Alternative Routes B and C would require the most tree clearing within the ROW, and Alternative Routes A and D would require the least tree clearing. Information regarding Ohio Agricultural District Lands within the Study Area was requested and received from the Brown County Auditor's office. Based on the information provided, Alternative Route D is the only alternative route that would cross Ohio Agricultural District Lands (6.3 acres). Alternatives A, B, and C would not cross or affect Agricultural District Lands. To minimize impact on Agricultural District Land, AEP Ohio Transco plans to place poles beyond or at the edges of agricultural fields, and any permanent impacts on agricultural lands would be limited to the area of the structure footprint.

4.2.2 Recreation and Conservation Lands

Resource Characteristics

No recreation or conservation lands are located within the Study Area.

Alternative Route Comparison

No recreation or conservation lands are located within the Study Area.

4.2.3 Developed Land Use

Resource Characteristics

Most developed land within the Study Area is residential, with most of the residences concentrated along State Highways 32 and 171. Before and during each public meeting, landowners were given the opportunity to comment on the use of their land, any planned future developments on their land, and any potential issues they had with the alternative routes. These comments were considered in the assessment and selection of the Proposed (Preferred) and Alternate Route.

Alternative Route Comparison

As shown in **Table 3,** none of the alternative routes would cross residential properties. Alternative Routes A, B, and C would have residential properties within 100 feet of centerline: 4, 3, and 3, respectively. Alternative Route D is not within 100 feet of residential properties. Alternative Route A would be within 250 feet of the greatest number of residential properties; however, several of these homes are on the opposite side of Stivers Road, and there is an existing distribution line along the centerline of Alternative Route A. Alternative Route D is near the fewest homes, with only five residential properties within 250 feet. As stated before, developed lands are concentrated along major highways, including State Highways 32 and 171 and U.S. Highway 62; therefore, these parcels are already affected by existing transportation corridors.

Alternatives A, B, C, and D are located within 1,000 feet of Coddaman School, which is a historical feature located southeast of the Sardinia Substation. All four alternative routes are also located within 1,000 feet of a place of worship, Katterman Church, located southeast of the Sardinia Substation. Only Alternative Route D is located within 100 feet of a cemetery. Because the route

does not cross any of these properties, no disturbance or other impacts on the school or places of worship are anticipated.

4.2.4 Historic and Archaeological Resources

Resource Characteristics

The Ohio History Connection Online Mapping System was reviewed for historical and archaeological resources within the Study Area. All historical and archaeological resources identified within the Study Area are shown on **Map 8** in **Attachment A**. **Table 3** includes the number of historical resources identified within 1,000 feet of centerline of the alternative routes and the number of archaeological resources identified within 100 feet of centerline of the alternative routes.

Alternative Route Comparison

Alternative Routes A, B, and C would not cross within 100 feet of recognized archaeological sites, nor would they cross within 1,000 feet of Ohio Historical Inventory (OHI) Historic Structures. The Alternative Route D centerline is within 100 feet of three archaeological sites, and two OHI Historic Structures are located within 1,000 feet. The archaeological sites would not likely be affected by construction activities.

Site 33BR0028 is a Late Archaic prehistoric site located near the eastern end of Alternative Route D. The site is situated just north of State Highway 32. Site 33BR0029 is an Unknown Woodland period prehistoric site also located near the eastern end of Alternative Route D and just south of Tri-County Highway. Site 33BR0030 is also an Unknown Woodland period site. It is located near the eastern end of Alternative Route D, and north of Tri-County Highway.

OHI site BRO0052606 is a vernacular-style, single-dwelling, residential brick structure erected in 1860. It is located near the corner of U.S. Highway 62 and State Highway 32. OHI Site BRO0052016 is a Gothic Revival-style, single-dwelling, residential structure erected in 1870. It is located at the corner of U.S. Highway 62 and Second Street. OHI Site BRO0052206 (Christian Union Church) is a religious structure erected in 1890, and it is located near the corner of U.S. Highway 62 and Maple Alley.

4.2.5 Scenic Resources

Resource Characteristics

Aesthetics are defined as a mix of landscape visual character, context in which the landscape is viewed (view/user groups), and scenic integrity of the landscape. This study reviewed the potential visibility and visual impact of the alternative routes through landscape character assessment, field evaluation, viewshed analysis, and environmental factor tabulations. Visual character encompasses the patterns of landform (topography), vegetation, land use, and aquatic resources (for example, lakes, streams, and wetlands). Multiple elements influence visual character, such as natural systems, human interactions, and land use. In natural settings, the visual character attributes are natural elements such as forested mountains or scenic rivers and lakes, whereas rural or

pastoral/agricultural settings may include constructed elements such as fences, walls, barns and outbuildings, and occasional residences. In a more developed setting, the visual character may include commercial or industrial buildings, manicured lawns, pavement, and other infrastructure.

The Siting Team observed distinctive landscapes within the Study Area: flat to gently rolling topography with agricultural development (**Figure 4**), forested and riparian areas near headwater streams (**Figure 5**), wetland areas, and light residential development. Flat to gently rolling topography with agricultural development is the most common landscape in the Study Area. Forested and riparian areas near headwater streams run throughout the entire Study Area, and light residential development is found along major roadways throughout the Study Area. Wetland areas within the Study Area were typically noted in low-lying areas at the edges of agricultural fields and along stream/drainage sources.

Figure 4. Typical Agricultural Field Present throughout the Study Area

Figure 5. Typical Forested Landscape Present in the Study Area

Alternative Route Comparison

Alternative Route D parallels existing roadways the longest of all alternative routes and would have the second lowest amount of tree clearing. Alternative Route D would require a somewhat greater amount of tree clearing when compared with Alternative Route A; however, the small increases in the visual impacts on residents from the new transmission line would be less noticeable when placed along an active roadway. Alternative Routes B and C have the shortest distance paralleling existing road corridors, would overbuild a shorter length of existing electric utility line, and would require more tree clearing.

4.3 Constructability

This section discusses the feasibility of a proposed transmission line as it relates to engineering and construction concerns. Constructability evaluates the use of existing transmission corridors, engineering challenges, and accessibility issues of a Proposed (Preferred) Route. Major factors that affect constructability include steep topography, condensed ROW, severe angles and number of turn angles, proximity to major highways, accessibility, safety, and cost. **Table 4** compares the engineering and construction considerations for the alternative routes**.**

Table 4. Constructability Evaluation Criteria					
ALTERNATIVE ROUTE	**UNIT**	**A**	**B**	**C**	**D**
General					
Length	miles	3.7	3.5	3.4	4.5
Transportation Resources					
Roads crossed	count	6	6	6	6
Railroads crossed	count	0	0	0	0
Utility Resources					
Oil and gas wells within 250 feet from edge of ROW	count	0	0	0	0
Communication towers within 1,000 feet of the centerline	count	0	0	0	0
Engineering and Construction Considerations					
Turn angles between 0 and 3 degrees	count	7	4	5	0
Turn angles between 3 and 15 degrees	count	3	3	2	4
Turn angles between 15 and 55 degrees	count	6	8	6	2
Turn angles greater than 55 degrees	count	2	1	0	2
Rights-of-Way Parallel and/or Overbuild					
Parallel existing AEP 23-kV transmission lines	miles	0	0	0	0
Parallel existing electric transmission ROW	miles	0.1	0.1	0.1	0
Parallel existing gas transmission lines	miles	0	0	0	0
Parallel existing road or railroad corridor	miles	1.7	0.8	0.5	3.2
Overbuild existing electric utility lines	miles	0.2	0	0	0

4.3.1 Engineering Design Considerations

Transmission Right-of-Way

AEP Ohio Transco attempted to minimize route length and amount of new ROW or easements acquired from landowners. Where possible and practical, AEP Ohio Transco considered using existing transmission ROW, paralleling existing electric lines, or paralleling other linear infrastructure (for example, roadways, railways, or gas lines).

Engineering and Construction Considerations

Potential engineering and construction challenges are important to consider when siting a transmission line. Heavy angles, steep topography, nearby towers, antennas, and airfields along with narrow ROW alignments are all elements that could ultimately require extensive or non-standard engineering and lead to increases in impacts and overall cost.

The proximity to existing roadways and transmission/distribution infrastructure could pose potential engineering and construction challenges (e.g., overbuilding distribution lines), but can also simplify construction access in some cases. Paralleling existing infrastructure or crossing over transmission

lines could require specialized construction techniques, and transmission crossings could require outages. AEP Ohio Transco attempted to minimize engineering challenges during the conceptual design phase.

Alternative Comparison

Alternative Routes A, B, and C parallel (within 50 feet) an existing electric transmission ROW, which exists on the opposite side (northern side) of Katterman Road for 0.1 mile near the Sardinia Station. These routes then cross over to the northern side of Katterman Road near Five Points Mowrystown Road and run parallel to Katterman Road for approximately 0.6 mile, on the opposite side of the road from the existing 69-kV transmission line and its ROW. Although this criterion indicates that Alternative Routes A, B, and C are near parcels that already hold easements with an electric utility company, these easements are actually on the opposite side of Katterman Road from where AEP Ohio Transco is proposing Alternative Routes A, B, and C.

Routes that parallel existing roadways offer benefits that include easier construction and maintenance access, a partially maintained ROW, and decreased tree clearing for installation. Alternative Route D has the greatest distance that parallels existing roadway corridors (3.2 miles, most of which is along State Route 32 just outside of the road ROW), but poses access issues due to the inability to access the ROW from this high-speed, divided four-lane highway. In this situation, the access benefits from paralleling roadways are not available, and construction and maintenance would be accessed via the proposed ROW or across other parcels outside of the proposed ROW. Alternative Route C parallels existing roadway corridors for the shortest distance (0.5 mile), whereas Alternative Route A parallels 1.7 miles of roadway corridors.

In terms of the number of heavy turn angles (15 degrees or more) within the various alternative routes, the number ranges from four (Alternative Route D) to nine (Alternative Route B). The cost to design and construct a pole structure and foundation at a turn angle is considerably higher than tangent structures in a straight line. Alternative Route D contains the fewest heavy turn angles (four turns of 15 degrees or more); however, the cost savings from fewer turn angles may be counteracted by the increased route length (Alternative Route D is the longest option).

4.3.2 Access Roads

Access roads will be finalized at a later date and will use existing improved roads and unimproved roads to minimize impacts. Access roads will generally require 30 feet of clearing for road base construction and cut-and-fill construction as needed.

5.0 IDENTIFICATION OF THE PROPOSED ROUTE

As stated in the introductory sections, the goal in selecting a suitable route for the Project is to minimize impacts on current land use and natural and cultural resources while avoiding circuitous routes and non-standard design requirements. However, in practice, minimizing all potential impacts is not typically possible. Often, inherent tradeoffs in potential impacts to every siting decision are required. For example, in heavily forested study areas, the route that avoids the most developed areas likely would have the greatest amount of forest clearing, and the route that has the least impact on vegetation and wildlife habitats often would affect more residences or farm lands. Thus, an underlying goal of a siting study and route selection is to reach a reasonable balance between minimizing potential impacts on one resource versus increasing the potential impacts on another.

The following sections summarize the rationale for selecting the Proposed (Preferred) Route, and thus, the route that the Siting Team considered to best minimize the overall impacts from the Project. The rationale presented is derived from the siting decisions made throughout the process, comments from landowners and regulatory agencies, the results of the comparative analysis of potential impacts presented in Section 4, the results of field ecological surveys to assess wetlands and streams, and the knowledge and experience of the Siting Team. An Alternate Route was also identified for the Project as required by OPSB rules using the same rationale.

5.1 Alternative Route Summary

5.2 Preferred and Alternate Route

Based on the Siting Team's extensive qualitative and quantitative review of information obtained from GIS data including aerial photography, existing ROW and property easements, field reconnaissance and ecological surveys, agency consultation, public outreach, and Project engineering and financial estimates, the Siting Team recommends Alternative Route A as the Preferred Route and Alternative Route D as the Alternate Route.

5.2.1 Preferred Route

The Siting Team concluded that Alternative Route A is the best route for construction and operation of the Project because it is shorter in length than Alternative Route D, contains fewer ecological features, provides easier construction and operation/maintenance access opportunities, and approximately 40 percent of the route parallels existing road ROW. Alternative Route A provides easier construction and maintenance access than Alternative Route D because access is not practical from State Route 32 (a high-speed, four-lane divided highway). Additionally, Alternative Route A avoids crossing Ohio Agricultural District Lands. The decision to select Alternative Route A instead of Alternative Routes B or C was based on the presence of fewer ecological features, easier construction access, and reduced impacts to agricultural land by paralleling road ROW.

The Preferred Route centerline is within 250 feet of 14 residences, which is five more residences than Alternative Routes B and C (9 residences). However, these five additional residences are across the

street from the proposed Preferred Route, set back from the road, and have two existing overhead utility lines, one on each side of Stivers Road.

A field ecological survey was performed along Alternative Routes A, B, C, and D to delineate and assess the quality of wetlands and streams. **Table 5** summarizes the delineated wetlands within the corridor for Alternative Routes A and D. Note that the wetland impacts on Alternative Routes B and C are similar to Alternative Route A.

Table 5. Delineated Wetlands within the Preferred and Alternate Route Potential Disturbance Area/Right-of-Way

Wetland Name	Route	Cowardin Wetland Type [a]	Acreage within Potential Disturbance Area/ROW [b]
Preferred Route Wetlands			
Wetland SS-06	Alternative Route A	PEM	0.09
Wetland SS-05	Alternative Route A	PEM	0.09
Wetland SS-03	Alternative Route A	PEM	0.01
Wetland SS-01	Alternative Route A	PEM/PSS	0.07
		Total	**0.26**
Alternate Route Wetlands			
Wetland SS-09	Alternative Route D	PFO	0.15
Wetland SS-10	Alternative Route D	PEM	0.15
Wetland SS-13	Alternative Route D	PFO	1.64
Wetland SS-15	Alternative Route D	PFO	0.08
Wetland SS-17	Alternative Route D	PEM	0.05
Wetland SS-18	Alternative Route D	PFO	0.29
Wetland SS-19	Alternative Route D	PEM	0.02
Wetland SS-20	Alternative Route D	PEM	0.03
Wetland SS-21	Alternative Route D	PEM	0.03
Wetland SS-22	Alternative Route D	PFO/PEM	0.02
Wetland SS-23	Alternative Route D	PEM	0.95
		Total	**3.41**

PFO palustrine forested

The Siting Team determined that one wetland (SS-13) located along Alternative Route D could not be spanned with the proposed transmission line (i.e., a pole structure would be required in the wetland) due to the expansive length of wetland SS-13. Alternative Route D would thus require regulatory authorization for construction impacts to this wetland, whereas no authorization would be required for Alternative Route A.

Minor adjustments and refinements were made to Alternative Route A to minimize impacts to agricultural fields and ecological features after it was selected as the Preferred Route. One adjustment moves the route segment to the west to more closely parallel Shitepoke Road. Additionally, one pole structure was moved northwest to avoid a wetland. This action also achieves the goal of reduced impacts to the agricultural field east of Shitepoke Road. **Attachment D** illustrates the Preferred Route and the minor route adjustments discussed here. **Attachment E** consists of a detailed mapbook to illustrate the selected Preferred and Alternate Routes.

5.2.2 Alternate Route

As required by the OPSB rule, the Alternate Route must not have more than 20 percent in common with the Preferred Route. Of the three remaining alternative routes, Alternative Route D is the only route to share less than 20 percent of a common route with the Preferred Route, Alternative Route A. The Alternate Route provides a reasonable alternative because it parallels an existing road corridor for most of the route, has fewer landowners crossed by the proposed ROW, and fewer residences within 250 feet of the centerline.

Drawbacks to the Alternate Route include challenging construction due to limited access options along the highway, State Route 32. Egress points along State Route 32 are limited because it is a high-speed, divided four-lane highway. Additionally, there are more ecological features present on the Alternate Route, which could require additional environmental permitting and more extensive access road installation for construction.

A minor refinement was made to the Alternate Route after the public information meeting to maximize paralleling of property boundaries to minimize impacts to agricultural fields. **Attachment D** illustrates the Alternate Route and the minor route adjustments discussed here. **Attachment E** consists of a detailed mapbook to illustrate the selected Preferred and Alternate Routes.

6.0 REFERENCES

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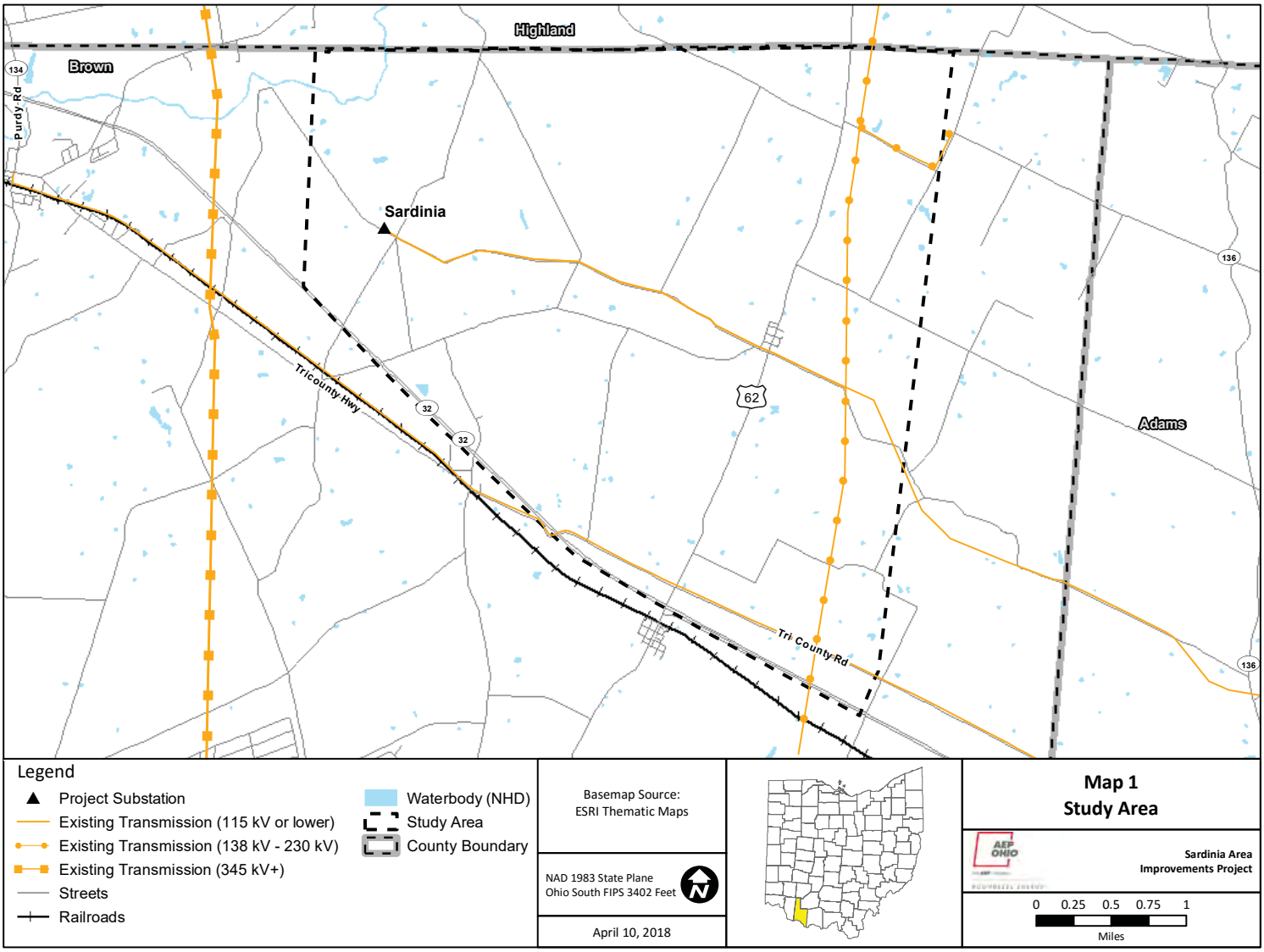
United State Fish and Wildlife Service (USFWS). 2018c. Snuffbox (*Epioblasma triquetra*) Fact Sheet. Accessed March 2018. https://www.fws.gov/midwest/endangered/clams/snuffbox/snuffboxfactsheet.html.

Attachment A: Maps



Legend

- Project Substation
- Existing Transmission (115 kV or lower)
- Existing Transmission (138 kV - 230 kV)
- Existing Transmission (345 kV+)
- Streets
- Railroads
- Waterbody (NHD)
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

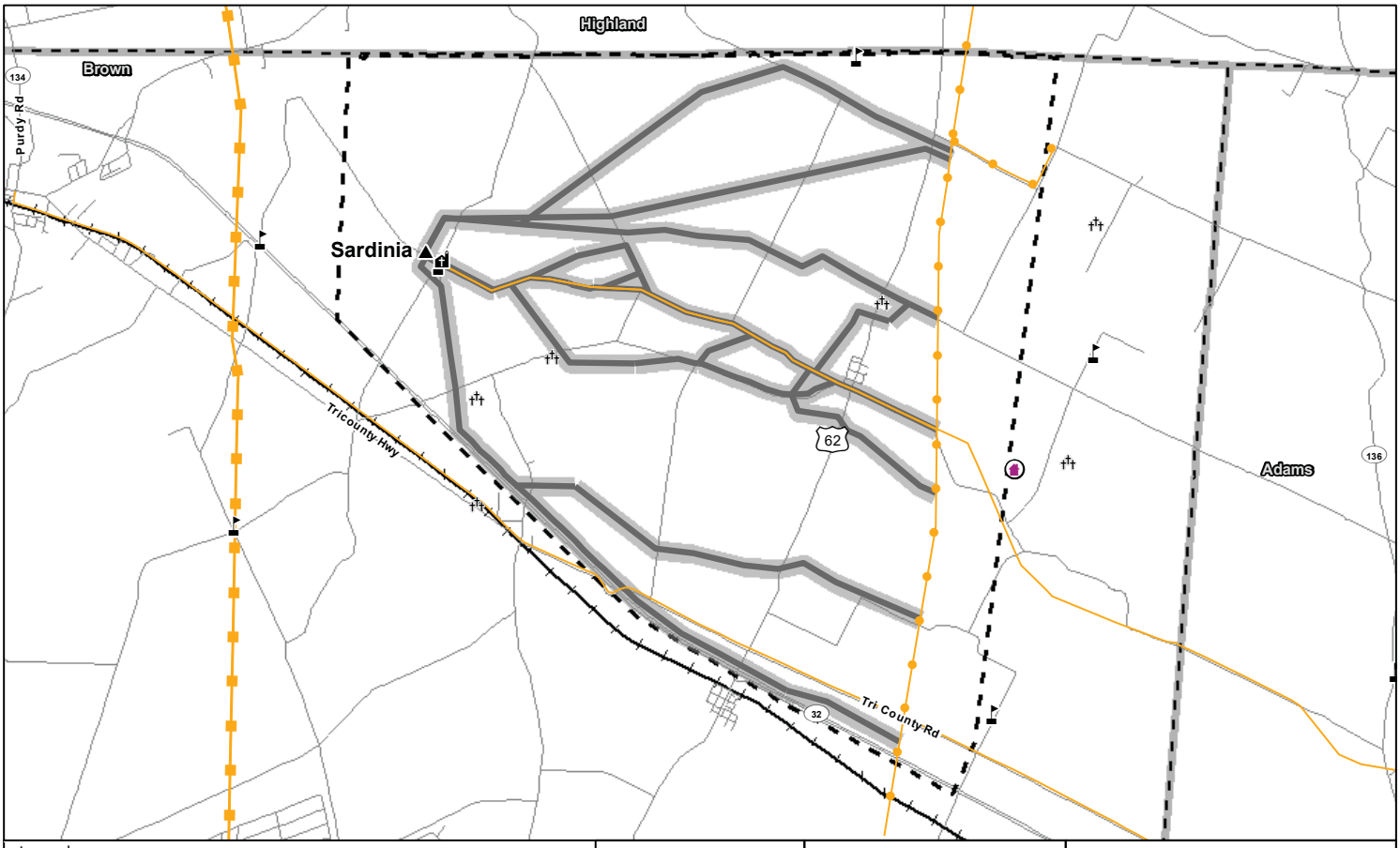
April 10, 2018

Map 1
Study Area

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Church
- Cemetery
- School
- National Register of Historic Places
- Conceptual Routes
- Existing Transmission (115 kV or lower)
- Existing Transmission (138 kV - 230 kV)
- Existing Transmission (345 kV+)
- Streets
- Railroads
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

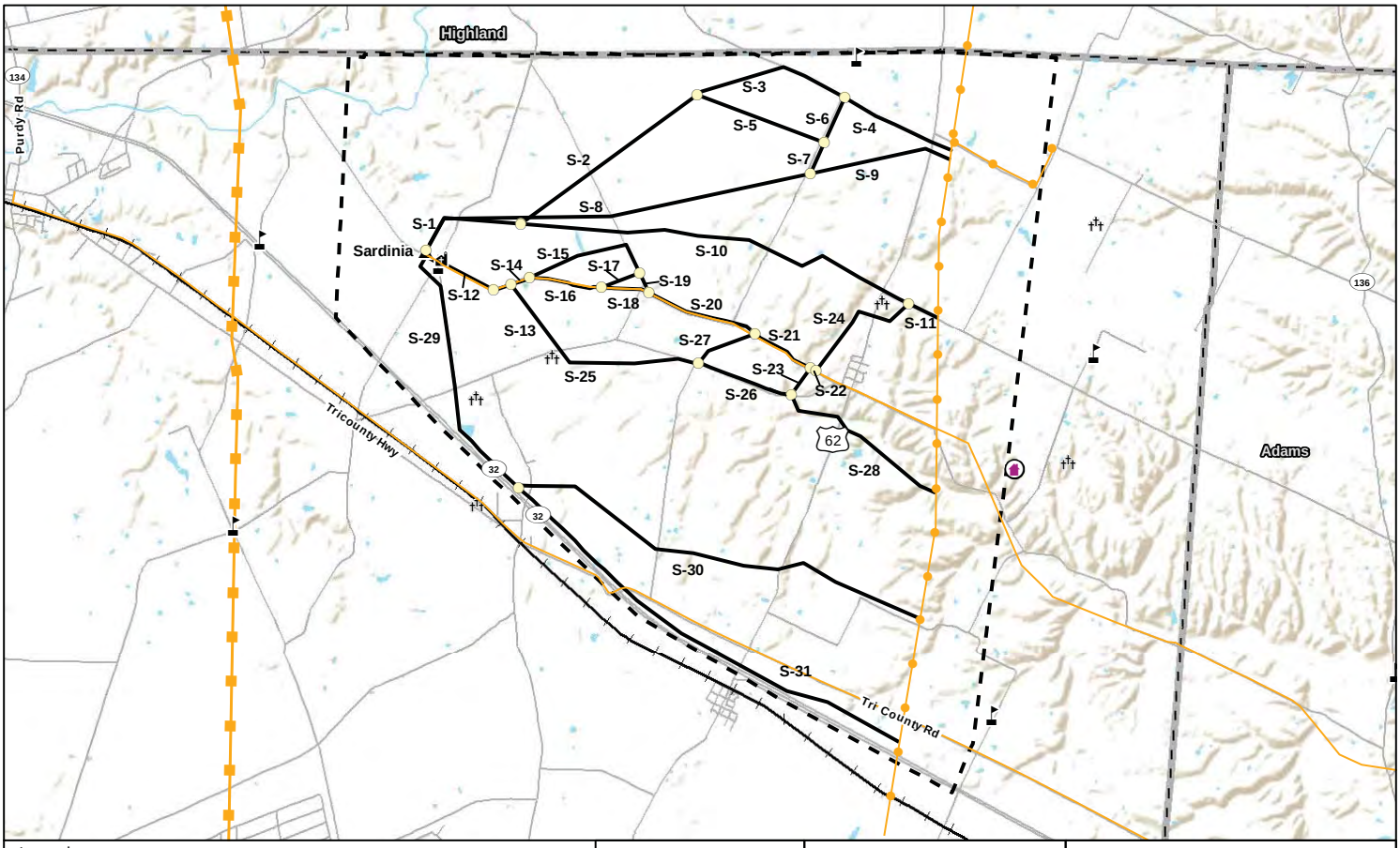
April 10, 2018

Map 2
Conceptual Routes

AEP OHIO

Sardinia Area
Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Segment Endpoint
- Church
- Cemetery
- School
- National Register of Historic Places
- Potential Route Network
- Railroads
- Existing Transmission (115 kV or lower)
- Existing Transmission (138 kV - 230 kV)
- Existing Transmission (345 kV+)
- Streets
- Waterbody (NHD)
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

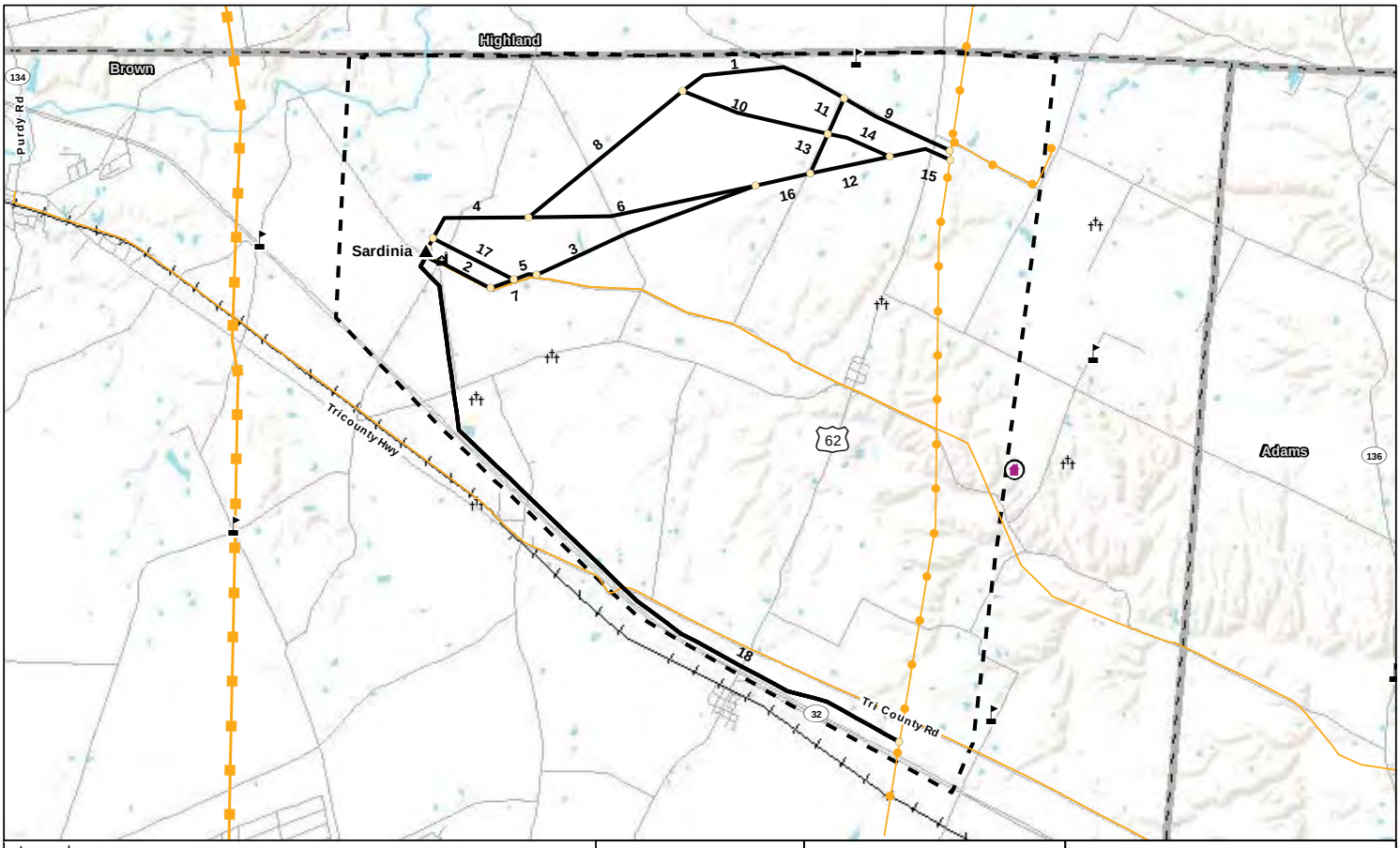
April 17, 2018

Map 3a
Potential Route Network

AEP OHIO

Sardinia Area
Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Segment Endpoint
- Church
- Cemetery
- School
- National Register of Historic Places
- Potential Route Network
- Railroads
- Existing Transmission (115 kV or lower)
- Existing Transmission (138 kV - 230 kV)
- Existing Transmission (345 kV+)
- Streets
- Waterbody (NHD)
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

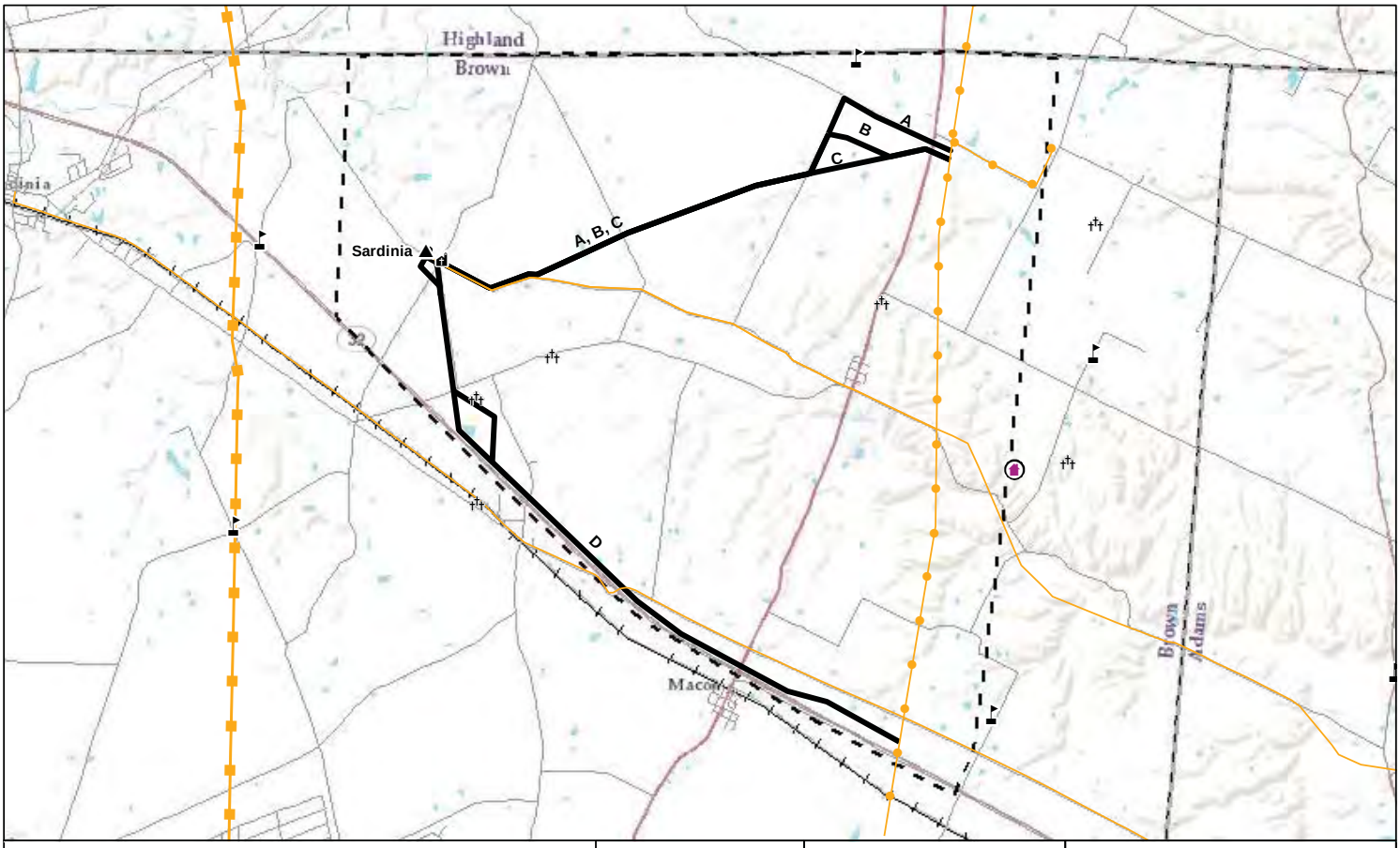
April 13, 2018

Map 3b
Potential Route Network

AEP OHIO

Sardinia Area
Improvements Project

0 0.25 0.5 0.75 1
Miles



- Project Substation
- Church
- Cemetery
- School
- National Register of Historic Places
- Proposed Routes
- Existing Transmission (115 kV or lower)
- Existing Transmission (138 kV - 230 kV)
- Existing Transmission (345 kV+)
- Streets
- Railroads
- Waterbody (NHD)
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

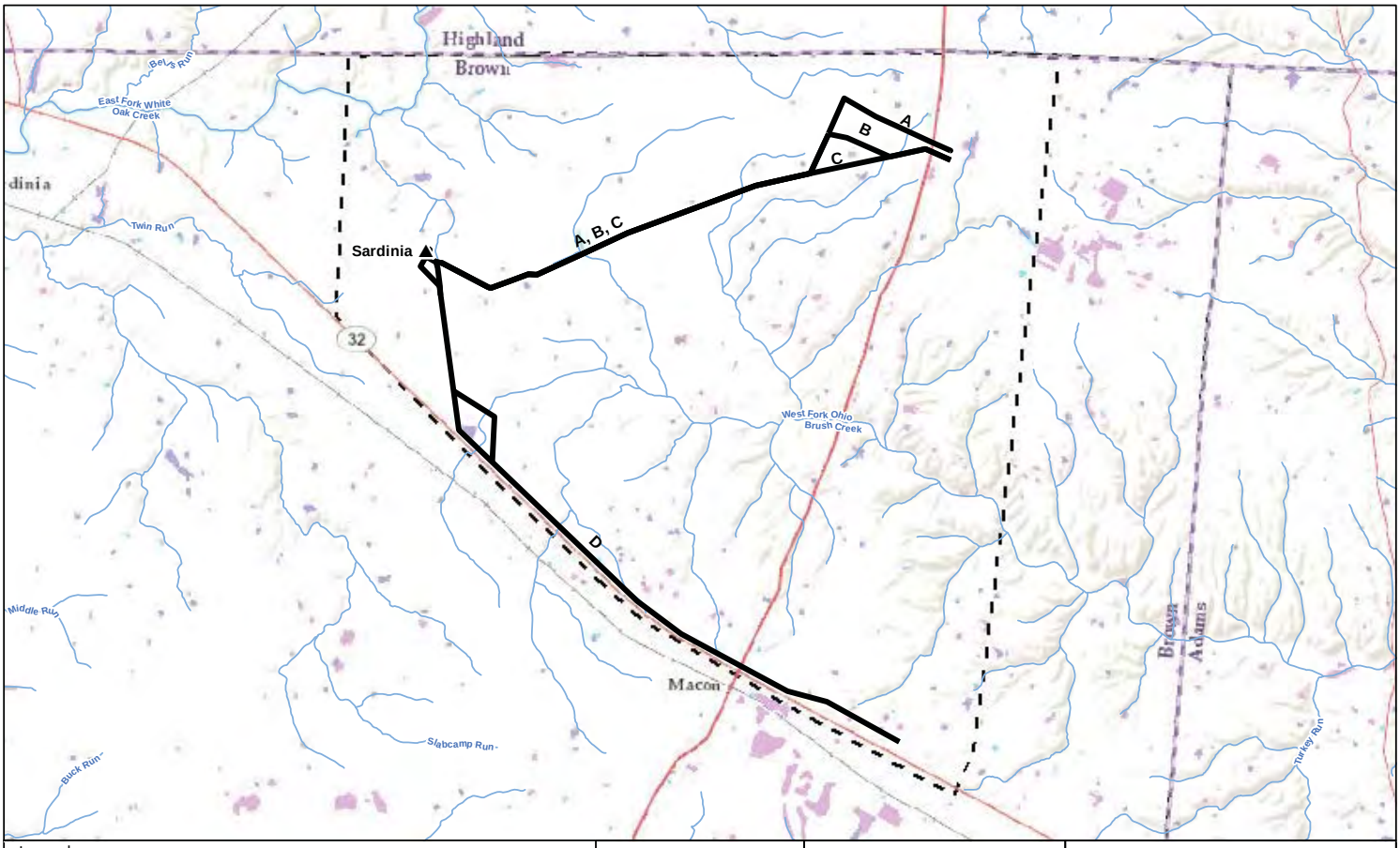
April 13, 2018

Map 4
Alternative Routes

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Proposed Routes
- Stream (NHD)
- Waterbody (NHD)
- Wetland (NWI)
- Study Area

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

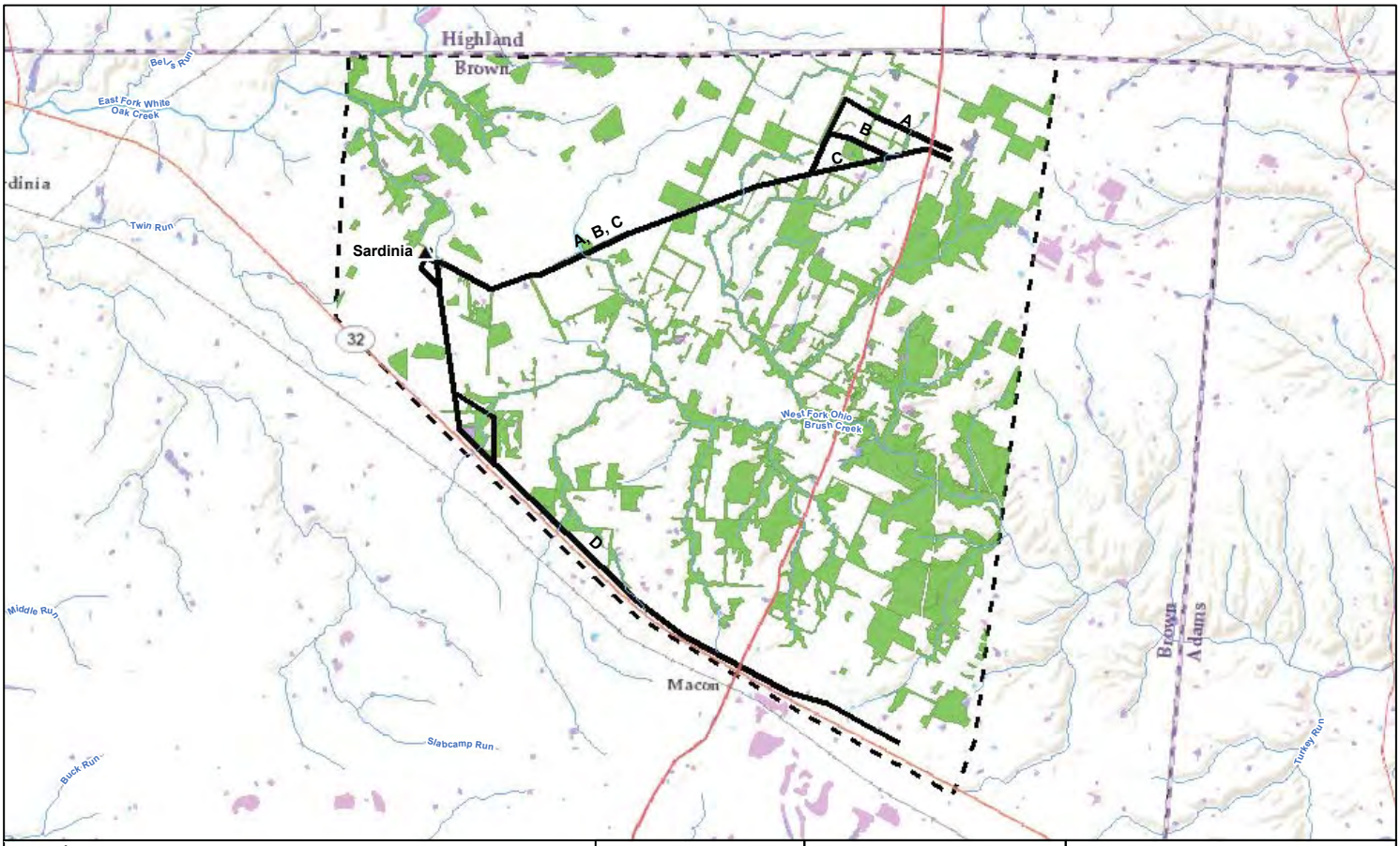
April 13, 2018

Map 5
Water Resources

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Proposed Routes
- Stream (NHD)
- Waterbody (NHD)
- Wetland (NWI)
- Forest Habitat
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

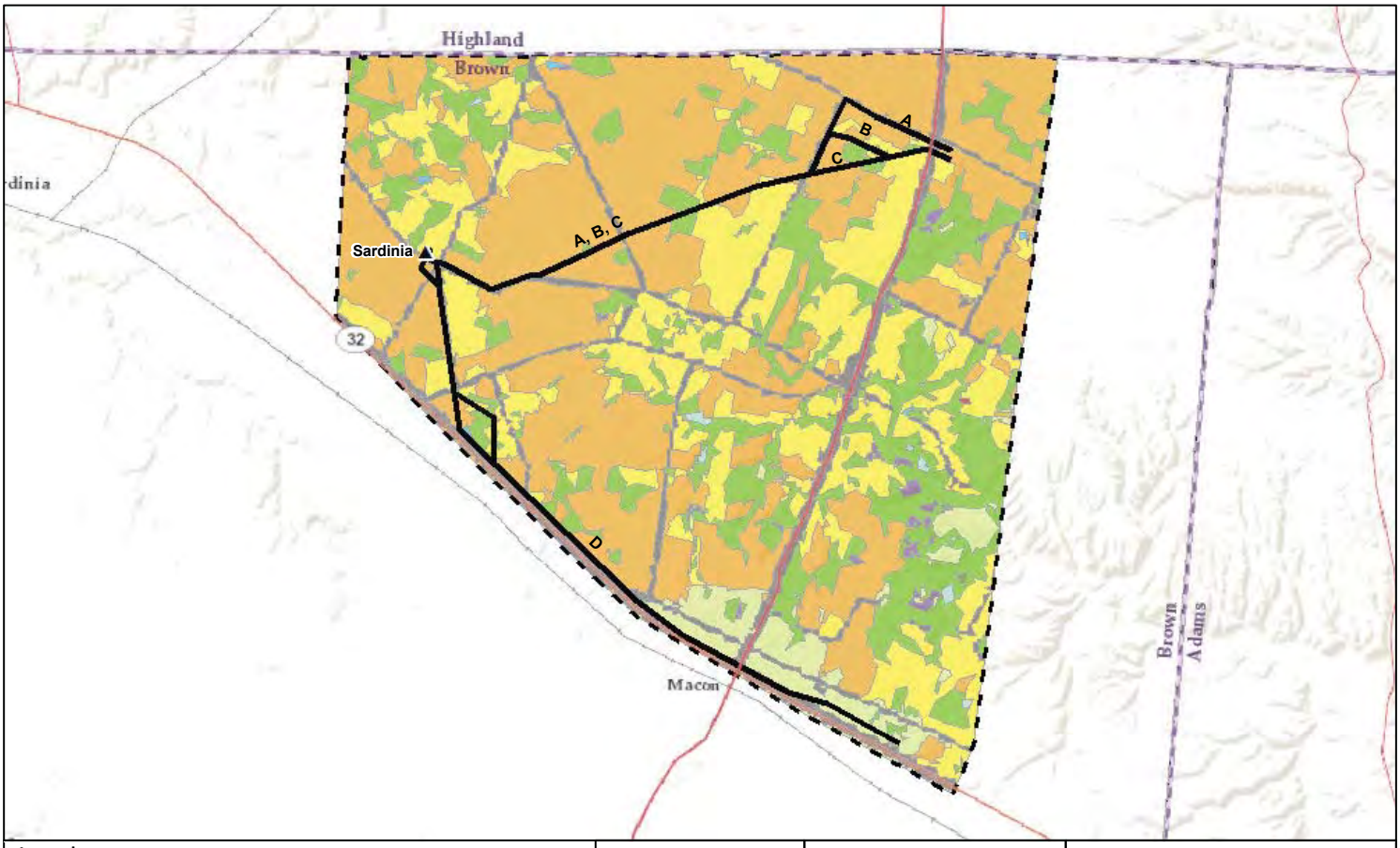
April 10, 2018

Map 6
Wildlife Habitat

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- Proposed Routes

Land Use (NLCD)

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed
- Evergreen Forest
- Hay/Pasture
- Herbaceuous
- Mixed Forest
- Open Water
- Shrub/Scrub
- Study Area
- County Boundary

Basemap Source:
ESRI Thematic Maps

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

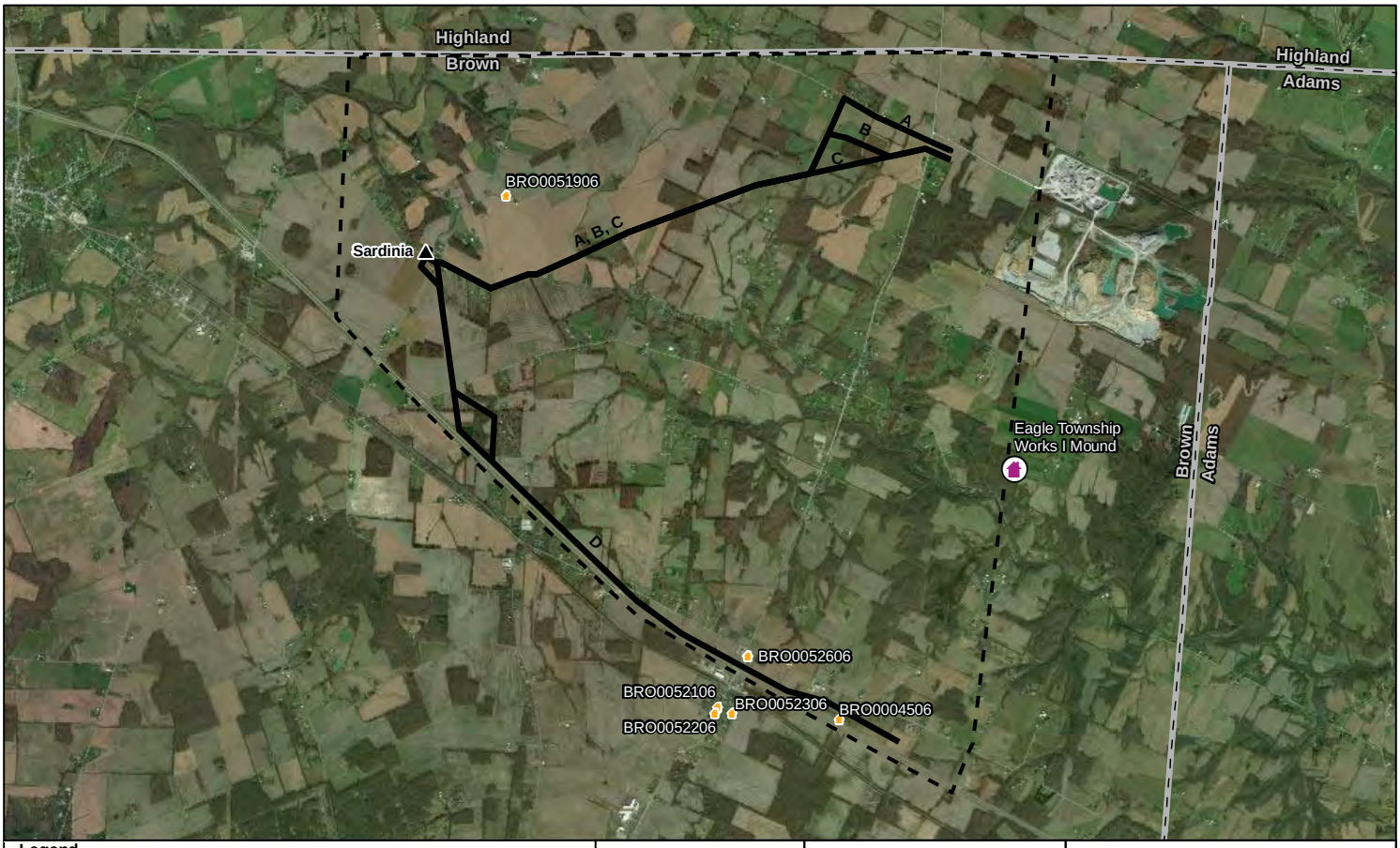
April 10, 2018

Map 7
Land Use

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles



Legend

- Project Substation
- National Register of Historic Places
- OHI
- Proposed Routes
- Study Area
- County Boundary

Basemap Source:
Ohio Statewide Imagery
Program, 2014

NAD 1983 State Plane
Ohio South FIPS 3402 Feet

April 24, 2018

Map 8
Cultural Resources

AEP OHIO

Sardinia Area Improvements Project

0 0.25 0.5 0.75 1
Miles

Attachment B: GIS Data Sources

Attachment B. GIS Data Sources		
SITING CRITERIA	**SOURCE**	**DESCRIPTION**
Land Use		
Number of parcels crossed by the ROW	Brown County Auditor (2018)	Count of the number of parcels crossed by the ROW
Number of residences within 1,000 feet of the route centerline	Digitized from 2015 NAIP aerial imagery and field verified from points of public access	Count of the number of residences within the ROW and within 1,000 feet of potential routes
Number of commercial buildings within 1,000 feet of the route centerline	Digitized from 2015 NAIP aerial imagery and field verified from points of public access	Count of the number of commercial buildings within the ROW and within 1,000 feet of potential routes
Acres of agricultural district land crossed	Brown County Auditor (2018)	Protected land that is devoted exclusively to agricultural production or devoted to and qualified for compensation under a federal land retirement or conservation program that is at least 10 acres in size, or produces an average yearly gross income of at least $2,500 during a 3-year period.
Number of archeological resources within the ROW and within 1,000 feet of centerline	Ohio History Connection (2018)	Previously identified archeological resources listed or eligible on the NRHP acquired through the database maintained by the Ohio History connection, which serves as the SHPO
Number of historic architectural resources within the ROW and within 1,000 feet of centerline	Ohio History Connection (2018)	Previously identified historic architectural resource sites and districts listed or eligible on the NRHP acquired through the database maintained by the Ohio History Connection, which serves as the SHPO
Number of cemeteries within 1,000 feet of the route centerline	Ohio History Connection (2018)	Cemeteries acquired through the database maintained by the Ohio History connection, which serves as the SHPO
Institutional uses (schools, places of worship) within 1,000 feet of the route centerline	USGS's GNIS (2018)	Locations of cemeteries, churches, hospitals, parks, and schools; features within 1,000 feet of potential routes were field verified
Natural Environment		
Forest clearing within the ROW	Digitized based on 2015 NAIP imagery	Acres of forest within the ROW
Number of NHD stream and waterbody crossings within the ROW	USGS (2018)	Comprehensive set of digital spatial data prepared by the USGS containing information about surface water features such as lakes, ponds, streams, rivers, springs, and wells
Acres of NWI wetland crossings within the ROW	USFWS (2018)	Information on the characteristics, extent, and status of the nation's wetlands and deep-water habitats
Miles of public lands crossed by the route	Protected Areas Database of the United States (2016)	Miles of federal, state, and local lands crossed by the ROW

Attachment B. GIS Data Sources		
SITING CRITERIA	**SOURCE**	**DESCRIPTION**
Threatened, endangered, rare or sensitive species occurrence within the Study Area	USFWS and ODNR Division of Wildlife (2017)	Known occurrences; locations of potential habitat based on land use
Technical		
Route length	Measured in GIS	Length of route in miles
Number and severity of angled structures	Developed in GIS	Anticipated number of angled structures less than 3 degrees, 3 to 45 degrees, and over 45 degrees based on preliminary design
Number of road crossings	ESRI road file (2017)	Count of federal, state, and local roadway crossings
Number of transmission line crossings	AEP Ohio Transco	Number of high-voltage (100-kV or greater) transmission lines crossed by the ROW
Length of transmission line parallel	AEP Ohio Transco	Miles of the route parallel to existing high-voltage transmission lines
Length of pipeline parallel	USDOT National Pipeline Mapping System (2017)	Miles of the route parallel to existing pipelines
Length of road parallel	ESRI road file (2017)	Miles of the route parallel to existing roadways

AEP Ohio Transco	American Electric Power Ohio Transmission Company
ESRI	Environmental Systems Research Institute
GIS	geographic information system
GNIS	geographic names information system
kV	kilovolt
NAIP	National Agricultural Imagery Program
NHD	National hydrography dataset
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
ODNR	Ohio Department of Natural Resources
ROW	right-of-way
SHPO	State Historic Preservation Office
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey

Attachment C: Agency Correspondence

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife
Michael R. Miller, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

27 September 2017

Brian Robertson
CH2M
400 E. Business Way
Cincinnati, OH 45241

Dear Mr. Robertson,

After reviewing the Natural Heritage Database, I find the Division of Wildlife has no records of rare or endangered species in the Seaman-Sardinia 138 kV Transmission Line Construction project area, including a one-mile radius, in Eagle Township, Brown County, Ohio. We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests or other protected natural areas within a one-mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. This letter only represents a review of rare species and natural features data within the Ohio Natural Heritage Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq.) and does not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke

Debbie Woischke
Ohio Natural Heritage Database Program

From:	susan_zimmermann@fws.gov
To:	Frank, Mike/CIN; Robertson, Brian/CIN
Cc:	nathan.reardon@dnr.state.oh.us; kate.parsons@dnr.state.oh.us
Subject:	AEP Ohio Transco Seaman-Sardinia Transmission Line Project, Brown County, Ohio [EXTERNAL]
Date:	Wednesday, October 18, 2017 9:02:57 AM
Attachments:	Letterhead for Emails 2.jpg Capture of Dan.PNG

TAILS# 03E15000-2018-TA-0004

Dear Mr. Frank,

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.

Due to the vague nature of the project, the USFWS cannot provide recommendations for these species at this time. We recommend that you coordinate your project with our office again once details of the project have been determined.

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,

Dan Everson

Field Supervisor

cc: Nathan Reardon, ODNR-DOW

Kate Parsons, ODNR-DOW

Attachment D: Overview of Preferred and Alternate Routes and Adjustments

Document Path: \\Brookside\GIS_SHARE\ENBG\00_Proj\AEP\Seaman_Sardinia_138kV\Maps\Report\Siting\Attachment_D.mxd

Legend

- Project Substation
- Preferred Route
- Alternate Route
- Preferred and Alternate Route Adjustments (After Siting Study)
- Existing Electric Transmission Line

BASE MAP SOURCE: National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:32,500

April 13, 2018

LOCATOR MAP

Attachment D
Preferred and Alternate Routes and Minor Adjustments

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 0.25 0.5
Miles

Attachment E: Preferred and Alternate Route Map Book

Document Path: \\brookside\GIS_SHARE\ENBG\00_Proj\AEP\Seaman_Sardinia_138kV\Maps\Siting\DDP_20180410.mxd

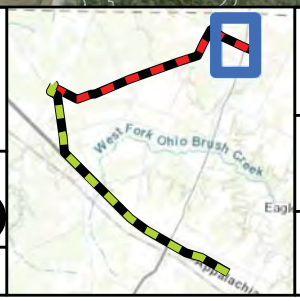
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

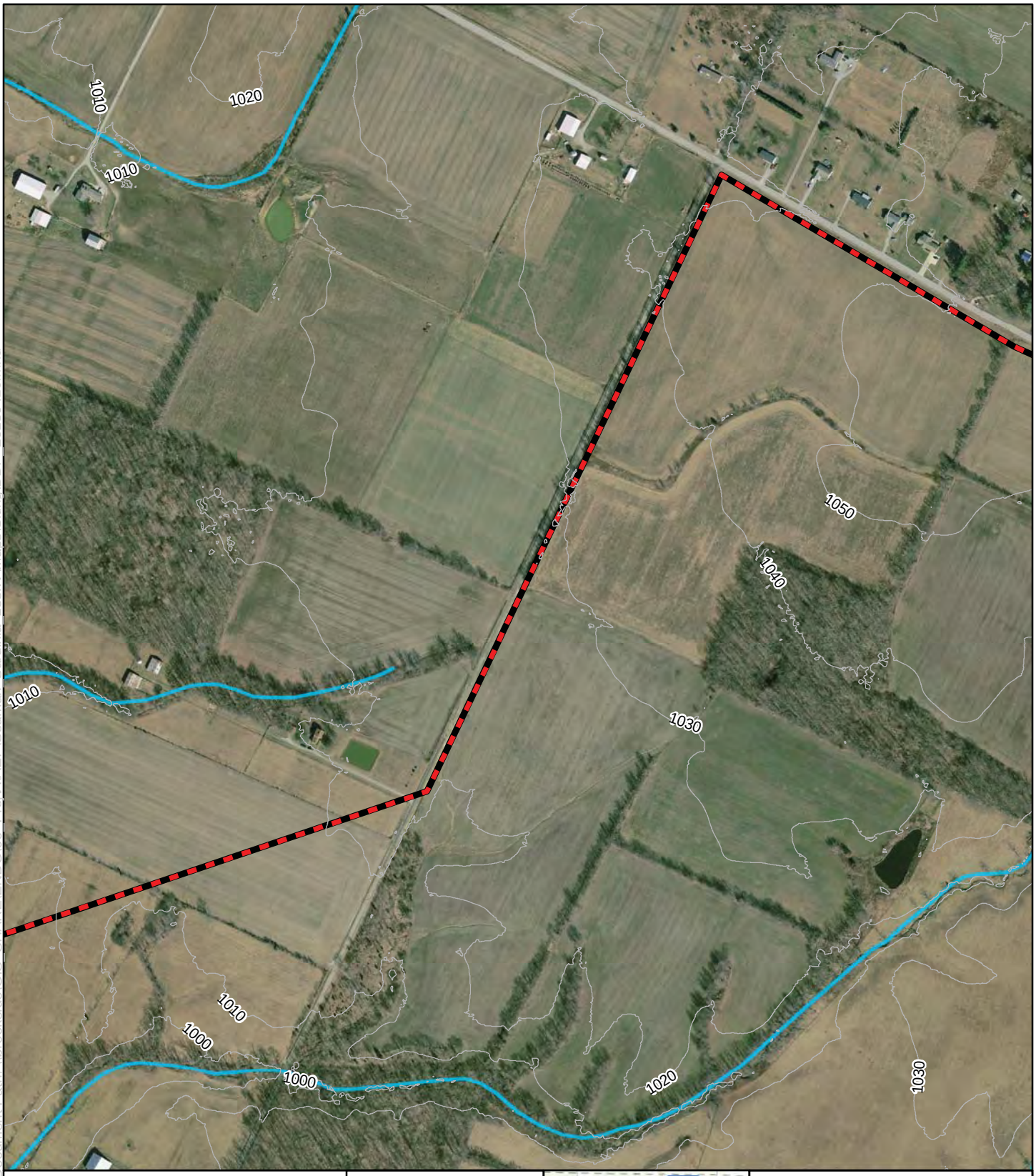


Map Book
Preferred Route 1

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet



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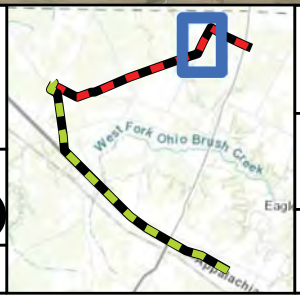
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

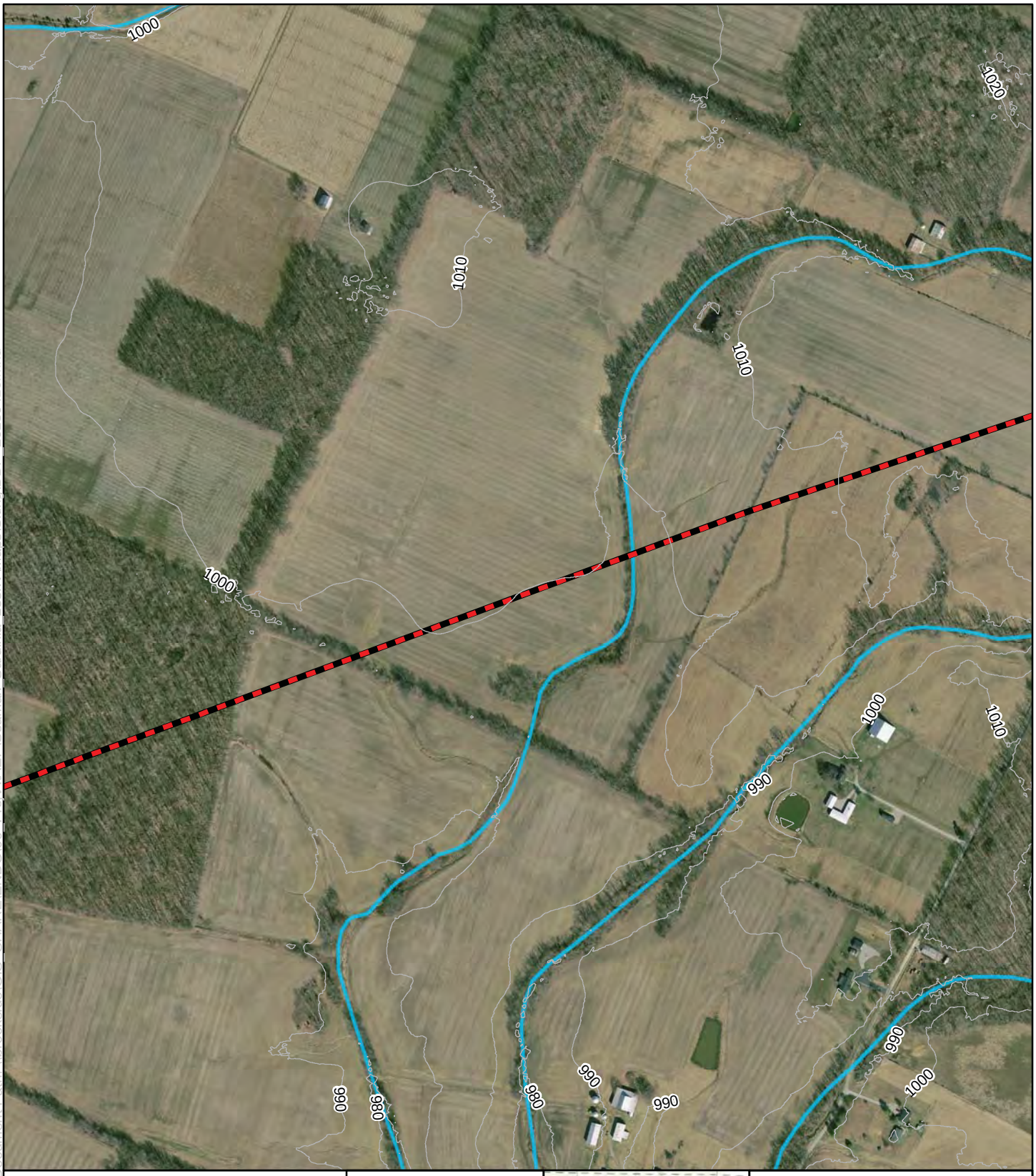


Map Book
Preferred Route 2

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet



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Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

Map Book
Preferred Route 3

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet

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Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

Map Book
Preferred Route 4

Sardinia Area Improvements Project

0 400 800
Feet

Document Path: \\brooksid\e\GIS_SHARE\ENBG\00_Proj\AEP\Seaman_Sardinia_138kVMaps\Siting\DDP_20180410.mxd

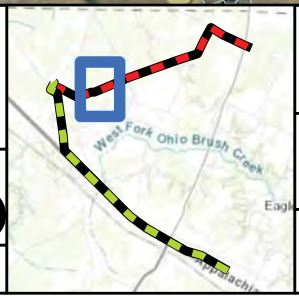
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

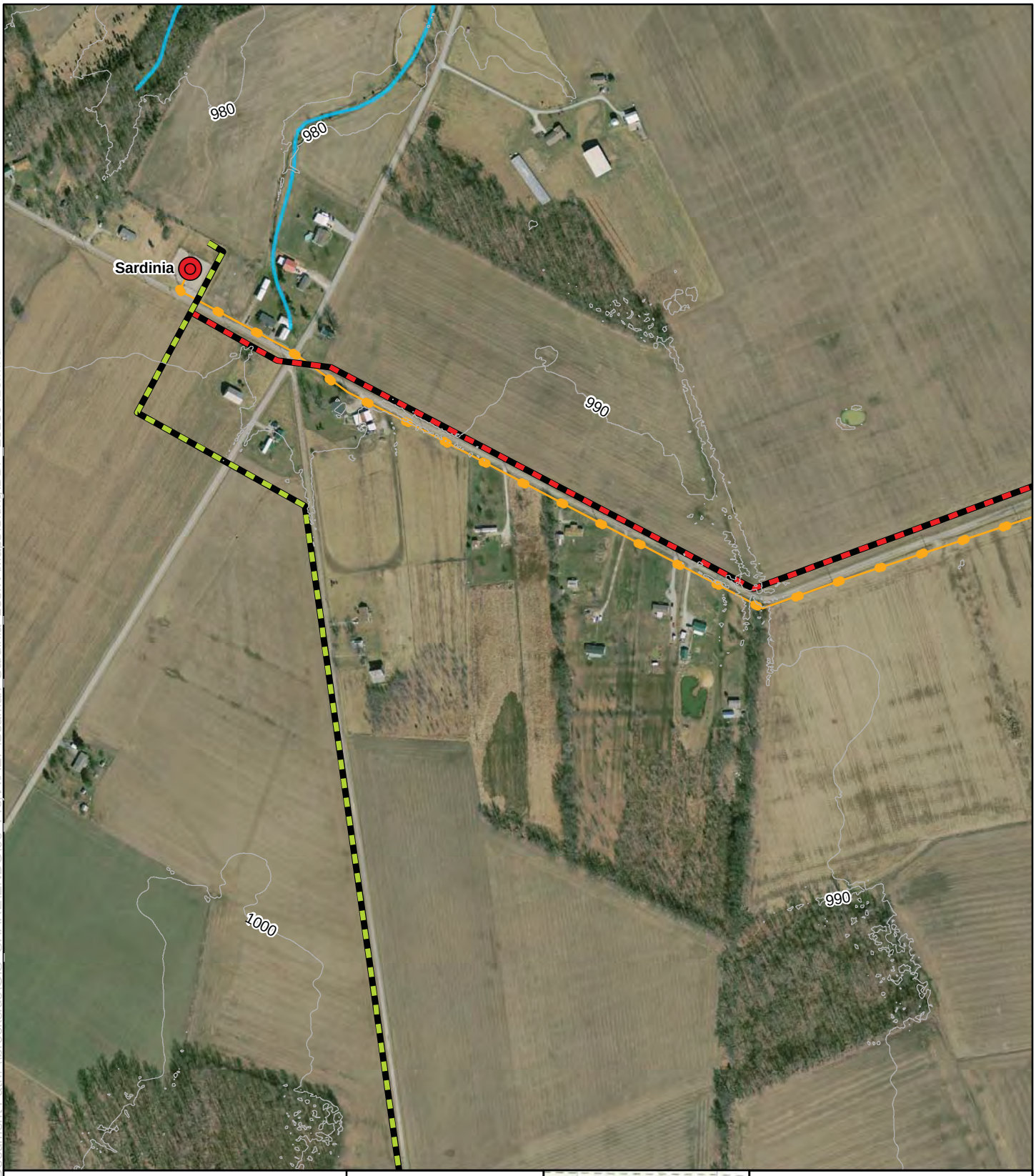


Map Book
Preferred Route 5

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet



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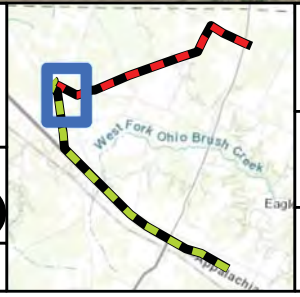
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018



Map Book
Preferred and Alternate Routes 6

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet

Document Path: \\brooksidegis_SHARE\ENBG\00_Proj\AEP\Seaman_Sardinia_138kVMaps\Siting\DDP_20180410.mxd

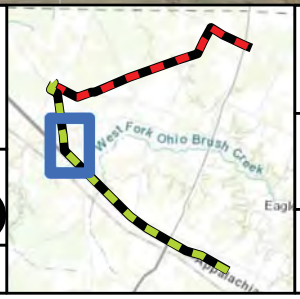
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018



Map Book
Alternate Route 7

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet

Document Path: \\brooksid\e\GIS_SHARE\ENBG\00_Proj\AEP\Seaman_Sardinia_138kVMaps\Siting\DDP_20180410.mxd

Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

Map Book
Alternate Route 8

AEP OHIO

Sardinia Area Improvements Project

0 400 800
Feet

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Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018

Map Book
Alternate Route 9

AEP OHIO

Sardinia Area Improvements Project

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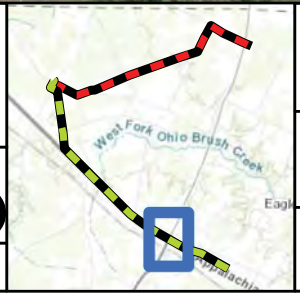
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018



Map Book
Alternate Route 10

AEP OHIO

Sardinia Area Improvements Project

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Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
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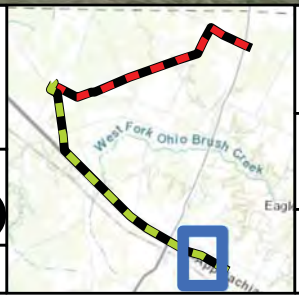

Map Book
Alternate Route 11

AEP OHIO

Sardinia Area Improvements Project

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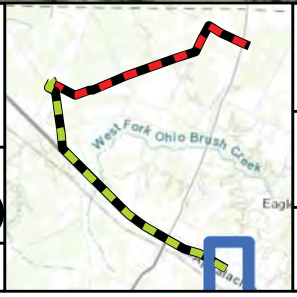
Legend

- Project Substation
- Preferred Route
- Alternate Route
- Existing Electric Transmission Line
- 10ft Contour
- Stream (NHD)

BASE MAP SOURCE:
OSIP (2015)

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 13, 2018



Map Book
Alternate Route 12

AEP OHIO

Sardinia Area Improvements Project

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Feet

4906-5-05 PROJECT DESCRIPTION

(A) PROJECT AREA DESCRIPTION

The map included in this section provides a description of the Project area's geography, topography, population centers, major industries, and landmarks.

(1) Project Area Map

Figures 7-1A and 7-1B provide maps at 1:24,000-scale, showing the Preferred and Alternate Routes for the Project. These maps include a 1,000-foot corridor on each side of the proposed transmission centerlines (hereafter referred to as the 2,000-foot corridor). These maps depict the proposed transmission lines, roads and railroads, major institutions, parks, and recreational areas that are publicly owned, existing gas pipeline and electric transmission line corridors, named lakes, reservoirs, streams, canals, and rivers, and population centers and legal boundaries of cities, villages, townships, and counties. The maps utilize the Sardinia (1982), Sugar Tree Ridge (1975), Ash Ridge (1976), and Winchester (1962) USGS 7.5-minute topographic quadrangles as base maps.

The information on the map was updated by reviewing digital, georeferenced aerial photography, property parcel data from the Brown County Auditor's Office, and field reconnaissance trips conducted between November 2017 and March 2018. The aerial photographs are georeferenced, ortho-corrected color images derived from ESRI ArcGIS Online.

(2) Proposed Right-of-Way, Transmission Length, and Properties Crossed

For AEP Ohio Transco's planning purposes, the proposed ROW width along the Preferred Route and Alternate Route is 50 feet on either side of centerline for a total of 100 feet. Table 5-1 provides information about the Preferred and Alternate Route ROW acreage, length, and properties crossed based on the proposed centerline.

TABLE 5-1
Right-of-way Area, Length, and Number of Properties Crossed for the Preferred and Alternate Routes

	Route Alternatives	
	Preferred	**Alternate**
Proposed ROW area (in acres)	44.9	54.5
Length (in miles)	3.7	4.5
Number of properties crossed (by ROW)	50	38

(B) ROUTE OR SITE ALTERNATIVE FACILITY LAYOUT AND INSTALLATION

(1) Site Clearing, Construction, and Reclamation

The following paragraphs provide information on the proposed site clearing, construction methods, and reclamation operations for the Project.

(a) Surveying and Soil Testing

The selected transmission line route will be surveyed to establish the centerline, ROW, and pole locations. The surveying will be completed using conventional or aerial methods. Topographic features and manmade structures near the proposed route that may affect the design will be identified during the survey. Minimal clearing of small trees and brush may be required if the surveyor's line of sight is obstructed. Offsets will be used to survey around large trees and other large obstructions. Profile measurements of the topography will be obtained by conventional or aerial methods. The centerline and ROW will be staked prior to construction.

Soil and rock tests will be performed along portions of the final approved route, if foundations for poles are necessary. Augured test borings will be achieved using a machine-driven auger at least 4 inches in diameter. Soil samples will be obtained at approximately 2.5-foot intervals for the first 10 feet, 5-foot intervals below 10 feet, and at any change in subsurface strata. Sampling will include split barrel samples in non-cohesive soils and thin-walled tube samples in cohesive soils. Typically, the testing will be performed to a depth of 30 to 40 feet. If rock is encountered, a carbide-tipped bit will be drilled 5 to 10 feet into the rock.

(b) Grading and Excavation

Soil surface grading for the Project is not anticipated. Some laydown and set-up areas for construction equipment may require minor local leveling, but this will be restricted to the immediate area. It is anticipated that most self-supporting steel pole locations will be installed by direct-embed methods. Due to site-specific requirements, some self-supporting steel poles may require concrete foundations. The excavation for each foundation will be approximately 6 to 8 feet in diameter and 25 to 35 feet deep. A portion of the excavated soil will be used for backfill around the foundation, and the excess soil material will be placed around the pole or hauled offsite to an approved spoils disposal site.

(c) Construction of Temporary and Permanent Access Roads and Trenches

Construction access will be required for installation of the pole structures and stringing of the conductor cable or wire. Access roads will require the landowner's input and approval. Preliminary access roads for the Preferred Route are along the ROW. Note these access roads cannot be fully planned and identified until after a final route is approved followed by AEP Ohio Transco's contact with affected landowners for transmission line easements. Where access across wetlands or streams is necessary, timber mats or equivalent will be used to minimize the environmental impacts. If field conditions necessitate the modification of the finalized access road locations during construction, the concurrence of the property owner will be obtained, necessary environmental field studies will be performed, and necessary permits will be updated.

(d) Stringing of Cable

During wire stringing operations, areas along the transmission line will be used as setup locations for the wire pulling equipment (such as conductor reels, groundwire reels, and the wire tensioner). Conductor installation will be accomplished using the tension stringing method. Lightweight cables or ropes will be fed through the stringing sheaves mounted on the poles. Conductors will be pulled through under sufficient tension to keep the conductor off the ground to prevent any damage to the conductor. Temporary guard or clearance poles will be used as a safety precaution at locations where the conductors could create a hazard to either crewmembers or the public. The locations and heights of clearance poles will be such that conductors are held clear of other electric distribution lines, communication cables, railroads and roadways. The stringing operation will be under the observation of transmission line construction crewmembers at all times. The observers will be in radio or visual contact with the operator of the stringing equipment.

(e) Installation of Electric Transmission Line Poles and Structures, Including Foundations

Generally, the Project will be constructed using steel poles, with direct embedded foundations. Where necessary, due to site-specific conditions, installation of a single pole vertically configured or 3-pole horizontally configured self-supporting structures will be utilized. Self-supporting structures have concrete pier foundations. The excavation for each concrete pier foundation will be approximately 6 to 8 feet in diameter and 25 to 35 feet deep.

(f) Post-Construction Reclamation.

Topsoil at pole excavations will be stockpiled when necessary and protected from erosion. Topsoil will be redistributed over disturbed areas to foster re-vegetation following construction (except in wetland areas). Restoration, including temporary and permanent seeding, will be coordinated with the construction activities to provide re-vegetation and soil stabilization at the earliest reasonable time. Following construction, all pole locations, material storage sites, and temporary access roads will be restored and seeded with a suitable grass seed mixture that will be specified in the erosion and sediment control plan.

Re-vegetation techniques will enhance the ROW for use as possible wildlife habitat. Although not planned, any stream banks that are disturbed during construction would be restored by planting of low-growing species, where necessary, to reduce bank erosion. Lawn or garden areas, or paved areas damaged during the construction of the transmission line, will be restored to original condition. Landscaping or landscape plantings damaged during construction will also be restored to original condition or replaced as directed by the affected property owner. After restoration is complete, AEP Ohio Transco will periodically inspect the ROW to identify areas of erosion, sedimentation, and inadequate re-vegetation conditions, if any. If such conditions are identified, corrective actions will be implemented.

(2) Facility Layout

No new associated facilities such as new substations are proposed for the Project. The existing Sardinia Substation is being expanded in conjunction with the Project.

(a) Transmission Line Route Map

Figures 8-2A through 8-2F and 8-3A through 8-3H show maps at 1:6,000-scale of the Preferred and Alternate Routes, respectively. These maps illustrate the data required by OAC 4906-5-05(A)(1). Although the additional information required by OAC 4906-5-05 (B)(2)(a) (for example, pole structure locations) will not be finalized until a final route is approved by the OPSB and the final engineering design is complete, preliminary locations are provided for the Preferred Route as illustrated in Figures 8-2A through 8-2F. The data and information defined in OAC 4906-5-05 (B)(2)(a) includes temporary access roads and proposed locations of transmission line poles and buildings. Access roads for the Preferred Route are along the ROW. No fenced-in or secured areas are planned for the Project.

AEP Ohio Transco is currently identifying staging areas and laydown areas for the Project. To date, none have been identified within the Project area. After sites are identified, AEP Ohio Transco will provide final locations that support this Project.

(b) Proposed Layout Rationale

A detailed description of the reasons for the proposed layout (i.e., the Preferred and Alternate Routes) are presented in the Siting Study (Appendix 4-1). There are no unusual features within the study area.

(c) Plans for Future Modifications

Except as otherwise described in this Application, AEP Ohio Transco currently has no plans for future modifications of the proposed Project.

(C) DESCRIPTION OF PROPOSED TRANSMISSION LINES OR PIPELINES

(1) Electric Power Transmission Lines

(a) Design Voltage

The transmission line will be designed and operated at 138 kV.

(i) Tower Designs, Pole Structures, Conductor Size and Number per Phase, and Insulator Arrangement

The majority of the line will be composed of a tangent, braced post, delta structure (Figures 5-1A to 5-1C) with an estimated above ground height of 80 feet. The conductor used for the new transmission line will be a 556.5 thousand circular mil (kcm)26/7 aluminum conductor, steel-reinforced cable (ACSR) per phase. This conductor has a maximum strength of approximately 22,600 pounds. The new line will utilize one 7#8 Alumoweld shield wire. The shield wire has a maximum strength of 15,930 pounds. Both the phase conductors and the shield wire will be

installed in accordance to the latest version of the National Electric Safety Code. The conductors will be supported by aluminum clamps which be attached to the insulators. Aluminum suspension clamps will support the shield wires. At dead-end locations, compression dead-end clamps will be used on both the conductor and the shield wire.

(b) Base and Foundation Design

All angle locations will require installation of a concrete pier foundation. The excavation for each concrete pier foundation will be approximately 6 to 8 feet in diameter and 25 to 35 feet deep.

(c) Cable Type and Size, where Underground

No underground cables are associated with this Project; therefore, this section is not applicable.

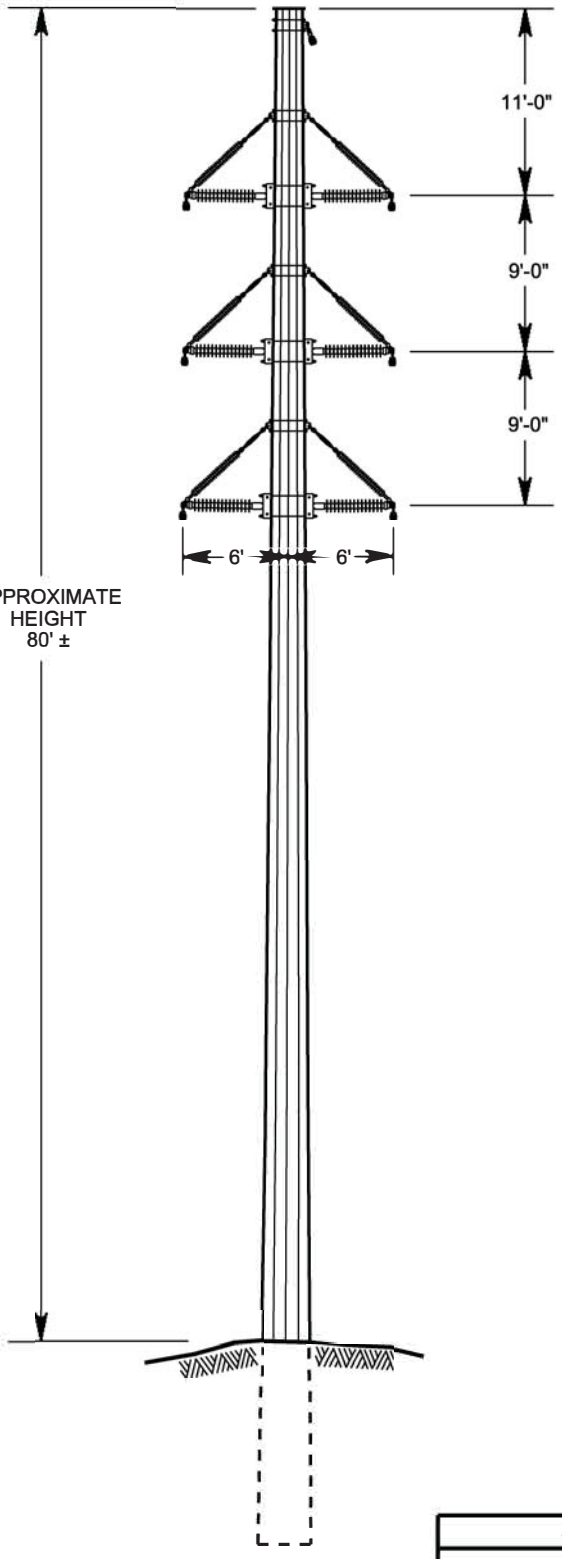
(d) Other Major Equipment or Special Structures

No other major equipment or special structures are required for the Project.

(2) Diagram of Electric Power Transmission Substations

No new electric power transmission substations are proposed for this Project.

Figures



SARDINIA 138kV EXTENSION

AMERICAN ELECTRIC POWER
BOUNDLESS ENERGY™

TYPICAL TANGENT
DOUBLE CIRCUIT
STEEL POLE

NOT TO SCALE | FIGURE 05-1A

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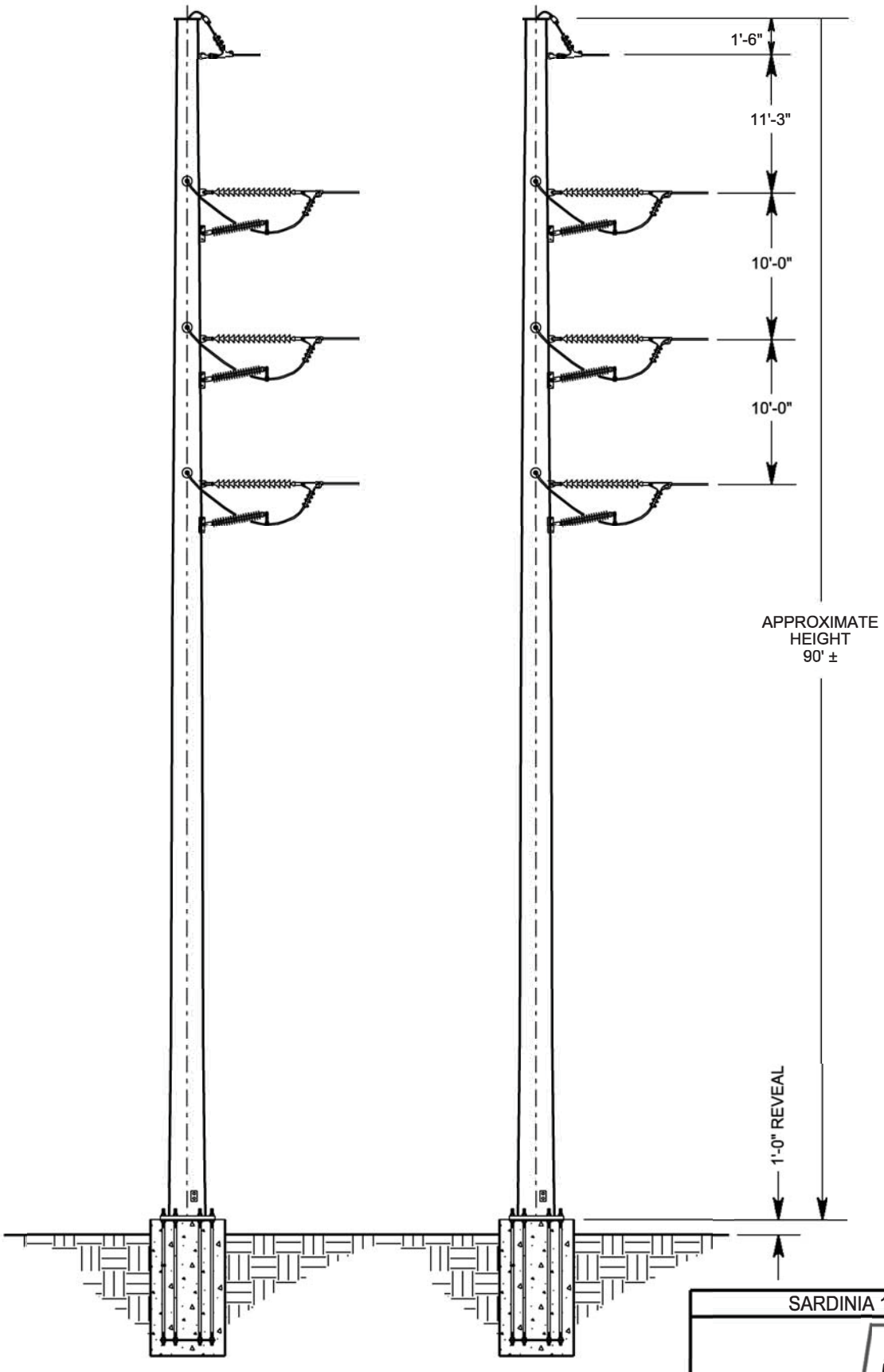

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SARDINIA 138kV EXTENSION

AMERICAN ELECTRIC POWER
BOUNDLESS ENERGY™

TYPICAL DEADEND
DOUBLE CIRCUIT
DOUBLE STEEL POLE

NOT TO SCALE | FIGURE 05-1B

COMPUTER GENERATED DWG. , DO NOT MANUALLY REVISE

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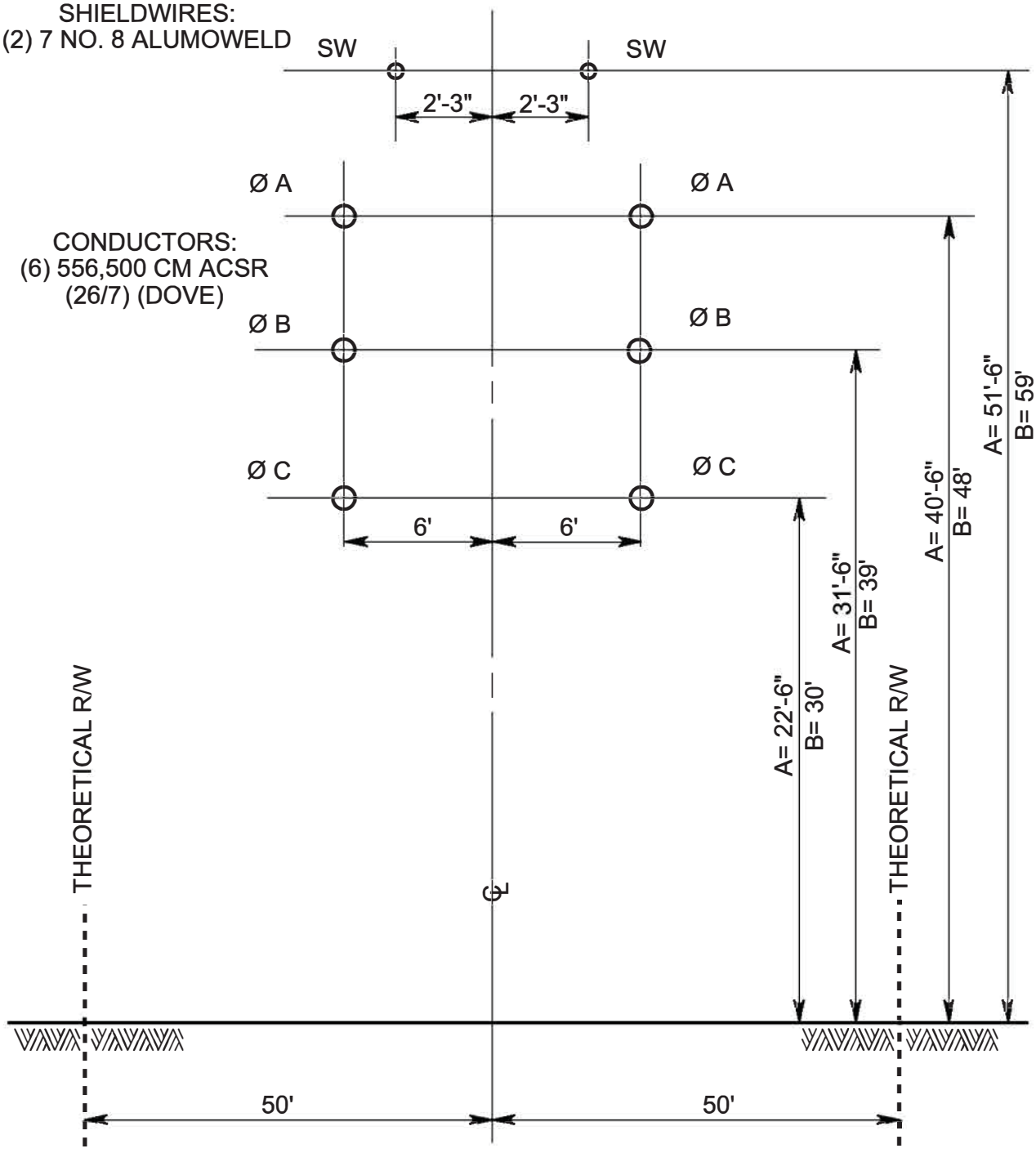

PROPOSED CONFIGURATION

DIMENSION "A" - CONFIGURATION UNDER EMERGENCY AND NORMAL MAXIMUM LOADING CONDITIONS.

DIMENSION "B" - CONFIGURATION UNDER WINTER NORMAL CONDUCTOR RATING CONDITIONS.

AMERICAN ELECTRIC POWER
BOUNDLESS ENERGY™

SARDINIA 138kV EXTENSION

TYPICAL DOUBLE CIRCUIT PHASE ARRANGEMENT

NOT TO SCALE | FIGURE 5-1C

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COMPUTER GENERATED DWG. , DO NOT MANUALLY REVISE

Appendix 5-1
Page 48 of the Long-Term Forecast Report of AEP Ohio Transmission Company, Inc.

PUCO FORM FE-T9
AEP OHIO TRANSMISSION COMPANY
SPECIFICATION OF PLANNED ELECTRIC TRANSMISSION LINES

1.	Line Name and Number:	Sardinia extension
2.	Points of Origin and Termination:	Wild Cat / Kenton 138kV line; Intermediate Station - N/A
3.	Right-Of-Way:	~4 miles / 100 ft / 2 ckt
4.	Voltage:	138kV/138kV
5.	Application For Certificate:	2018
6.	Construction:	ISD 2021
7.	Capital Investment:	$12M
8.	Planned Substations:	Name - Possible expansion of Sardinia; Voltage - 138/12kV; Acreage - <1 acre; Location - Highland
9.	Supporting Structures:	TBD
10.	Participation with Other Utilities:	N/A
11.	Purpose of the Planned Transmission Line	Retire Seaman - Sardinia lineand provide new rendundant source for Sardinia
12.	Consequences of Line Construction Deferment or Termination:	Increased risk of failure on Seaman-Sardinia line, increased CMI for Sardinia customers
13.	Miscellaneous	

4906-5-06 ECONOMIC IMPACT AND PUBLIC INTERACTION

(A) OWNERSHIP OF PROPOSED FACILITY

AEP Ohio Transco will construct, own, operate, and maintain the proposed 138 kV transmission line.

(B) CAPITAL AND INTANGIBLE COSTS ESTIMATE FOR ELECTRIC POWER TRANSMISSION FACILITY ALTERNATIVES

AEP Ohio Transco developed estimates of applicable capital and intangible costs for a variety of components of the Project. Each of the enumerated components is included in Table 6-1. The table also includes estimates of applicable intangible and capital costs for both the Preferred and Alternate Routes of the Project.

TABLE 6-1
Estimates of Applicable Intangible and Capital Costs for Both the Preferred and Alternate Routes

FERC Account Number	Description	Preferred Route	Alternate Route
350	(1) Land and Land Rights	$0	$0
352	(2) Structures and Improvements	$2,800,000	$2,800,000
353	(3) Substation Equipment	$2,000,000	$2,000,000
354	(4) Towers and Fixtures	$0	$0
355	(5) Poles and Fixtures	$3,921,023	$3,594,253
356	(6) Overhead Conductors and Devices	$895,562	$1,039,982
357	(7) Underground Conductors and Insulation	$0	$0
358	(8) Underground-to-Overhead Conversion Equipment	$0	$0
359	(9) ROW Clearing and Roads, Trails or Other Access	$1,451,000	$1,581,000
	TOTAL	**$11,067,585**	**$11,015,235**

FERC = Federal Energy Regulatory Commission

(C) CAPITAL AND INTANGIBLE COSTS ESTIMATE FOR GAS TRANSMISSION FACILITY ALTERNATIVES

This Application is for an electric transmission line therefore this section is not applicable.

(D) PUBLIC INTERACTION AND ECONOMIC IMPACT

This section of the Application provides information regarding public interaction and the economic impact for each of the route alternatives.

(1) Counties, Townships, Villages, and Cities within 1,000 feet

Both routes, including all areas within 1,000 feet of the centerlines, are located within Eagle Township, Brown County. Neither route is located within 1,000 feet of any villages or cities.

(2) Public Officials Contacted

AEP Ohio Transco contacted several local officials to discuss the Project. Appendix 6-1 provides a list of the local public officials, including their office addresses and office telephone numbers, who have been contacted to date or will be provided a digital or hard copy of the Application.

(3) Planned Public Interaction

AEP Ohio Transco mailed letters to residents, tenants, and elected officials, issued a public notice and a news release to the local media, created a Project website and hosted one public information open house. During the construction of this Project, AEP Ohio Transco will maintain Project updates on its website, retain ROW land agents that discuss Project timelines, construction and restoration activities, and convey this information to affected owners and tenants. Copies of informational materials available at the public open house are included in Appendix 6-2.

During any phase of this Project, the public may contact Erin Miller, Project Outreach Specialist, at 614-552-1929 or toll free 877-215-9261, or e-mail ecmiller1@aep.com to ask questions or provide comments. To access the Project's website, please visit http://www.aeptransmission.com/ohio/ and click the Project website link.

For copies of this Application, the public can do any of the following:

- Go to the local Library
- Go to http://opsb.ohio.gov/ and search for the Project's case number

On AEP Ohio Transco's website, there is information on how to contact AEP Ohio Transco to express comments or questions regarding the Project. The exact language is:

> To ask questions or submit comments about this Project please contact:
> Erin Miller, Project Outreach Specialist at 614-552-1929 or complete the email form below.

AEP Ohio Transco is logging comments and information provided through its public interaction program.

At least seven days prior to any construction activities, an AEP Ohio Transco ROW agent will notify the landowner or the tenant by mail, telephone, or in person, depending on landowner preference.

(4) Liability Insurance or Compensation

AEP's insurance program for construction and operation of the proposed facility is outlined below:

- AEP Ohio Transco maintains bodily injury and property damage liability insurance with limits of at least $1,000,000 for each occurrence.
- AEP Ohio Transco is a qualified self-insuring employer under the State of Ohio Worker's Compensation law. AEP maintains insurance as required by the Industrial Commission of Ohio statutes.

(5) Tax Revenues

The Preferred and Alternate Routes are located within Brown County. Local school districts, park districts, and fire departments will receive tax revenue from the Project. AEP Ohio Transco will pay property taxes on utility facilities in each jurisdiction. The approximate annual property taxes associated with the Preferred and Alternate Routes over the first year after the Project is completed are $391,000 and $388,530, respectively.

Based on the 2018 tax rates, the following information includes preliminary estimates for these taxing authorities:

Preferred Route:

Brown County	$54,030
Eagle Township	$36,910
Eastern LSD (Brown Co.)	$256,830
Southern Hills JVSD	$43,230
	TOTAL $391,000

Alternate Route:

Brown County	$53,700
Eagle Township	$36,680
Eastern LSD (Brown Co.)	$255,200
Southern Hills JVSD	$42,950
	TOTAL $388,530

Appendix 6-1
List of Public Official Points of Contact

APPENDIX 6-1

Sardinia Area Improvements Project
Public Officials Contacted and Officials to be Served
A Copy of Certified Application

Brown County Commissioners
Mr. Tony Applegate
Mr. Barry Woodruff
Mr. Daryll Gray
Administration Building
Suite #101
800 Mt. Orab Pike
Georgetown, Ohio 45121
(937) 378-3956

Brown County Engineer
Mr. Todd Cluxton
25 Veterans Blvd.
Georgetown, Ohio 45121
(937) 378-6456

Brown County Soil & Water Conservation District
706 South Main Street
Georgetown, Ohio 45121
(937) 378-4424

Eagle Township Trustee
Mr. Bob Burns
9436 Ketterman Road
Sardinia, Ohio 45171
(937) 446-2802

Eagle Township Trustee
Mr. Robert Hare
10626 Fincastle Winchester Road
Winchester, Ohio 45697
(513) 313-8806

Eagle Township Trustee
Mr. Joseph Purdy
12971 Five Points-Mowrystown Road
Sardinia, Ohio 45171
(937) 446-3318

Eagle Township Fiscal Officer
Ms. Donna Malblanc Young
10291 Malblanc Road
Winchester, Ohio 45697
(937) 695-0428

Village of Sardinia
Mayor Todd Bumbalough
151 Maple Avenue
Sardinia, Ohio 45171
(937) 446-3807

Appendix 6-2
Public Open House Informational Materials

SARDINIA
AREA IMPROVEMENTS

AEP OHIO
An AEP Company
BOUNDLESS ENERGY™

AEP Ohio plans to add an additional source of power to improve the reliability of the electric transmission grid in Brown County. The Sardinia Area Improvements include building about 5 miles of new 138-kilovolt (kV) transmission line, upgrading the Sardinia substation, and removing the 12-mile Seaman-Sardinia 69 kV transmission line The company anticipates filing an application with the Ohio Power Siting Board in spring 2018. Preliminary estimates show this is an approximate $19 million investment.

WHAT

AEP Ohio is seeking public input on the proposed study segments to help determine a route for the new line. The company will need to acquire easements for a 100-foot right-of-way corridor for safe construction, operation and maintenance of the transmission line.

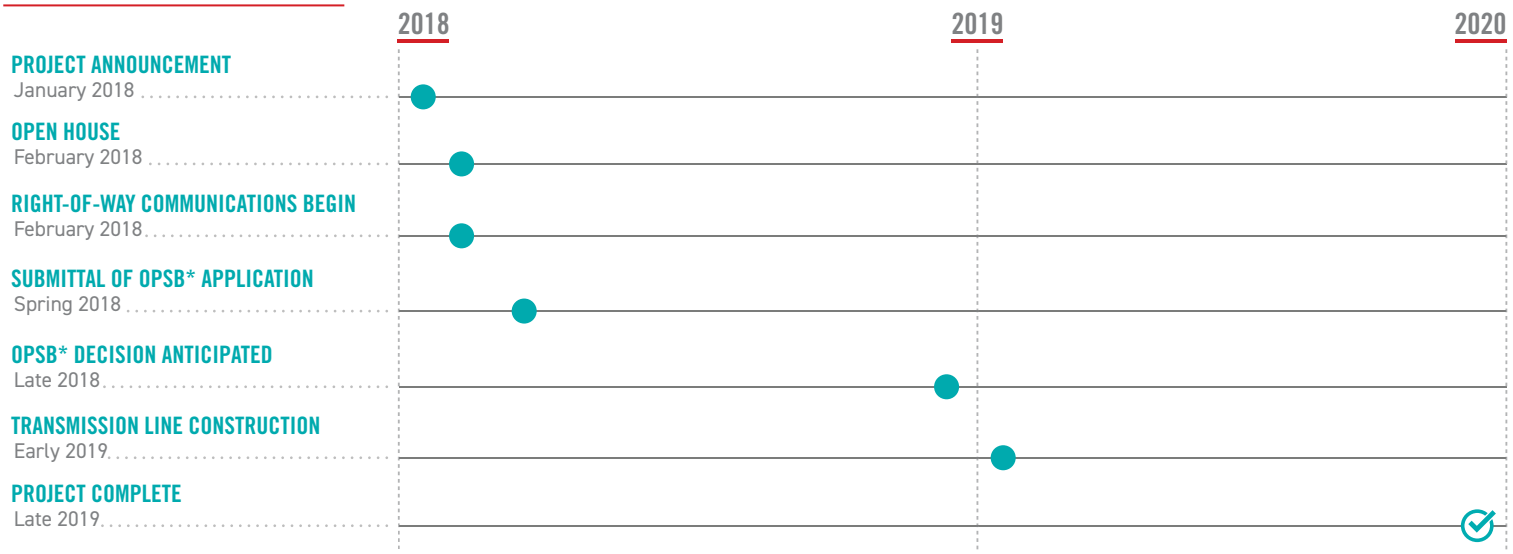
WHY

The project adds an additional power source to the area's electric transmission grid and updates the infrastructure to provide reliable electricity to customers. The existing transmission line has reached an age where it requires replacement. The modern facilities provide local customers with greater electric service reliability

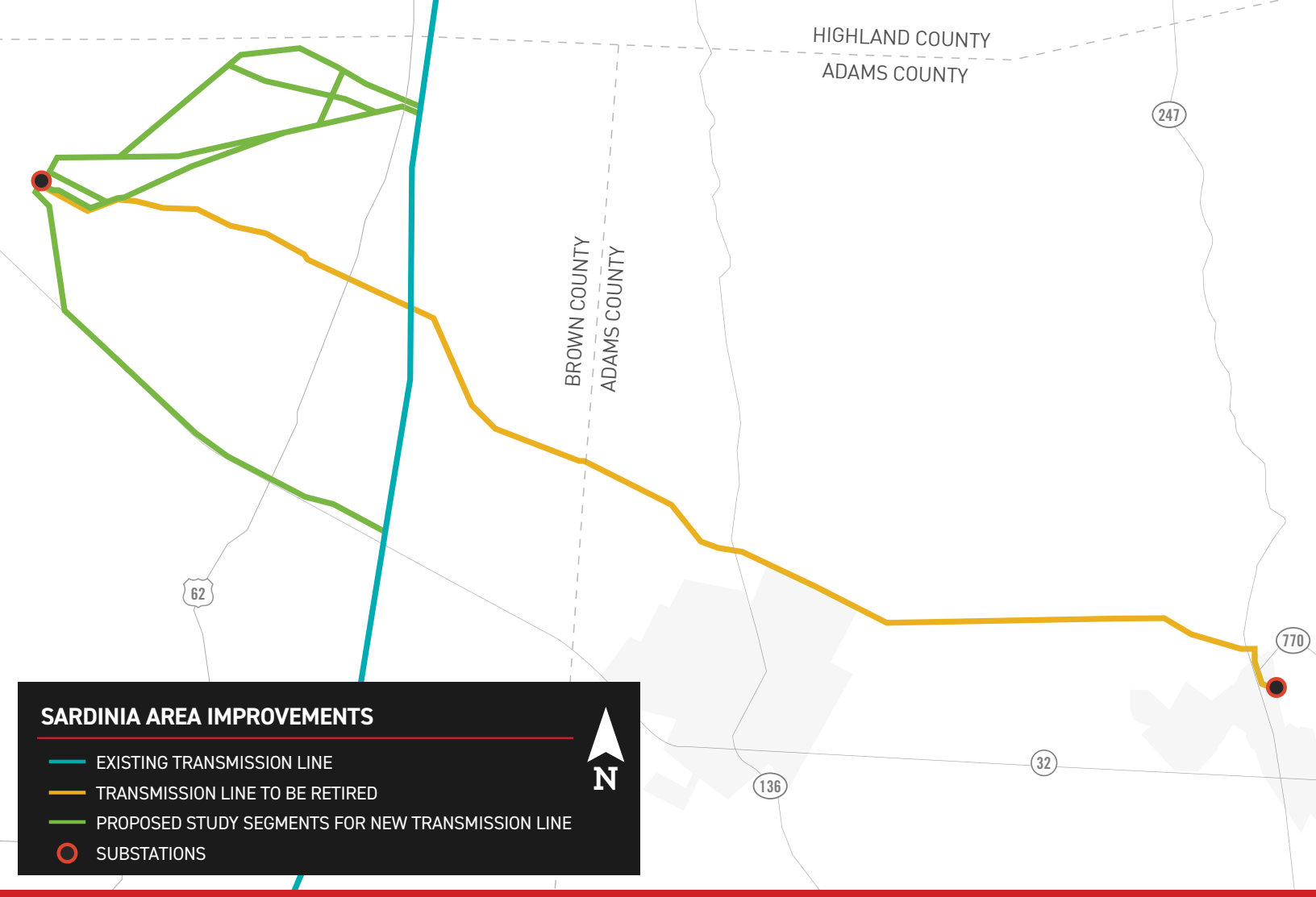
WHERE

The project area is located in Eagle Township in Brown County, east of Sardinia.

PROJECT SCHEDULE



*Timeline subject to change.
*OPSB (Idaho Power Sitting Board).



TYPICAL STRUCTURES

The project will use steel single pole structures that will be about 110-feet tall. The structures will be located in an approximate 100-foot wide right-of-way corridor.

Structure Height: Approximately 110 feet
Right-of-Way Width: Approximately 100 feet

*Exact structure, height and right-of-way requirements may vary

AEP OHIO VALUES YOUR INPUT ABOUT THIS PROJECT. PLEASE SEND COMMENTS AND QUESTIONS TO:

AEP Ohio
c/o Erin Miller
700 Morrison Road
Gahanna, OH 43230

ecmiller1@aep.com
(614) 552-1929 or (877) 215-9261
AEPOhio.com/Sardinia

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01/08/2018

1/11/2018

AEP OHIO TO HOLD COMMUNITY OPEN HOUSE TO DISCUSS PLANNED TRANSMISSION PROJECT TO IMPROVE ELECTRIC SERVICE RELIABLITY FOR CUSTOMERS IN BROWN COUNTY

GAHANNA, Ohio, January 11, 2018 – AEP Ohio and AEP Ohio Transmission Company Inc., are announcing an estimated $19 million investment in the electric transmission grid in Brown County with a new power line project. AEP Ohio plans to improve the reliability of the electric transmission grid by updating aging infrastructure to improve its condition and address performance issues with the Sardinia Area Improvements project.

The Sardinia Area Improvements involves building about 5 miles of 138-kilovolt (kV) transmission line, upgrading a substation, and removing about 12 miles of existing 69 kV transmission line to bring an additional source of power to improve service reliability for customers. The new line will be built with steel, single pole structures and will require easements for a 100-foot wide right-of-way corridor.

“An open house is a great opportunity to inform the public about our siting process, seek public input, and work collaboratively with landowners to make routing decisions,” said Kelly Bussler, senior customer services account representative.

To learn more about this project, the public is invited to attend an open house on February 1 at Sardinia Elementary School located at 7742 Tri County Highway in Sardinia. Doors open at 5:30 p.m. The event will run until 7:30 p.m. The informational workshop provides residents the opportunity to meet and talk with project representatives and view detailed maps. There is no formal presentation. Visitors may come and go at any time during the open house.

A regulatory application will be submitted to the Ohio Power Siting Board (OPSB) by spring of 2018. The OPSB is the state regulatory agency that reviews and approves plans to construct electrical facilities in Ohio. Once the application is approved, construction is anticipated to begin in early 2019 and be complete by early 2021.

Additional information about the project and a searchable map are available online at AEPOhio.com/Sardinia.

- - -

AEP Ohio is based in Gahanna, Ohio, and is a unit of American Electric Power. AEP Ohio provides electricity to nearly 1.5 million customers. News and information about AEP Ohio can be found at AEPOhio.com. American Electric Power is one of the largest electric utilities in the United States, delivering electricity and custom energy solutions to nearly 5.4 million customers in 11 states. AEP owns the nation’s largest electricity transmission system, a more than 40,000-mile network that includes more 765-kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP also operates 224,000 miles of distribution lines. AEP

ranks among the nation’s largest generators of electricity, owning approximately 26,000 megawatts of generating capacity in the U.S. AEP’s utility units operate as AEP Ohio, AEP Texas, Appalachian Power (in Virginia and West Virginia), AEP Appalachian Power (in Tennessee), Indiana Michigan Power, Kentucky Power, Public Service Company of Oklahoma, and Southwestern Electric Power Company (in Arkansas, Louisiana and east Texas). AEP’s headquarters are in Columbus, Ohio.

MEDIA CONTACT:
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4906-5-07 HEALTH AND SAFETY, LAND USE, AND REGIONAL DEVELOPMENT

(A) HEALTH AND SAFETY

(1) Compliance with Safety Regulations

The construction and operation of the Project will comply with the requirements specified in the North American Electric Reliability Corporation's mandatory Reliability Standards, the National Electrical Safety Code, the Public Utilities Commission of Ohio, and will meet all applicable safety standards established by the Occupational Health and Safety Administration (OSHA).

Safety is the highest priority for AEP Ohio Transco. Our priority towards employee and public safety is exemplified by AEP Ohio Transco's policy as stated in the Company Safety Manual:

> *The AEP Ohio Transco system holds in high regard the safety and health preservation of its employees. Accidents injure people, damage equipment, destroy materials, and cause needless personal suffering, inconvenience, and expense. We believe, "No operating condition or urgency of service can ever justify endangering the life of anyone."*
>
> *To this end, we will constantly work toward the following:*
>
> - *The maintenance of safe and healthful working conditions,*
> - *Consistent adherence to proper operating practices and procedures designed to prevent injuries and illnesses,*
> - *Conscientious observance of governmental and company safety regulations.*

AEP Ohio Transco also administers a contractor safety program. Contractors are required to maintain internal safety programs and to provide safety training.

(2) Electric and Magnetic Fields

In accordance with the OPSB requirements specified in O.A.C 4906-5-07(A)(2), the following subsections discuss the analysis of electric and magnetic fields (EMFs) associated with the Project.

(a) Calculated Electric and Magnetic Field Strength Levels

EMF calculations for winter normal conductor rating, emergency line loading and normal maximum loading are provided for the proposed double-circuit line configuration representative of the most common structure design planned for the Project. This configuration, representing the typical dead-end and tangent design, is shown in Figure 5-1A through 5-1C. EMF levels were computed within the ROW of the line configuration at the point of minimum ground clearance, where EMF is the highest. Lower EMF levels are expected beyond the ROW edge. Because the line configurations associated with the Preferred and Alternate Routes are identical, EMF levels produced by these configurations in any route selected for the Project would be the same.

Factors that affect EMF include the ROW width, operating voltage, current flow magnitude, phase configuration, conductor height above ground, electrical unbalance, and other nearby objects. Nominal voltages and balanced conditions are assumed, with line conductors arranged in a modified delta configuration depicted in Figures 5-1A through 5-1C. No trees, shrubs, buildings, or other objects that can block EMF are assumed in proximity to the proposed line.

All calculations were obtained at the height of 3.28 feet (1 meter) above ground using the Electric Power Research Institute (EPRI) EMF Workstation computer program. Three loading conditions were examined: (1) normal maximum loading, (2) emergency loading, and (3) winter normal conductor rating, consistent with the OPSB requirements. Normal maximum loading represents the peak flow expected with all system facilities in service; daily/hourly flows fluctuate below this level. Emergency loading is the maximum current flow during unusual (contingency) conditions, which exists only for short periods. Winter normal conductor rating represents the maximum current flow that a line, including its terminal equipment, can carry during winter conditions. It is not anticipated that either circuit of this line would operate at its winter normal rating in the foreseeable future.

Loading levels used in the EMF calculations, along with key line design data, are presented in Table 7-1. These levels are based on the 2019 projected system conditions.

TABLE 7-1
EMF Calculations for the Sardinia Area Improvements Project

Condition	Circuit Load (amperes)	Ground Clearance (feet)	Electric Field (kV/m)*	Magnetic field (mG)*
Seaman-Sardinia 138 kV				
(1) Normal Maximum Loading	360	30	0.08/2.07/0.08	9.96/28.50/9.96
(2) Emergency Line Loading	418	22.6	0.08/3.13/0.08	13.13/50.98/13.13
(3) Winter Normal Conductor Rating	1940	30	0.08/2.07/0.08	59.7/171.03/59.7

*EMF levels (left ROW edge/maximum/right ROW edge) computed one meter above ground at the point of minimum ground clearance, assuming balanced phase currents and 1.0 P.U. voltages. ROW width is 50 feet (left) and 50 feet (right) of centerline, respectively.
kV/m = kilovolt per meter; mG = milligauss

In accordance with O.A.C 4905-5-07 (2)(a), EMF strength values are provided for the monopole configuration for the Project. Additional pole and conductor configurations were not modeled because the four residences located within 100 feet of the Preferred Route centerline (and two residences located within the Alternate Route centerline) do not constitute more than 10 percent of the total line length or more than 1 mile of the total line length being certificated.

(b) Current State of EMF Knowledge

Electric and magnetic fields occur naturally in the environment. An electric field is present between the earth and its atmosphere, and can discharge as lightning during thunderstorms. The

earth also has a magnetic field, which provides an operating basis for the magnetic compass. EMF exists wherever there is a flow of electricity, including electrical appliances and power equipment.

Electric fields are produced by voltage or electric charge. A lamp cord that is plugged in produces an electric field even if the lamp is turned off. These fields commonly are measured in kilovolts per meter (kV/m); higher voltages produce stronger electric fields. Magnetic fields are created by the flow of current in a wire. As current increases, the magnetic field strength also increases; these fields are measured in units known as gauss, or milligauss (mG).

Electric fields are blocked by trees, shrubs, buildings, and other objects. Magnetic fields are not easily blocked; they can pass through most objects. The strength of these fields decreases rapidly with distance from the source.

Possible health effects from exposure to EMF have been studied for several decades. Initial research, focused on electric fields, found no evidence of biologic changes that could lead to adverse health effects. Subsequently, a large number of epidemiologic studies examined the possible role of magnetic fields in the development of cancer and other diseases in adults and children. While some studies have suggested an association between magnetic fields and certain types of cancer, researchers have been unable to replicate those results consistently in other studies. Similarly, inconclusive or inconsistent results have been reported in laboratory studies of animals exposed to magnetic fields that are representative of common human exposures. A summary of such exposures, found in residential settings, is provided in Table 7-2.

TABLE 7-2
Magnetic Fields from Household Electrical Appliances and Devices

Appliance Type	Number of Devices	Magnetic Field (mG)		
		1.2 inches (0.1 feet)	12 inches (1.0 feet)	User Distance
AC Adapters	3	1.4 – 863	0 -7.5	0 – 0.8
Blood Pressure Monitors	4	4.2 – 39.6	0 – 0.3	0 -0.2
Bluetooth Headsets	3	0	0	0
Coffee Grinders	3	60.9 – 779	0.3 – 6.5	0.8 – 40.9
Compact Fluorescent Bulbs	15	0 – 32.8	0 – 0.1	0 – 0.6
Compact Fluorescent Bulb Ballast	1	8.5 – 23.5	0 – 0.1	0 -0.1
Computers, Desktop	3	3.8 – 68.9	0 – 1.1	0.1 – 0.5
Computers, Laptop	4	0 – 5.1	0	0 – 0.1
Digital Cameras	3	0	0	0
Digital Photo Frames	5	0	0	0
Digital Video Recorders	4	0 – 29.6	0 – 0.2	0
Dimmer Switches	4	11.5 – 32.1	0 – 0.8	0 – 0.8

TABLE 7-2
Magnetic Fields from Household Electrical Appliances and Devices

Appliance Type	Number of Devices	Magnetic Field (mG)		
		1.2 inches (0.1 feet)	12 inches (1.0 feet)	User Distance
DVD Players	5	0 – 28.9	0 – 0.5	0
Electric Lawn Mower	1	1939	156	14.1
Electric Leaf Blowers	4	272 – 4642	17.1 - 155	28.3 – 61.5
Electric Toothbrushes	5	3.6 – 742	0 – 4.8	3.6 - 742
Electric Toothbrush Chargers	5	0 – 4.2	0	0
External Hard Drives	4	0.6 – 1.7	0	0
Gaming Consoles	10	0 – 215	0 – 0.5	0 – 0.6
GPS, Handheld	5	0 – 0.1	0	0
Hobby Tools	2	126 – 438	1.4 – 2.4	1.4 – 438
Hot Glue Guns	3	0 – 0.9	0	0
LCD Computer Monitors	4	0 – 4.5	0	0
LCD Televisions	4	1.1 – 3.9	0 – 2.5	0 – 0.6
Massagers/Massage Chairs	3	81.9 – 500	0.6 – 2.3	214 – 500
MP3 Players	5	0	0	0
Noise Cancellation Headphones	1	0	0	0
Paper Shredders	4	11.0 – 4841	0.5 – 102	0.5 – 33.4
Plasma Televisions	2	45.1 – 73.6	1.4 – 2.2	0 – 0.1
Power Tools – Corded	3	784 – 982	8.8 – 31.3	46.8 - 123
Power Tools – Cordless	6	9.0 – 227	0 – 2.2	0 – 13.7
Printers	5	0.1 – 6.2	0 – 0.3	0 – 0.3
Scanners	3	0.6 – 6.7	0 – 0.3	0
Security System Panels	3	0 – 0.3	0	0
Tankless Hot Water Heater	1	10.1 – 21.9	1.2	0.2
Track Lighting	5	0.2 – 4.0	0 – 0.3	0
Vacuum Cleaners, Personal/Car	3	75.5 – 2226	0.6 – 23.3	0.1 – 23.1
Wireless Game Controllers	11	0	0	0
Wireless Routers	4	0 – 0.5	0	0 – 0.3

Source: Electric Power Research Institute, 2010

As part of the National Energy Policy Act of 1992, U.S. Congress enacted the Electric and Magnetic Fields Research and Public Information Dissemination (EMF RAPID) program. The National Institute of Environmental Health Sciences (NIEHS) was charged with overseeing the health research and conducting an EMF risk evaluation. In its final report to Congress, issued in 1999, NIEHS concluded that power-frequency "EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard." Nonetheless, the report stated, "this finding is insufficient to warrant aggressive regulatory concern." (NIEHS, 1999)

In 2001, the Standing Committee on Epidemiology of International Commission on Non-Ionizing Radiation Protection (ICNIRP) wrote in its review of the epidemiologic literature on EMF and health:

"…given the methodological uncertainties and in many cases inconsistencies of the existing epidemiologic literature, there is no chronic disease outcome for which an etiological [causal] relation to EMF exposure can be regarded as established (ICNIRP, 2001)."

In addition, in 2001, International Agency for Research on Cancer (IARC) published the results of an EMF health risk evaluation conducted by an expert scientific working group, which concluded that power frequency "magnetic fields are 'possibly carcinogenic to humans,' based on consistent statistical associations of high level residential magnetic fields with a doubling of risk of childhood leukemia" (IARC, 2001). IARC assigns its "possibly carcinogenic to humans" classification (Group 2B) if there is "limited evidence" of carcinogenicity in both humans and experimental animals, or if there is "sufficient evidence" in animals, but "inadequate evidence" in humans. Group 2B includes some 285 "agents" such as coffee, pickled vegetables, carpentry, textile manufacturing, and gasoline, among others.

A comprehensive assessment of the EMF health risks was published by the World Health Organization (WHO) in 2007. In its assessment, WHO wrote: "Scientific evidence suggesting that everyday, chronic, low-intensity (above 0.3-0.4 □) [3-4 mG] power-frequency magnetic field exposure poses a possible health risk is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia" (WHO, 2007). It added, however:

> "…virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF [extremely low frequency] magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern (WHO, 2007)."

Regarding acute effects, WHO noted, "Acute biological effects have been established for exposure to ELF electric and magnetic fields in the frequency range up to 100 kHz [kilohertz] that may have adverse consequences on health. Therefore, exposure limits are needed. International guidelines exist that have addressed this issue. Compliance with these guidelines provides adequate protection for acute effects" (WHO, 2007).

In summary, some studies have reported an association between long-term magnetic field exposure and particular types of health effects, while other studies have not. The nature of the reported association remains uncertain as no known mechanism or laboratory animal data exist to support the cause-and-effect relationship.

In view of the scientific evidence, the Institute of Electrical and Electronics Engineers (IEEE) and other organizations have established guidelines limiting EMF exposure for workers in a controlled environment and for the public. These guidelines focus on prevention of acute neural stimulation. No limits have been established to address potential long-term EMF effects, as the guideline organizations consider the scientific evidence insufficient to form the basis for such action. For power-frequency EMF, IEEE Standard C95.6-2002 recommends the following limits as shown in Table 7-3 (IEEE, 2002).

TABLE 7-3
Recommended Power Frequency EMF Limits

	General Public	Controlled Environment
Electric Field Limit (kV/m)	5.0	20.0*
Magnetic Field Limit (mG)	9040	27,100

* 10.0 kV/m within power line ROW

To address public concerns about EMF, the Government of Canada in 2012 updated its website with the latest knowledge on the subject. It contains the following statements on the EMF health-related risks: “Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at ELFs. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors” (Healthy Canadians, 2012). Similarly, in 2013, the updated website of the WHO concludes: “to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health”.

AEP Ohio Transco has been following the EMF scientific developments worldwide, participating in and sponsoring EMF studies, and communicating with customers and employees on the subject. In addition, AEP Ohio Transco is a member of Electric Power Research Institute, an independent, non-profit organization sponsoring and coordinating EMF epidemiological, laboratory, and exposure studies.

(c) Line Design Considerations

Design alternatives were not considered because of EMF and their strength levels. Transmission lines, when energized, generate EMF. Laboratory studies have failed to establish a material correlation between exposure to EMF and effects on human health. However, some people are concerned that EMF has impacts on human health. Because of these concerns, EMF associated with the new circuits was calculated in Table 7-1. The EMF was computed assuming the highest possible EMF values that could exist along the proposed transmission line. Normal daily EMF levels

will operate below these maximum load conditions. Based on studies from the National Institutes of Health, the magnetic field (mG) associated with emergency loading at the highest EMF value for this transmission line, is lower than those associated with normal household appliances like microwaves, electric shavers, and hair dryers. For additional information regarding EMF, the National Institute of Health has posted information on their website:

https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf

(d) EMF Public Inquiries Policy

Information on electric and magnetic fields is available on AEP Ohio's website (https://www.aepohio.com/info/projects/emf/); it describes the basics of EMF theory, scientific research activities, and EMF exposures encountered in everyday life. Similar material will be made available for those affected by the construction activities in this Project.

AEP Ohio Transco occasionally receives requests from customers for EMF measurements on their properties. These measurements are provided free of charge to the customers.

(3) Estimate of Radio, Television, and Communications Interference

Radio interference can be experienced in the AM broadcast band (535-1605 kHz) and FM band (88-108 megahertz [MHz]), caused by transmission line gap-type discharge (1-1000 MHz). Dielectric discharge due to air ionization, known as corona, is not a concern with 138-kV transmission planned in this Project. Gap-type discharge, such as that emitted by loose or defective transmission hardware, typically is localized and can be readily detected and corrected, or additional mitigation measures can be applied to eliminate the interference source.

Today's digital television signals react differently to interference than the pre-2009 analog signals. Common problems with analog television included ghosting of images, noise from weak signals, and other problems, which degraded the quality of the image and sound, although the programming was still watchable. With digital TV, reception of the signal must be very nearly complete. Otherwise, audio and video are not usable. Television signals, which are transmitted at frequencies above 50 MHz, can be affected by gap discharges if received from air broadcasts (by "rabbit ears"). These problems have largely been addressed with the use of cable television.

(4) Noise from Construction, Operations, and Maintenance

(a) Blasting Activities

Dynamiting and blasting activities will not be necessary during construction of the Project.

(b) Operation of Earth Moving and Excavating Equipment

During the construction phase of the transmission line installation, a temporary increase in noise will result from the construction equipment used to clear portions of the transmission line ROW and install the equipment. Standard construction techniques will be used, and procedures will

comply with applicable OSHA standards. Therefore, the noise impact on nearby sensitive areas is anticipated to be minimal. The total duration of construction of the proposed Project is estimated to be approximately 19-20 months.

(c) Driving of Piles, Rock Breaking or Hammering, and Horizontal Directional Drilling

Driving of piles is not anticipated during construction of the Project. If required, there will be a temporary increase in noise during construction only.

(d) Erection of Structures

Pole structures will be installed by vehicle-mounted cranes or equivalent equipment. Self-supporting steel poles will require delivery of concrete for foundation construction, including excavation work for the foundation. There will be a temporary increase in noise during construction only.

(e) Truck Traffic

An increase in truck traffic is anticipated during the construction of the Project for equipment access and equipment delivery. No other additional traffic is anticipated for the Project beyond periodic mowing or removal of dangerous trees from the ROW.

(f) Installation of Equipment

The equipment will be installed using standard practices and equipment. There will be a temporary increase in noise during construction only.

(B) LAND USE

(1) Map of the Site and Route Alternatives

An applicant for a Certificate of Environmental Compatibility and Public Need for electric transmission facilities is required to evaluate both the Preferred and Alternate Routes for the transmission line within the Application. Maps at 1:24,000-scale, including the area 1,000 feet on either side of the centerline, are presented as Figures 7-1A and 7-1B (refer to Section 4906-5-05) and include the following information:

- Centerline and ROW for the Preferred and Alternate Routes
- Proposed substation locations
- Land use types, road names, structures, and incorporated areas and population centers

(2) Impact on Identified Land Uses

Land use in the Project area is primarily influenced by topography. The Project area has flat to gently rolling topography with agricultural development, forested and riparian areas near headwater streams, wetland areas, and light residential development. Residences are concentrated along State Highway 32 and the various county roads in the Project area.

Comparisons of the various land use types and land use features for both routes are included in Tables 7-4 through 7-6 for the Preferred and Alternate Routes. The estimates of each land use

type being crossed by the transmission line, land use within the 100-foot-wide construction ROW, and the permanent ROW (linear feet, acreage, and percentages) were determined using geographic information system (GIS) software calculations. The potential disturbance area during construction activities (vegetation clearing, pole installations, etc.) consists of the 100-foot-wide construction ROW and access roads. The 100-foot-wide permanent ROW will be restored through soil grading, seeding, and mulching, thus the permanent impact to the ROW is primarily limited to the removal of existing trees and other vegetation. Property owners may continue to utilize most of the ROW area for general uses that will not affect the safe and reliable operation of the transmission line, such as lawn maintenance.

TABLE 7-4
Length and Percent of Land Uses Crossed by Route Alternatives

Land Use	Preferred Route*		Alternate Route*	
	Linear Feet	Percent	Linear Feet	Percent
Agriculture / Agricultural District Land	8,525	43.7%	4,172	17.7%
Commercial / Industrial	0	0.0%	0	0.0%
Institutional	0	0.0%	0	0.0%
Developed	5,260	27.0%	11,063	46.8%
Herbaceous (Old Field)	0	0.0%	631	2.7%
Recreational	0	0.0%	0	0.0%
Residential	4,069	20.8%	3,969	16.8%
Road Right-of-Way	141	0.7%	143	0.6%
Utility Right-of-Way	104	0.5%	50	0.2%
Woodlot	1,266	6.5%	1,707	7.2%
Delineated Wetland	133	0.7%	1,647	7.0%
Delineated Stream	15	0.1%	33	0.1%
Delineated Pond	0	0.0%	0	0.0%
Open Water	0	0.0%	212	0.9%
Total	**19,513**	**100.0%**	**23,627**	**100.0%**

* Numbers in the table are for the route centerlines.

TABLE 7-5
Acreage and Percent of Land Uses Crossed by Route Alternatives

Land Use	Preferred Route*		Alternate Route*	
	Acreage	Percent	Acreage	Percent
Agriculture / Agricultural District Land	19.66	43.8%	10.22	18.8%
Commercial / Industrial	0	0.0%	0.07	0.1%
Institutional	0.04	0.1%	0.00	0.0%
Developed	7.81	17.4%	22.55	41.4%
Herbaceous (Old Field)	0	0.0%	1.80	3.3%
Recreational	0	0.0%	0.00	0.0%
Residential	8.49	18.9%	9.44	17.4%
Road Right-of-Way	3.16	7.0%	1.39	2.6%
Utility Right-of-Way	1.53	3.4%	0.11	0.2%
Woodlot	3.88	8.7%	4.75	8.7%
Delineated Wetland	0.26	0.6%	3.40	6.3%
Delineated Stream	0.04	0.1%	0.08	0.1%
Delineated Pond	0	0.0%	0.04	0.1%
Open Water	0	0.0%	0.55	1.0%
Total	**44.9**	**100%**	**54.4**	**100%**

*Numbers in the table are for the planned potential disturbance area which is a nominal 100-foot-wide corridor centered on the route.

TABLE 7-6
Number of Sensitive Features Within or Near the Potential Disturbance Area for the Route Alternatives

	Route Alternatives	
	Preferred	**Alternate**
Length (in miles)	3.7	4.5
Features within the Potential Disturbance Area of Route Alternatives*		
Historic Structures (OHI)	0	0
National Register of Historic Places	0	0
Previously Identified Archaeological Sites	0	0
Residences	0	0
Commercial Buildings	0	0
Industrial Buildings	0	0
Schools and Hospitals	0	0
Churches and Civic Buildings	0	0
Recreational Lands	0	0
Airports	0	0
Features within 1,000 feet of Route Alternatives (centerline)		
Historic Structures (OHI)	0	2
National Register of Historic Places	0	0
Previously Identified Archaeological Sites	0	3
Residences	40	78
Commercial Buildings	0	10
Industrial Buildings	0	3
Schools and Hospitals	0	0
Churches and Civic Buildings	1	1
Recreational Land	0	0
Airports	0	0

* The planned potential disturbance area is a nominal 100-foot-wide corridor centered on the route.
OHI = Ohio Historic Inventory

(a) Residential

Preferred Route: The Preferred Route is located within 1,000 feet of 40 residences, none of which are within the planned potential disturbance area. As shown in Table 7-5, residential land makes up 18.9 percent of the Preferred Route ROW (100 feet wide).

Alternate Route: The Alternate Route is located within 1,000 feet of 78 residences, none of which are within the planned potential disturbance area. As shown in Table 7-5, residential land makes up 17.4 percent of the Alternate Route ROW (100 feet wide).

(b) Commercial

Preferred Route: No commercial buildings are located within the planned potential disturbance area or within 1,000 feet of the Preferred Route. As shown in Table 7-5, commercial/industrial land makes up 0.0 percent of the Preferred Route ROW (100 feet wide).

Alternate Route: The Alternate Route is located within 1,000 feet of 10 commercial buildings, none of which are within the planned potential disturbance area. As shown in Table 7-5, commercial/industrial land makes up 0.1 percent of the Alternate Route ROW (100 feet wide).

(c) Industrial

Preferred Route: No industrial buildings are located within the planned potential disturbance area or within 1,000 feet of the Preferred Route. As shown in Table 7-5, commercial/industrial land makes up 0.0 percent of the Preferred Route ROW (100 feet wide).

Alternate Route: The Alternate Route is located within 1,000 feet of three industrial building, none of which are within the planned potential disturbance area. As shown in Table 7-5, commercial/industrial land makes up 0.1 percent of the Alternate Route ROW (100 feet wide).

(d) School and Hospitals

No schools or hospitals are located within the planned potential disturbance area or within 1,000 feet of the Preferred and Alternate Route. As shown in Table 7-5, institutional land makes up 0.1 percent of the Preferred Route ROW (100 feet wide) and 0.0 percent of the Alternate Route ROW (100 feet wide).

(e) Churches and Civic Buildings

Preferred Route: The Preferred Route is located within 1,000 feet of one church, Katterman Church, which is not within the planned potential disturbance area. As shown in Table 7-5, institutional land makes up 0.1 percent of the Preferred Route ROW (100 feet wide).

Alternate Route: The Alternate Route is located within 1,000 feet of one church, Katterman Church, which is not within the planned potential disturbance area. As shown in Table 7-5, institutional land makes up 0.0 percent of the Alternate Route ROW (100 feet wide).

(f) Recreational

No recreational land is located within the planned potential disturbance area or within 1,000 feet of the Preferred and Alternate Route. As shown in Table 7-5, recreational land makes up 0.0 percent of the Preferred Route ROW (100 feet wide) and Alternate Route ROW (100 feet wide).

(g) Agricultural

As shown in Table 7-4, approximately 43.7 percent (8,525 feet) of the Preferred Route and 17.7 percent (4,172 feet) of the Alternate Route cross agricultural land. A discussion of agricultural land and Agricultural District Land is provided in section (C) below.

(3) Impact on Identified Nearby Structures

(a) Structures within 200 Feet of Proposed Right-of-Way

There are 16 residences within 200 feet of the Preferred Route ROW; these residences range from 30 to 195 feet from the edge of ROW. There are eight residences within 200 feet of the Alternate Route ROW; these residences range from 37 to 198 feet from the edge of ROW. There is one church within 200 feet of the Preferred Route and Alternate Route ROW; this church is 72 feet and 86 feet away, respectively. There are 20 and 19 other structures (i.e., garage, barn) within 200 feet of the Preferred Route and Alternate Route ROW, respectively. There are no commercial, industrial, or recreational structures within 200 feet of the proposed ROW for either route.

(b) Destroyed, Acquired, or Removed Buildings

The potential removal of structures within the proposed ROW was mitigated during the Siting Study through the placement of routes away from buildings. It is unlikely that construction of the Preferred or Alternate Routes will require the removal of any residential or commercial buildings.

(c) Mitigation Procedures

Mitigation for the prohibition of the future installation of structures within the ROW, and vegetative clearing and maintenance activities for the transmission line, will be determined as part of AEP Ohio Transco's acquisition of the ROW for this Project, as part of the negotiated settlement between AEP Ohio Transco and the property owner, or as determined in appropriation proceedings. If an existing septic system located in the transmission ROW is impacted by construction, operation, or maintenance of the proposed Project, the septic system will be repaired or replaced by AEP Ohio Transco as necessary to meet the appropriate installation requirements.

(C) AGRICULTURAL LAND IMPACTS

The potential impacts of the Project on agricultural land use include potential damage to crops that may be present, disturbance of underground field drainage systems, compaction of soils and potential for temporary reduction of crop productivity. Agricultural land used for crop cultivation within the Preferred and Alternate Route ROWs is estimated at 19.66 acres and 10.22 acres, respectively. Other herbaceous land that could be used for grazing comprises 0.00 acre of the Preferred Route and 1.80 acres of the Alternate Route.

Soil compaction resulting from construction activities is typically a temporary issue and is resolved within a few seasons of plowing and tilling. AEP Ohio Transco will work with the agricultural landowners to resolve conflicts with drainage tiles and irrigation systems that are affected by the Project where necessary.

(1) Agricultural Land Map

The various categories of agricultural land use and Agricultural District lands are depicted on Figures 7-2A and 7-2B for both the Preferred and Alternate Routes.

(2) Impacts to Agricultural Lands and Agricultural Districts

The Brown County Auditor's Office was contacted to obtain information on current Agricultural District lands records. The centerline and ROW of the Preferred Route does not cross any Agricultural District parcels. One Agricultural District parcel is located within 1,000 feet of the Preferred Route. The centerline and ROW of the Alternate Route crosses one Agricultural District parcel. The parcel crossed is located near the Sardinia Substation, between Five Points Mowrystown Road and Kratz Road. No additional Agricultural District parcels are located within 1,000 feet of the Alternate Route. The data was received from the Brown County Auditor's Office on March 15, 2018. The provided data fulfills the requirement of O.A.C. 4906-5-07 (C)(1)(b), which states this data must be collected not more than 60 days prior to submittal.

(a) Acreage Impacted

Table 7-5 provides the quantification of the acreage impacted for agricultural land use (crop cultivation, Agricultural District lands, and herbaceous land). The agricultural land use was based on aerial imagery and field observations.

(b) Evaluation of Construction, Operation, and Maintenance Impacts

The following subsections include an evaluation of the impact of the construction, operation, and maintenance of the proposed transmission line and the following agricultural facilities and practices within the Project area, where present.

(i) Field Operations

Field operations such as plowing, planting, cultivating, spraying, and harvesting of cultivated crops will only be interrupted for a portion of the growing season or a portion of the dormant season for agricultural operations. Property owners will be compensated for crop damages resulting from AEP Ohio Transco's construction activities. No significant impacts to livestock operations or grazing areas are anticipated. Property owners may continue to utilize most of the ROW area for general uses after construction, contingent upon the use having no adverse impact on the safe and reliable operation of the transmission line such as lawn maintenance, crop cultivation, and livestock.

(ii) Irrigation

There are no known irrigation systems within the proposed ROW for the either route. AEP Ohio Transco will identify the presence of any such systems through contact with landowners once the final route is approved. Any system that must be relocated will be coordinated with the landowner to avoid affecting the irrigation system's operation and avoid any cost incurred by the landowner.

(iii) Field Drainage Systems

Damage to field tile systems is unlikely given the installation of mostly direct-embed steel poles and a relatively short construction duration, but AEP Ohio Transco will restore damaged systems to their pre-construction condition. AEP Ohio Transco will also work with the agricultural landowners to resolve conflicts with field drainage systems and other facilities that are crossed by the Project, where necessary.

(iv) Structures Used for Agricultural Operations

There are no structures within 200 feet of the ROW that will be adversely affected by the construction and operation of the transmission line.

(v) Agricultural Land Viability for Agricultural Districts

The Preferred Route ROW does not cross any Agricultural District parcels and the Alternate Route ROW crosses one Agricultural District parcel. At the time of survey, this land was being used for agricultural purposes. Steel, single-pole structures will be placed on edge of the parcel along Kratz Road. Due to the limited amount of disturbance at this location, no significant impacts on the viability of the Agricultural District lands is anticipated.

(c) Mitigation Procedures

Mitigation for damage to existing crops and the compaction of soils is provided as compensation to the property owner as specified in the easement for the ROW. The specific terms of the easement regarding crop damage or soil compaction are determined as part of AEP Ohio Transco's acquisition of the ROW for the Project, as part of the negotiated settlement between AEP Ohio Transco and the property owner, or as determined in appropriation proceedings. Additionally, AEP Ohio Transco and the contractors hired to work on the Project have extensive experience in transmission line construction. Both AEP Ohio Transco and the selected contractors will work to minimize agricultural impacts during construction of the Project.

(i) Avoidance or Minimization of Damage

To minimize damage to agricultural land, AEP Ohio Transco will place structures beyond or at the edges of agricultural fields and will primarily install single tangent poles to support the transmission line. This mitigation effort should limit disruption of plow patterns and minimize the creation of areas where weeds and other non-crops can grow in relation to construction of the transmission line. In instances where there is damage in the ROW, compensation for this limited impact will be provided to the property owner.

(ii) Field Tile System Damage Repairs

Concerns over interference with irrigation systems will be addressed on a case-by-case basis with the individual property owner. In general, AEP Ohio Transco will provide mitigation for damage to underground drainage systems from construction, operation, and maintenance activities by repairing or replacing damaged sections of the drainage systems as necessary.

(iii) Segregation and Restoration of Topsoil

Excavated topsoil will be segregated and stockpiled where necessary to maintain long-term agricultural uses. Top soil will also be de-compacted and restored to original conditions, unless otherwise agreed to by the landowner.

(D) LAND USE PLANS AND REGIONAL DEVELOPMENT

This section of the Application provides information regarding land use plans and regional development.

(1) Impacts to Regional Development

This Project is expected to support regional development in Brown County through increased reliability and availability of electric power to residential, commercial, institutional, and industrial users throughout the region. No negative impacts on regional development are foreseen for this Project. A more detailed discussion of the need for this Project and how it will affect regional development is included in Section 4906-5-03 of this Application.

(2) Compatibility of Proposed Facility with Current Regional Land Use Plans

The Brown County Planning Department, which serves Brown County, was contacted for information regarding regional land use plans (Berry, 2018, personal communication). AEP Ohio Transco's consultant was informed that there is no regional land use development plan for Brown County.

(E) CULTURAL AND ARCHAEOLOGICAL RESOURCES

Cultural resource studies of the Project area were conducted on behalf of AEP Ohio Transco. To date, these studies have included a background records check and literature review using data files from the State Historic Preservation Office (SHPO) for the Preferred and Alternate Routes, and an architectural/historic resources survey and archaeological investigation of the entirety of the Preferred Route. A summary of this effort for the Preferred Route will be filed as a confidential filing with the Board because of the sensitive nature of the location information for archaeological sites.

(1) Cultural Resources Map

Based on the cultural resources desktop study, there are no scenic rivers or scenic routes/byways (as defined by the Ohio Department of Natural Resources [ODNR] and/or the Ohio Department of Transportation [ODOT]) or registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within 1,000 feet of the proposed routes.

Although no significant registered or listed cultural resources, there are three archaeological sites and two architectural resources within 1,000 feet of the Alternate Route. There is also one cemetery located within 1,000 feet of both the Preferred and Alternate Routes. Cultural resources already in the public domain (churches, cemeteries, and OHI structures) are identified on Figures 7-1A and 7-1B.

(2) Cultural Resources in Study Corridor

Cultural resources studies to date have involved background research utilizing data files from the Ohio Historic Preservation Office (OHPO) online mapping system for both the Preferred and Alternate Routes. In addition, a Phase I archaeological reconnaissance survey and an architectural history investigation were conducted for the Preferred Route.

For the background research, a 1,000 feet buffer was used to identify previously known cultural resources and to provide information on the probability of identifying cultural resources within the potential disturbance area. The OHPO online mapping database included a review of the Ohio Archaeological Inventory, the OHI, Determination of Eligibility files, the National Register of Historic Places (NRHP), historic cemeteries, historic bridges, national historic landmarks, and previous cultural resources surveys.

There were no previously recorded cultural resources identified within the potential disturbance area of either the Preferred Route or the Alternate Route from the desktop review. A field investigation of the potential disturbance area of the Preferred Route was conducted. To date, the Phase I archaeological reconnaissance resulted in the identification of three prehistoric sites, none of which are recommended eligible for the NRHP; they are not landmarks or considered significant.

Additionally, the architectural and historical resources survey resulted in the identification of 18 architectural and historical resources, within what was considered as the Area of Potential Effect. One resource (BRO0060606) was considered to be significant, eligible for the NRHP under Criterion C. However, the Project is not considered to have an adverse effect on this resource. No further history/architectural work was considered to be necessary.

(3) Construction, Operation, and Maintenance Impacts on Cultural Resources

Based on the results of the cultural resources desktop review, architectural and historical resources survey, and Phase I archaeological survey conducted to date, impacts to known and significant cultural resources associated with the construction, operation, and maintenance of the proposed Project are not anticipated.

(4) Mitigation Procedures

Based on the results of the desktop review, architectural and historical resources survey, and Phase I archaeological survey conducted to date, no impacts to known and recorded historic properties are anticipated because of the Project; therefore, no mitigation is proposed at this time.

(5) Aesthetic Impact

(a) Visibility of the Proposed Facility

The viewsheds along both the Preferred and Alternate Routes from residences and potentially sensitive vantage points may be altered by the presence of the transmission line. The Project area

consists of flat to gently rolling topography. Many roads in the area are paralleled by wood poles supporting electric transmission lines and/or distribution lines. The addition of the proposed Project will have not have a significant impact on the overall visual landscape. At select locations where tree clearing is required, visual impacts will be greater.

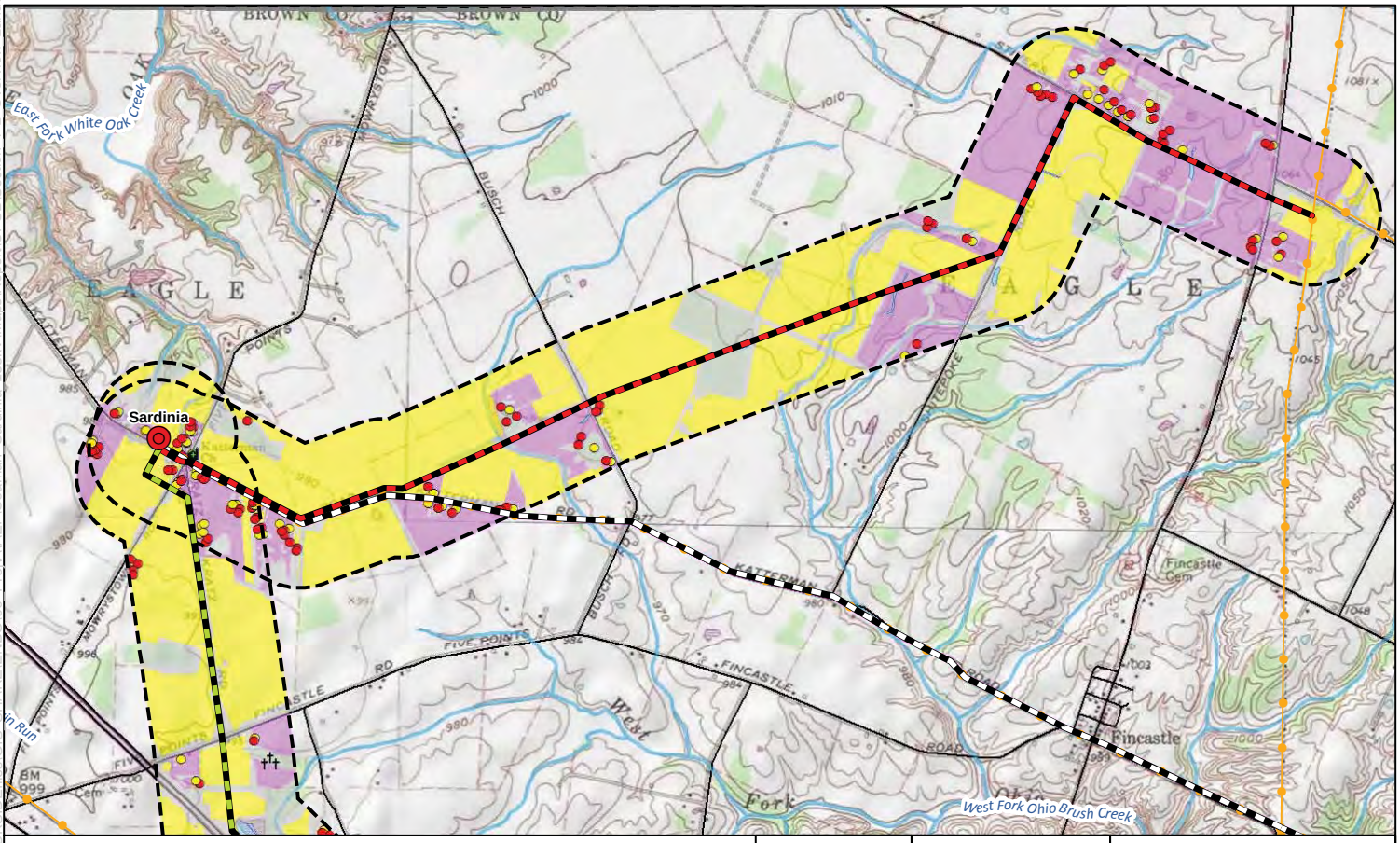
(b) Facility Effect on Site and Surrounding Area

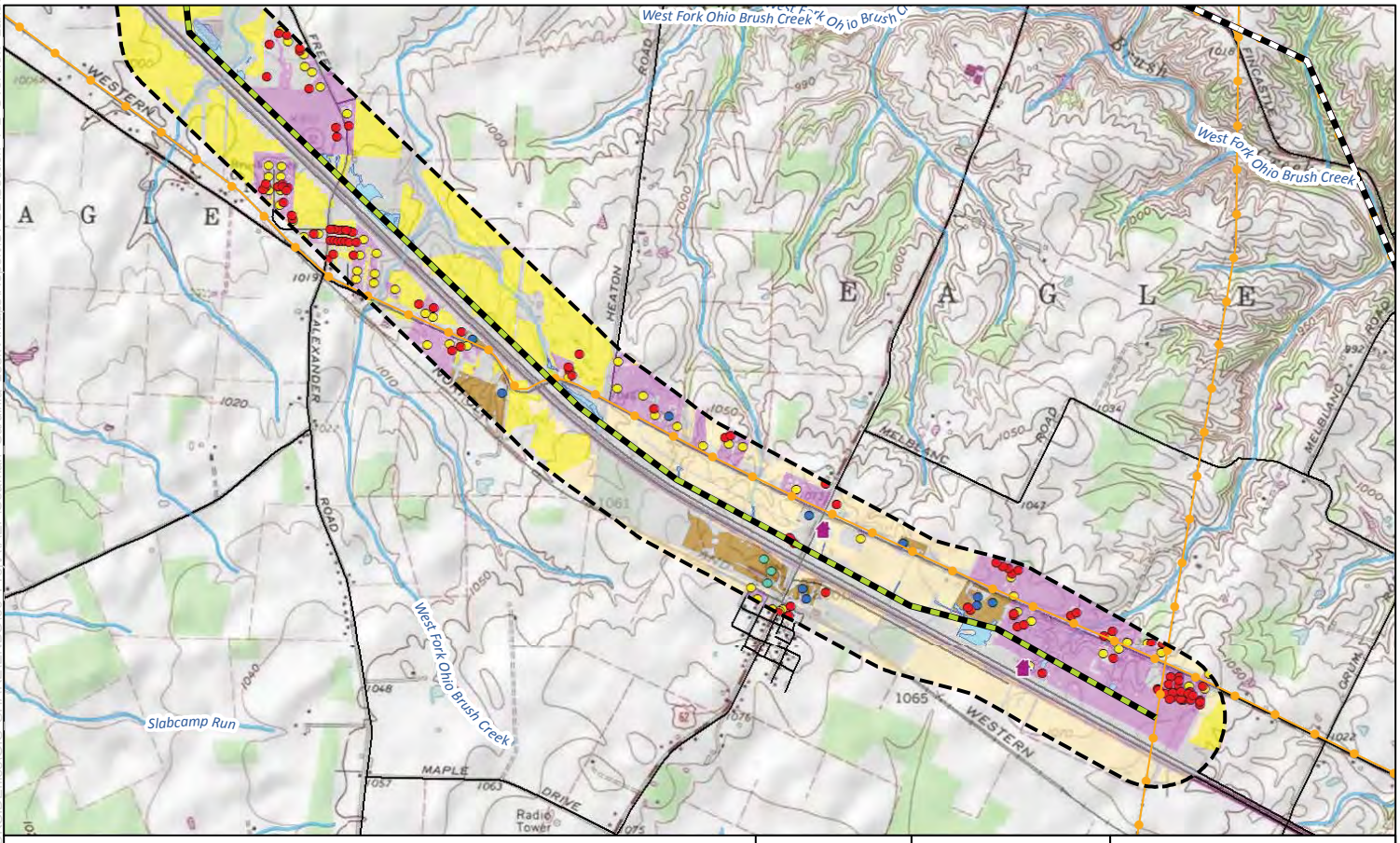
Construction of the proposed transmission line would affect the existing visual aesthetics of the area through which the transmission line passes primarily from the removal of trees from the ROW of the transmission line and the introduction of a new man-made element in the landscape. The degree of visual impact of a new man-made element will vary with the setting; the impact can be evaluated by comparing the amount of contrast resulting from the construction of the new element and the existing landscape. For example, if the transmission line were screened from view, then the aesthetic impact would be minimal, and if the transmission line were placed in an existing open area, it would have a comparatively higher aesthetic impact. In areas where the transmission line follows or replaces similar facilities, the aesthetic impact would be reduced, because it would create an incremental visual change in the existing visual setting.

(c) Visual Impact Minimization

The ability to minimize the visual impacts of the proposed transmission line is constrained by engineering requirements and existing land use. AEP Ohio Transco has limited the potential aesthetic impacts of the transmission line to the extent possible through the route selection process, and where practical, paralleling or overbuilding existing transmission and existing linear infrastructure.

Figures





Substation
Preferred Route
Alternate Route
Seaman-Sardinia 69kV (To be Retired)
1,000-Foot Buffer
Church
Cemetery

OHI Structure
Other Existing Electric Transmission Line

Water Resources
Herbaceuous
Shrub/Scrub
Woodlot
Stream (NHD)

Streets
County

Structure
School
Church
Commercial
Industrial
Other
Residential

Land Use
Agriculture
Developed
Industrial and Commerical
Institutional
Residential
Utility ROW

BASE MAP SOURCE:
USGS 7.5-minute Topographic Quadrangles: Sardinia, Sugar Tree Ridge, Ash Ridge, Winchester

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:24,000

April 20, 2018

LOCATOR MAP

FIGURE 7-1B
LAND USE MAP

Sardinia Area Improvements Project
Brown County, OH

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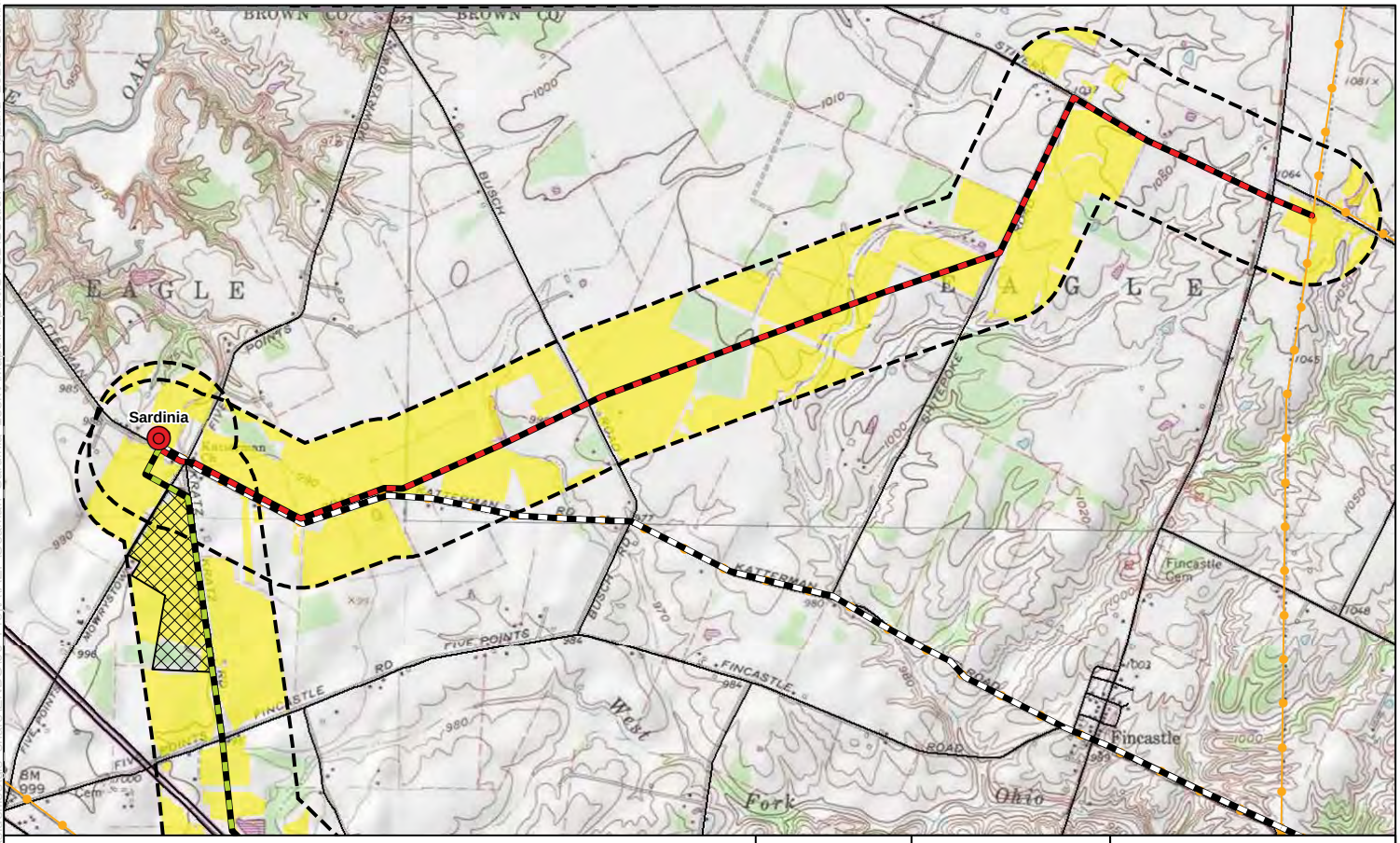
Miles



Substation
Preferred Route
Alternate Route
Seaman-Sardinia 69kV (To be Retired)
1,000-Foot Buffer
Other Existing Electric Transmission Line
Streets
County
Agriculture
Agricultural District Landwithin 1,000ft

BASE MAP SOURCE: USGS 7.5-minute Topographic Quadrangles: Sardinia, Sugar Tree Ridge, Ash Ridge, Winchester

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:24,000

April 20, 2018

LOCATOR MAP

Brown County

FIGURE 7-2A
AGRICULTURAL LAND USE MAP

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

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Miles

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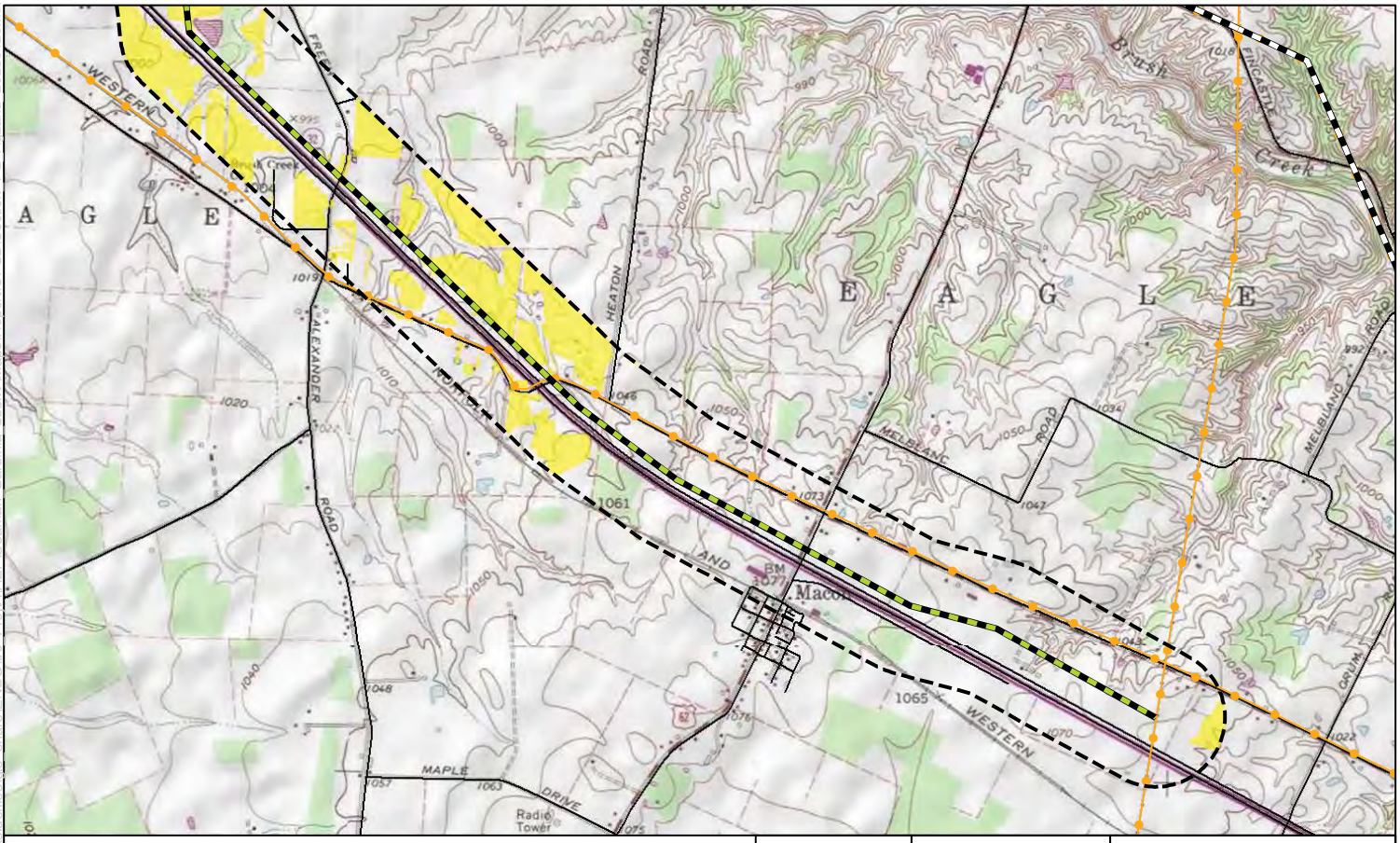

Substation
Preferred Route
Alternate Route
Seaman-Sardinia 69kV (To be Retired)
1,000-Foot Buffer
Other Existing Electric Transmission Line
Streets
County
Agriculture
Agricultural District Landwithin 1,000ft

BASE MAP SOURCE:
USGS 7.5-minute Topographic Quadrangles: Sardinia, Sugar Tree Ridge, Ash Ridge, Winchester

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:24,000

April 20, 2018

LOCATOR MAP

Brown County

FIGURE 7-2B
AGRICULTURAL LAND USE MAP

Sardinia Area Improvements Project
Brown County, OH

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4906-5-08 ECOLOGICAL INFORMATION AND COMPLIANCE WITH PERMITTING REQUIREMENTS

In March 2018, AEP Ohio Transco conducted a study to assess the potential effects of construction and operation of the proposed Project on the ecology of the Project area. A map and literature search was conducted for a 1,000-foot corridor on either side of the centerline of both the Preferred and Alternate Routes. A field survey of ecological habitat and features was performed within 200 feet on either side of the centerline for both the Preferred and Alternate Routes (hereafter referred to as the Field Survey Area), except for along State Highway 32 on the Alternate Route. The Field Survey Area in this specific area was reduced to 250 feet (200 feet north of centerline, 50 feet south of centerline) as the remainder of the study area is maintained grass areas (mowed) as part of the ROW for State Highway 32. Field surveys were conducted from March 7 – 29, 2018. Information in the following paragraphs addresses AEP Ohio Transco's ecological study conducted for both the Preferred and Alternate Routes.

(A) ECOLOGICAL MAP

Maps at a scale of 1:6,000 (1 inch = 800 feet) including the corridor 1,000 feet either side of the centerline (referred to as the 2,000-foot corridor) of the Preferred and Alternate Routes are presented as Figures 7-1A and 7-1B. These maps depict the transmission line alignments, substation locations, and land use classifications, including vegetative cover. Features within 1,000 feet of the proposed routes were identified from published data and, where accessible, verified by the field ecological survey.

An ecological overview map is provided as Figure 8-1. More detailed maps at 1:6,000 scale depicting field-delineated waterbody and wetland features, lakes, ponds, reservoirs, slopes of 12 percent or greater, wildlife areas, nature preserves, and conservation areas within the 2,000-foot corridor are provided as Figures 8-2A through 8-2F (Preferred Route) and Figures 8-3A through 8-3H (Alternate Route).

(B) FIELD SURVEY REPORT FOR VEGETATION AND SURFACE WATERS

The ecological survey of both the Preferred and Alternate Routes were conducted in March 2018 by AEP Ohio Transco's consultant, CH2M HILL Engineers, Inc. (now part of Jacobs Engineering Group) (referred to hereafter as CH2M). The field survey was preceded by review of published mapping, aerial photography, protected federal and state-listed species, and ecological information for at least 1,000 feet on either side of the Preferred and Alternate Route centerlines. Map sources included USGS 7.5-minute quadrangle topographic maps, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, and U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey maps.

Published information regarding existing flora and fauna was requested from the ODNR - Division of Wildlife (DOW) Ohio Natural Heritage Program. This request included available GIS shapefiles of location records of state-listed species within 1 mile of the Project. The information provided by the ODNR-DOW indicated no records of federal- or state-threatened or endangered species, or species of special concern, within 1 mile of the Preferred and Alternate Routes (ODNR-DOW,

2017a). More detail on the data provided by the ODNR-DOW is provided in Section 4906-05-08(C)(1).

(1) Vegetative Communities, Wetlands, and Streams in Study Area

(a) Vegetative Communities

Vegetative communities and land use types within the Field Survey Area include: agricultural and pasture fields, old fields, early or second growth successional forests, riparian areas, palustrine emergent (PEM) wetlands, palustrine scrub-shrub (PSS) wetlands, palustrine forested (PFO) wetlands, and residential lawns, in addition to the identified waterbodies. Habitat descriptions are provided below. Details on the anticipated impacts from construction of the proposed Project are provided in Section 4906-05-08(B)(3)(a) below and in Table 8-5.

(i) Agricultural and Pasture Fields

Portions of both the Preferred Route and Alternate Route cross agricultural and/or pasture fields. Production of crops such as corn (*Zea mays*) and soybean (*Glycine max*) were observed in the majority of the crop fields. A horse pasture was also observed, dominated by a variety of grass species which had been grazed.

(ii) Old Field

Herbaceous cover exists in successional old field communities. Old-field plant communities are at the earliest stages of recolonization following disturbance. This community type is typically short-lived (less than 10 years), progressively giving way to shrub and forest communities unless periodically re-disturbed, in which case they remain as fallow fields. Old-field areas are located within some portions of the Project area, usually in inactive pastures or clear-cut areas.

Dominant plant species in the old-field communities included:

- Allegheny blackberry (*Rubus allegheniensis*)
- Giant goldenrod (*Solidago gigantea*)
- Silky dogwood (*Cornus amomum*)
- Canada goldenrod (*Solidago canadensis*)
- Rambler rose (*Rosa multiflora*)
- Broom sedge (*Andropogon virginicus*)
- Teasel (*Dipsacus fullonum*)
- Japanese bristlegrass (*Setaria faberi*)
- Yellow foxtail (*Setaria pumila*)
- White clover (*Trifolium pretense*)

(iii) Successional Forests

Upland early successional or second growth forest is present across portions of the Field Survey Area within the Preferred and Alternate Routes.

Dominant canopy species within these forested areas include the following:

- Box elder (*Acer negundo*)
- Red Maple (*Acer rubrum*)
- Pin oak (*Quercus palustris*)
- Beech (*Fagus grandifolia*)
- Shagbark hickory (*Carya ovata*)

Dominant understory species include:

- Rambler rose
- Allegheny blackberry
- Eastern red cedar (*Juniperous virginiana*)
- Poison ivy (*Toxicodendron radicans*)

The understory of the various forest communities within the Project area ranged from open to moderately dense.

(iv) Wetlands

Wetlands were observed and delineated within the proposed Preferred Route and Alternate Route. Dominant plant species typically found in wetlands crossed by the Project are listed below.

Dominant plant species observed within PEM wetlands include the following:

- Gray Sedge (*Carex grayi*)
- Narrowleaf cattail (*Typha angustifolia*)
- Giant goldenrod
- Woolgrass (*Scirpus cyperinus*)
- Reed canary grass (*Phalaris arundinacea*)
- Various sedge species (*Carex spp.*)
- American elm (*Ulmus americana*)
- Dark-green bulrush (*Scirpus atrovirens*)
- Poverty rush (*Juncus tenuis*)
- Fox sedge (*Carex vulpinoidea*)

Dominant plant species observed within PSS wetlands include the following:

- American elm (*Ulmus americana*)
- Black willow (*Salix nigra*)
- Giant goldenrod
- Creeping Jenny (*Lysimachia nummularia*)
- Silky dogwood

Dominant plant species observed within PFO wetlands include the following:

- American elm
- Pin oak
- Silver Maple (*Acer saccharinum*)
- Green ash (*Fraxinus pennsylvanica*)
- Silky dogwood
- Red maple
- Rambler rose
- Giant goldenrod
- Fowl Bluegrass (*Poa palustris*)
- Harvest lice (*Agrimonia parviflora*)
- Black Willow

(v) Residential and Commercial

Residential and commercial areas exist within the Preferred and Alternate Route Field Survey Areas. Vegetation identified on residential and commercial property includes areas of grasses and other herbaceous species, such as fescue, common dandelion, white clover, red clover, and ground ivy maintained through mowing.

(vi) Utility ROW

Some linear ROWs are within or adjacent to the proposed Preferred and Alternate Routes, all of which occur adjacent to roads. These ROWs exist for AEP's 69kV line and local electric distribution lines. Vegetation along the existing transmission and/or distribution electric ROWs has been maintained by mowing and consists of grasses, herbaceous plants, and scrub-shrub vegetation. Vegetation with tall growth potential that poses a risk to the operation and maintenance of overhead electric transmission lines is typically removed periodically from the ROW. Dominant herbaceous vegetation consists of rambler rose, goldenrod (*Solidago spp*.), wingstem (*Verbesina alternifolia*), fescue, common dandelion, white clover, red clover, ground ivy, Queen Anne's lace, broom sedge, eastern daisy fleabane (*Erigeron annuus*), common milkweed (*Asclepias syriaca*), little bluestem (*Schizachyrium scoparium*), Fuller's teasel, chicory (*Cichorium intybus*), and crownvetch (*Securigera varia*).

(b) Wetlands

According to the U.S. Army Corps of Engineers (USACE), a wetland is defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation (hydrophytic) typically adapted for life in saturated (hydric) soil conditions.

AEP Ohio Transco's consultant used the onsite methodology described in the 1987 Technical Report Y-87-1, USACE Wetlands Delineation Manual (USACE, 1987) and subsequent guidance documents including the 2012 Regional Supplement to the USACE Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (USACE, 2012) and Regional Supplement to the USACE Wetland Delineation Manual: Midwest (Version 2.0) (USACE, 2010). Additionally, each identified wetland was evaluated in accordance with the Ohio Rapid Assessment Method

(ORAM) developed by Ohio Environmental Protection Agency (OEPA; Mack, 2001). Wetland categorizations were conducted in accordance with the latest quantitative score calibration procedure (OEPA, 2001). To identify whether potential wetlands exist along the Preferred and Alternate Routes, a desktop study of available resources was performed prior to the field wetland delineations. Additionally, USFWS NWI maps and the NRCS soil survey (NRCS, 2016) and hydric soil list for Brown County were reviewed for areas within 1,000 feet of the Preferred and Alternate Routes.

(i) Summary of National Wetland Inventory Data

USFWS NWI data, including freshwater wetlands and riverine areas, were mapped within 1,000 feet of the Preferred and Alternate Routes, and reviewed to guide the field ecological survey as one factor in identifying potential wetland locations (USFWS, 2017a). The NWI-mapped areas for the Preferred and Alternate Routes are shown on Figures 8-2A through 8-2F and Figures 8-3A through 8-H, respectively. Table 8-1 summarizes the NWI data by wetland classification and habitat type. The actual extent and type of field-delineated wetlands along the routes are discussed in the next section.

TABLE 8-1
NWI Wetlands Within 1,000 feet of the Preferred and Alternate Routes

Wetland Type	NWI Code	NWI Habitat Type*	Total Number of Each Habitat Type Preferred/ Alternate
Freshwater Emergent Wetland	PEM1A	Palustrine Emergent Persistent Temporary Flooded	2 – Alternate
Freshwater Emergent Wetland	PEM1B	Palustrine Emergent Persistent Seasonally Saturated	1 – Preferred
Freshwater Emergent Wetland	PEM1C	Palustrine Emergent Persistent Seasonally Flooded	2 – Preferred 2 – Alternate
Freshwater Emergent Wetland	PFO1A	Palustrine Forested Broad-Leaved Deciduous Temporary Flooded	2 – Alternate
Freshwater Scrub-Shrub Wetland	PSS1A	Palustrine Scrub-Shrub Broad-Leaved Deciduous Temporary Flooded	1 – Preferred 1 – Alternate
Freshwater Pond	PUBG	Palustrine Unconsolidated Bottom Intermittently Exposed	1 – Alternate
Freshwater Pond	PUBGh	Palustrine Unconsolidated Bottom Intermittently Exposed Diked/Impounded	1 – Preferred 10 – Alternate
Freshwater Pond	PUBGx	Palustrine Unconsolidated Bottom Intermittently Exposed Excavated	13 – Preferred 13 – Alternate
Riverine	R4SBC	Riverine Intermittent Streambed Seasonally Flooded	7 – Preferred 8 – Alternate
Riverine	R5SBC	Riverine Unknown Perennial Unconsolidated Bottom Permanently Flooded	3 – Preferred 2 – Alternate
Total Number of Preferred Route NWI Wetlands:			**28**
Total Number of Alternate Route NWI Wetlands:			**41**

Notes:
Total number of PEM = 7, PSS= 2, PFO=2, Pond = 38, Riverine = 20
* USFWS, 2016a

(ii) Field-Delineated Wetlands

A total of six wetlands (totaling 0.83 acres) were delineated within the Preferred Route Field Survey Area. Within the Alternate Route Field Survey Area, 15 wetlands (totaling 8.62 acres) were delineated.

A total of 0.26 acre of wetlands were delineated within the Preferred Route ROW and 3.41 acres within the Alternate Route ROW. These field-delineated wetlands for the Preferred and Alternate Routes are mapped on Figures 8-2A through 8-2F and Figures 8-3A through 8-3H, respectively.

Detailed information on each wetland is provided in Table 8-2. The anticipated temporary construction impacts, where unavoidable, on these wetlands are included in Table 8-2 and further discussed in Section 4906-05-08(B)(3)(b).

TABLE 8-2
Delineated Wetlands within the Preferred and Alternate Route Environmental Field Survey Area and Potential Disturbance Area/ROW

Wetland Name	Route	Figure	Cowardin Wetland Type [a]	ORAM Score	ORAM Category	Acreage within Field Survey Area [b]	Acreage within Potential Disturbance Area/ROW [c]	Length Crossed by Centerline (feet)
Preferred Route Wetlands								
Wetland SS-07	Preferred	8-2C	PSS	32	1 or 2 Gray Zone	0.07	0.00	0
Wetland SS-06	Preferred	8-2C	PEM	41	Modified 2	0.09	0.09	47
Wetland SS-05	Preferred	8-2D	PEM	19	1	0.24	0.09	31
Wetland SS-04	Preferred	8-2D	PFO	24.5	1	0.03	0.00	0
Wetland SS-03	Preferred	8-2E	PEM	14.5	1	0.08	0.01	0
Wetland SS-01	Preferred	8-2E	PEM/PSS	19.5	1	0.32	0.07	55
					Total	**0.83**	**0.26**	**133**
Alternate Route Wetlands								
Wetland SS-09	Alternate	8-3C	PFO	38.5	Modified 2	0.33	0.15	90
Wetland SS-10	Alternate	8-3D	PEM	25.5	1	0.32	0.15	0
Wetland SS-11	Alternate	8-3D	PEM	25.5	1	0.10	0.00	72
Wetland SS-12	Alternate	8-3D	PEM	40.5	Modified 2	0.11	0.00	0
Wetland SS-13	Alternate	8-3D	PFO	40.5	Modified 2	3.20	1.64	750
Wetland SS-14	Alternate	8-3D	Vernal Pool	40.5	Modified 2	0.08	0.00	0
Wetland SS-15	Alternate	8-3D	PFO	39	Modified 2	0.09	0.08	58
Wetland SS-16	Alternate	8-3E	PEM	28	1	0.18	0.00	0
Wetland SS-17	Alternate	8-3E	PEM	40	Modified 2	0.63	0.05	0
Wetland SS-18	Alternate	8-3E	PFO	40	Modified 2	0.58	0.29	181
Wetland SS-19	Alternate	8-3F	PEM	24	1	0.09	0.02	7

TABLE 8-2
Delineated Wetlands within the Preferred and Alternate Route Environmental Field Survey Area and Potential Disturbance Area/ROW

Wetland Name	Route	Figure	Cowardin Wetland Type [a]	ORAM Score	ORAM Category	Acreage within Field Survey Area [b]	Acreage within Potential Disturbance Area/ROW [c]	Length Crossed by Centerline (feet)
Wetland SS-20	Alternate	8-3F	PEM	19	1	0.11	0.03	15
Wetland SS-21	Alternate	8-3F	PEM	18	1	0.06	0.03	13
Wetland SS-22	Alternate	8-3G	PFO/PEM	20	1	0.07	0.02	12
Wetland SS-23	Alternate	8-3G	PEM	29	1	2.67	0.95	449
					Total	**8.62**	**3.41**	**1,647**

Notes:

a Wetland Type: PEM = palustrine emergent, PSS = palustrine scrub/shrub, PFO = palustrine forested.

b The width of the Field Survey Area was 400 feet on Preferred Route and 250-400 feet on the Alternate Route.

c The width of the potential disturbance area and the final maintained ROW is planned to be 100 feet.

(c) Waterbodies

(i) Field-Delineated Streams

Streams and drainage channels were delineated and assessed during the ecological survey of the Preferred and Alternate Routes. Streams with drainage areas greater than 1 square mile or maximum pool depths greater than 40 centimeters (cm) were assessed using the OEPA Qualitative Habitat Evaluation Index (QHEI). The QHEI is one measure that is used by OEPA, in association with biotic sampling, to determine a stream's aquatic life use designation in accordance with the Ohio water quality standards (OEPA, 2006). The QHEI method classifies streams based on their drainage area. Streams that drain greater than or equal to 20 square miles are classified as "larger streams," while those that drain less than 20 square miles are classified as "headwaters." QHEI-classified streams then receive a narrative rating based upon their score:

- Score less than 30 for both headwaters and larger streams = Very Poor
- Score between 30 and 42 for headwaters, and 30 and 44 for larger streams = Poor
- Score between 43 and 54 for headwaters, and 45 and 59 for larger streams = Fair
- Score between 55 and 69 for headwaters, and 60 and 74 for larger streams= Good
- Score greater than or equal to 70 for headwaters, and 75 for larger streams = Excellent

Two streams (Stream SS-18 and Stream SS-20) were evaluated using the QHEI method. Both of these streams were located in the Alternate Route. No waterbodies within the Project area are designated Superior High Quality Waters (OEPA, 2003). Field personnel completed the QHEI near the proposed centerline of the transmission line crossing when possible.

The OEPA's Headwater Habitat Evaluation Index (HHEI) is used to evaluate streams with a drainage area less than or equal to one square mile, and maximum pools depths less than or equal to 40 cm (OEPA, 2012). The HHEI is generally used to assess Primary Headwater Habitat (PHWH) streams that typically fall under the classification of first or second-order streams. The HHEI rates a stream based on its physical habitat and uses that information to determine the biological potential of the stream. The physical habitats scored for the HHEI are substrate type, pool depth, and bank full width. Scores for Class I PHWH Streams range from 0 to 29.9; scores for Class II PHWH Streams range from 30 to 69.9; and scores for Class III PHWH Streams range from 70 to 100. A "Modified" qualifier may be added as a prefix to any of these classes if evidence of anthropogenic alterations, such as channelization and bank stabilization, are observed. A higher PHWH class corresponds with a more continuous flow regime. The flow regime determines the physical habitat of the stream, and is therefore indicative of the biological communities it can support. Streams with scores between 30 and 69 may be classified as potential rheocrene habitat, depending on substrate type, watershed size, and stream flow. The PHWH class for these potential rheocrene streams is then identified by evaluating the biology (fish, salamanders, and benthic macroinvertebrates). Per AEP Ohio Transco's consultant's standard operating procedures, it was not necessary to perform a biotic evaluation, and potential rheocrene streams were listed in Table 8-3 as "Rheocrene Potential."

A total of 13 streams were evaluated using the HHEI method. Eight streams were identified along the Preferred Route Field Survey Area and four streams were identified along the Alternate Route Field Survey Area. One stream (Stream SS-13) was identified along both the Preferred and Alternate Routes. The HHEI evaluations were completed at the proposed transmission line crossing points, if crossed by the proposed alignment.

Streams identified during the ecological survey on the Preferred and Alternate Routes are shown on Figures 8-2A through 8-2F and Figures 8-3A through 8-3H, respectively. Detailed information on each delineated stream is included in Table 8-3. Aquatic life use designations within the Southwest Ohio Tributaries Basin obtained from O.A.C. 3745-1-09 are also provided (OEPA, 2017). The Ohio River, located approximately 50 miles southeast of the proposed Project, is a traditionally navigable waterway as defined by USACE.

Approximately 384 linear feet of stream are located within the Preferred Route ROW, while approximately 713 linear feet are located within the Alternate Route ROW.

The Preferred Route centerline has four stream crossings. The length of delineated streams located within the Preferred Route Field Survey Area is approximately 2,365 linear feet. The Alternate Route centerline has five stream crossings. The total length of streams located within the Field Survey Area of the Alternate Route is approximately 2,521 linear feet. Construction impacts on these features are included in Table 8-3 and further discussed in Section 4906-05-08(B)(3)(c).

TABLE 8-3
Streams within the Preferred and Alternate Route Environmental Field Survey Area and Potential Disturbance Area/ROW

Stream ID Waterbody Name	Route	Figure	Flow Regime	Top of Bank Width (feet)	Maximum Pool Depth (inches)	Form	Score	OEPA Aquatic Life Use Designation	PHWH Class (HHEI)/ Narrative Rating (QHEI)	Crossed by Centerline	Length (linear feet) within Field Survey Area [a]	Length (linear feet) within Potential Disturbance Area/ROW [b]
Preferred Route												
Stream SS-13 UNT East Fork White Oak Creek	Preferred	8-2A	Intermittent	3	5	HHEI	37	--	Modified Class II PHWH	No	138	0
Stream SS-12 UNT West Fork Ohio Brush Creek	Preferred	8-2B	Ephemeral	2	1	HHEI	17	--	Modified Class I PHWH	No	128	0
Stream SS-11 UNT West Fork Ohio Brush Creek	Preferred	8-2B	Intermittent	10	18	HHEI	34	--	Modified Class II PHWH	Yes	445	116
Stream SS-10 UNT West Fork Ohio Brush Creek	Preferred	8-2C	Intermittent	1.5	4	HHEI	37	--	Modified Class II PHWH	Yes	369	56
Stream SS-09 UNT West Fork Ohio Brush Creek	Preferred	8-2D	Ephemeral	1	1	HHEI	18	--	Modified Class I PHWH	No	196	0
Stream SS-08 UNT West Fork Ohio Brush Creek	Preferred	8-2D	Ephemeral	1	3	HHEI	27	--	Modified Class I PHWH	No	128	0
Stream SS-07 UNT West Fork Ohio Brush Creek	Preferred	8-2D	Intermittent	4	6	HHEI	47	--	Class II PHWH	Yes	419	105

TABLE 8-3
Streams within the Preferred and Alternate Route Environmental Field Survey Area and Potential Disturbance Area/ROW

Stream ID Waterbody Name	Route	Figure	Flow Regime	Top of Bank Width (feet)	Maximum Pool Depth (inches)	Form	Score	OEPA Aquatic Life Use Designation	PHWH Class (HHEI)/ Narrative Rating (QHEI)	Crossed by Centerline	Length (linear feet) within Field Survey Area [a]	Length (linear feet) within Potential Disturbance Area/ROW [b]
Stream SS-06 UNT West Fork Ohio Brush Creek	Preferred	8-2D	Ephemeral	1	2	HHEI	28	--	Modified Class I PHWH	No	108	0
Stream SS-02 UNT West Fork Ohio Brush Creek	Preferred	8-2F	Intermittent	3	3	HHEI	33	--	Modified Class II PHWH	Yes	434	107
										Total	**2,365**	**384**
Alternate Route												
Stream SS-13 UNT East Fork White Oak Creek	Alternate	8-3A	Intermittent	3	5	HHEI	37	--	Modified Class II PHWH	No	143	0
Stream SS-18 UNT West Fork Ohio Brush Creek	Alternate	8-3C	Intermittent	15	20	QHEI	57	WWH	Good Warmwater	Yes	272	105
Stream SS-19 UNT West Fork Ohio Brush Creek	Alternate	8-3C	Intermittent	2.5	3	HHEI	36	--	Modified Class II PHWH	Yes	301	114
Stream SS-20 West Fork Ohio Brush Creek	Alternate	8-3D	Intermittent	25	> 24	QHEI	53.5	--	Fair Warmwater	Yes	245	90

TABLE 8-3
Streams within the Preferred and Alternate Route Environmental Field Survey Area and Potential Disturbance Area/ROW

Stream ID Waterbody Name	Route	Figure	Flow Regime	Top of Bank Width (feet)	Maximum Pool Depth (inches)	Form	Score	OEPA Aquatic Life Use Designation	PHWH Class (HHEI)/ Narrative Rating (QHEI)	Crossed by Centerline	Length (linear feet) within Field Survey Area [a]	Length (linear feet) within Potential Disturbance Area/ROW [b]
Stream SS-21 UNT West Fork Ohio Brush Creek	Alternate	8-3E	Intermittent	2.5	4	HHEI	38	--	Modified Class II PHWH	No	270	57
Stream SS-22 UNT West Fork Ohio Brush Creek	Alternate	8-3E	Intermittent	4	4	HHEI	44	--	Modified Class II PHWH	Yes	1,011	247
Stream SS-23 UNT West Fork Ohio Brush Creek	Alternate	8-3G	Intermittent	1.5	2	HHEI	35	--	Modified Class II PHWH	Yes	279	100
										Total	**2,521**	**713**

Notes:

a The width of the Field Survey Area was 400 feet on Preferred Route and 250-400 feet on the Alternate Route

b The width of the potential disturbance area and the final maintained ROW is planned to be 100 feet.

UNT = unnamed tributary

(ii) Lakes, Ponds, and Reservoirs

No major lakes or reservoirs were observed along the proposed Preferred or Alternate Routes. One pond totaling 0.10 acre was identified during the field evaluation along the Preferred Route. Three ponds totaling 1.90 acres were identified during the field evaluation along the Alternate Route. Ponds within the Field Survey Area are shown on Figures 8-2A through 8-2F, and Figures 8-3A through 8-3H and are summarized in Table 8-4.

Impacts to ponds from construction, operation, or maintenance of the proposed transmission line are not anticipated. Best management practices (BMPs) to control soil erosion and sedimentation (for example, using silt fencing and filter sock as appropriate during construction to minimize runoff siltation).

TABLE 8-4
Delineated Ponds within the Preferred Route and Alternate Route Environmental Field Survey Area

Feature Name	Route	Figure	Acreage within Field Survey Area	Acreage within ROW	Linear Feet Crossed by Centerline
Preferred Route Ponds					
Pond SS-04	Preferred	8-2D	0.10	0	0
		Total:	**0.10**	**0**	**0**
Alternate Route Ponds					
Pond SS-01	Alternate	8-3C	1.55	<0.01	0
Pond SS-02	Alternate	8-3H	0.20	0.01	0
Pond SS-03	Alternate	8-3H	0.15	0.03	0
		Total:	**1.90**	**0.05**	**0**

Notes:
a All measurements listed as <0.01 were assumed to be 0.01 for calculations.
b "0" indicates the pond is not within the ROW.

(2) Map of Facility, Right-of-Way, and Delineated Resources

Detailed maps at 1:6,000 scale depicting the delineated water features, Field Survey Area, and proposed ROW for the Preferred and Alternate Routes are provided as Figures 8-2A through 8-2F and Figures 8-3A through 8-3H, respectively.

(3) Construction Impacts on Vegetation and Surface Waters

(a) Construction Impacts on Vegetation

The construction impacts on woody and herbaceous vegetation along both the Preferred and Alternate Routes will be limited to the initial clearing of vegetation within the 100-foot ROW for the proposed transmission line and access roads. Specific locations for access roads will be

identified at the time of AEP Ohio Transco's transmission line easement acquisition process. Trees adjacent to the proposed ROW, that are dead, dying, diseased, leaning, significantly encroaching, or prone to failure may require clearing to allow for safe operation of the transmission line. Vegetative wastes (such as tree limbs and trunks) generated during the construction phase will be windrowed or chipped and disposed of appropriately depending on individual landowner requests. The approximate vegetation impacts, based on GIS analysis, along the Preferred and Alternate Route ROWs are provided in Table 8-5.

TABLE 8-5
Approximate Vegetation Impacts Along the Potential Disturbance Area/ROW

Land Use Type	Length of Route (in feet)	Length of Route (in miles)	Acreage within ROW
Preferred Route			
Agricultural	8,525	1.6	19.66
Herbaceous (Old Field)	0	0.0	0.00
Residential	4,069	0.8	8.49
Utility ROW	104	0.0	1.53
Woodlot	1,266	0.2	3.88
Delineated Wetland	133	0.0	0.26
Alternate Route			
Agricultural	4,172	0.8	10.22
Herbaceous (Old Field)	631	0.1	1.80
Residential	3,969	0.8	9.44
Utility ROW	50	0.0	0.11
Woodlot	1,707	0.3	4.75
Delineated Wetland	1,647	0.3	3.40

(b) Construction Impacts on Wetlands

Preferred Route: During wetland and waterbody delineations, four wetlands were identified along the Preferred Route within the proposed ROW, totaling 0.26 acre within the ROW. The delineated wetlands are shown on Figures 8-2A through 8-2F. Detailed information about each feature can be found in Table 8-2 in Section 4906-05-08(B)(b)(ii). Three of these wetlands are crossed by the Preferred Route centerline, totaling 133 linear feet. Impacts to the wetlands will be avoided by placing transmission line structures outside of wetland boundaries, where practical. Where temporary construction access through a wetland cannot be avoided, the crossing will occur during dry conditions or protective construction matting will be used to minimize impacts from construction vehicles.

Wetland ORAM categories delineated in the Preferred Route ROW are detailed below:

- Category 1 wetlands: Three Category 1 wetlands with ORAM scores ranging from 16 to 24.5 were identified within the ROW, totaling 0.17 acre. No PFO or PSS wetlands will be impacted during construction.

- Category 1 or 2 Gray Zone wetlands: No Category 1 or 2 Gray Zone wetlands were identified within the ROW; therefore, no construction impacts are anticipated.

- Category 2 wetlands: No Category 2 wetlands were identified within the ROW; therefore, no construction impacts are anticipated.

- Category Modified 2 wetlands: One Category Modified 2 wetland with an ORAM score of 41 was identified within the ROW, totaling 0.09 acre. No PFO or PSS wetlands will be impacted during construction.

- Category 3 wetlands: No Category 3 wetlands will be crossed; therefore, no construction impacts are anticipated.

Alternate Route: During wetland and waterbody delineations, fifteen wetlands were identified along the Alternate Route ROW, totaling 3.41 acres within the ROW. The delineated wetlands are shown on Figures 8-3A through 8-3H. Detailed information about each feature can be found in Table 8-2 in Section 4906-05-08(B)(b)(ii). Ten wetlands are crossed by the centerline of the Alternate Route, totaling 1,647 linear feet. If this route were selected for construction, impacts to wetlands will be avoided by placing transmission line structures outside wetland boundaries where practical. Where temporary construction access through a wetland cannot be avoided, the crossing will occur during dry conditions or matting will be used to minimize impacts.

Wetland ORAM categories delineated in the Alternate Route ROW are detailed below:

- Category 1 wetlands: Six Category 1 wetlands with ORAM scores ranging from 18 to 29 were identified within the proposed ROW, totaling 1.2 acres. No PFO or PSS wetlands will be impacted during construction.

- Category 1 or 2 Gray Zone wetlands: No Category 1 or 2 Gray Zone wetlands will be crossed; therefore, no construction impacts are anticipated.

- Category Modified 2 wetlands: Five Category Modified 2 wetlands with ORAM scores ranging from 38 to 40.5 were identified within the ROW, totaling 2.21 acres. Of that total, 2.16 acres of PFO wetlands will be impacted through the clearing of trees and shrubs during construction. This will result in the PFO wetlands being converted to PEM.

- Category 2 wetlands: No Category 2 wetlands will be crossed; therefore, no construction impacts are anticipated.

- Category 3 wetlands: No Category 3 wetlands will be crossed; therefore, no construction impacts are anticipated.

Through appropriate planning and permitting, care will be taken near wetlands to avoid or minimize filling and sedimentation during construction. AEP Ohio Transco will avoid the placement of poles within wetlands to the extent practical. Selective clearing will be required to remove specific types of woody vegetation in wetlands that might impede construction or interfere with operation of the transmission line. Where wooded or forested wetlands occur within the ROW, the trees will be removed.

To minimize soil erosion and sedimentation during construction, BMPs such as utilization of silt fences and construction matting will be implemented as required during construction. Sedimentation potential at wetlands is unlikely because of the plans for pole placement outside of wetlands, and the fact that construction equipment will only cross wetlands if necessary, and will do so using construction matting if wet conditions require.

Disturbance of soils in wetland areas during construction will be minimized. Placement of permanent fill material in wetland areas will be avoided to the extent practical. Although not anticipated, if it is necessary to place a pole or guy wires within a wetland, they will be accessed using construction matting if wet conditions exist at the time of construction. No excavation other than the boring or excavation of a hole for pole installation will be performed within wetland areas. If pole placement is required within a wetland, no additional fill will be placed in the wetlands beyond the placement of the pole and borehole backfill.

Wetland areas will be clearly staked prior to the commencement of any clearing to minimize incidental vehicle impacts. Other than the remote possibility of pole locations within wetlands discussed above, operation of heavy mechanized equipment is not planned within any identified wetland areas, although some construction equipment may need to cross wetland areas on construction matting if wet conditions exist at the time. Woody vegetation in wetlands will be hand-cut by chain saws or other non-mechanized techniques. When necessary, rubber-wheeled vehicles, or vehicles equipped with tracks, will be used to remove vegetation debris. AEP Ohio Transco will perform all construction work in accordance with the conditions and requirements of regulatory permits obtained for the Project.

(c) Construction Impacts on Waterbodies

The Preferred Route centerline crosses four streams. The Alternate Route centerline crosses five streams. Detailed information about each feature can be found in Table 8-3 in Section 4906-05-08(B)(c)(i).

Approximately 384 linear feet of stream are located within the Preferred Route ROW, while approximately 713 linear feet are located within the Alternate Route ROW.

AEP Ohio Transco will not conduct mechanized clearing within 25 feet of any stream, and will only clear (using hand cutting techniques) those trees in this area that are tall enough to or have the potential to interfere with safe construction and operation of the line. No streams will be filled or permanently impacted. Some streams may have to be crossed by construction vehicles. Exact pole locations have not been fully determined to date although preliminary locations have been identified. Access paths to proposed pole locations will be evaluated when more detailed engineering is completed and as landowner negotiations progress. If a new stream crossing were necessary, it would comply with one of the following three proposed methods to cross streams:

- Temporary stream ford
- Temporary culvert stream crossings
- Temporary access bridge

Temporary stream fords are not likely, but may be conducted for crossing low quality ephemeral and intermittent streams with a drainage watershed less than 1 square mile. This will involve minimum clearing necessary to gain access to the stream and for passage of construction vehicles.

- Disturbance of the stream will be kept to a minimum, stream bank vegetation will be preserved to the maximum extent practical, and the stream crossing width will be kept as narrow as possible. Clearing will be done by hand cutting rather than grubbing.

- Sediment-laden runoff will be prevented from flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fences will be used as needed according to local topographic conditions.

- Following completion of the work, the areas cleared for the temporary access crossing will be stabilized through plantings of woody species where appropriate. Areas of exposed soil will be stabilized in accordance with the stormwater pollution prevention plan (SWPPP) for the Project.

Culvert stream crossings may be proposed for crossing marginal quality perennial, ephemeral, and intermittent streams with a drainage watershed of less than 1 mile. These crossings may be removed or remain in place to provide maintenance access to the line (critical if service is to be reliable).

- Disturbance of the stream will be kept to a minimum, stream bank vegetation will be preserved to the maximum extent practical, and the stream crossing width will be kept as narrow as possible. Clearing will be done by hand-cutting techniques rather than grubbing. Roots and stumps will be left in place to aid stabilization and to accelerate re-vegetation.

- Sediment laden runoff controlled to minimize from flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fence will be used as needed according to local topographic conditions.

- Culvert pipes will be placed on the existing streambed to avoid a drop or waterfall at the downstream end of the pipe, which would be a barrier to fish migration. Crossings will be placed in shallow areas rather than pools.

- Culverts will be sized to be at least three times the depth of the normal stream flow at the crossing location.

- There will be enough culvert pipes to cross the stream completely with no more than a 12-inch space between each one.

- Stone, rock, or aggregate of ODOT number 1 as a minimum size will be placed in the channel, and between culverts. To prevent washouts, larger stone may be used with gabion mattresses. No soil will be placed in the stream channel.

- After completion of construction, some rock aggregate and structures such as culvert pipes used for the crossing will be left in place if approved by the landowner and authorized within environmental permits. Care will be taken so that aggregate does not create an impoundment or impede fish passage. Structures such as gabion mattresses will be removed.

- Stream banks will be stabilized and woody species planted as appropriate.

Temporary access bridges or culvert stream crossings may be used for high quality perennial, ephemeral, and intermittent streams and streams with a drainage watershed greater than 1 square mile (or possibly less in some cases).

- Disturbance of the stream will be kept to a minimum, stream bank vegetation will be preserved to the maximum extent practical, and the stream crossing width will be kept as narrow as possible. Clearing will be done by hand cutting rather than grubbing. Roots and stumps will be left in place to aid stabilization and to accelerate re-vegetation.

- Sediment laden runoff will be controlled to minimize flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fence will be used as needed according to local topographic conditions.

- Bridges will be constructed to span the entire channel. If the channel width exceeds 8 feet, then a floating pier or bridge support may be placed in the channel. No more than one pier, footing, or support will be allowed for every 8 feet of span width. No footings, piers, or supports will be allowed for spans of less than 8 feet.

- No fill other than clean stone, free from soil, will be placed within the stream channel.

Stream crossings, if any, will be addressed in the Project SWPPP which will be provided to the OPSB. Some of the access routes may be left in place for maintenance activity. BMPs, including

utilization of silt fence or filter sock, will be used as appropriate during construction to minimize runoff siltation.

(4) Operation and Maintenance Impacts on Vegetation and Surface Water

During operation of the transmission line along either of the proposed routes, the impacts on vegetation are anticipated to be minor. Undeveloped non-forested land not significantly disturbed by construction should retain its current vegetation composition. Periodic cutting along the proposed 100-foot-wide transmission line ROW is not expected to result in a significant environmental impact to the vegetation in these types of areas.

The potential impacts on woody and herbaceous vegetation along either of the proposed routes will be limited to maintenance activities along the proposed transmission line ROW and access roads for safe and reliable operation of the transmission line. Trees adjacent to the proposed transmission line ROW, that are dead, dying, diseased, leaning, significantly encroaching, or prone to failure may require clearing to allow for safe operation of the transmission line. Vegetative waste (such as tree limbs and trunks) that is generated during the construction phase will be windrowed or chipped and disposed of appropriately depending on individual landowner requests.

Once the transmission line is in operation, no significant impacts to streams or drainage channels are anticipated. Only periodic selective removal of vegetation that interferes with the operation of the transmission line will be required. No major lakes, ponds, or reservoirs should be affected by the operation or maintenance of the Preferred or Alternate Routes.

AEP Ohio Transco does not anticipate significant wetland impacts from the operation or maintenance of the Preferred and Alternate Routes. Vegetation that occurs within wetland areas may require periodic cutting. It is not anticipated that such activities would result in erosion or water quality degradation. Maintenance cutting of woody vegetation in wetland areas would be hand-cut by chain saws or other non-mechanized techniques.

(5) Mitigation Procedures

The following mitigation procedures will be used during construction, operation, and maintenance of the proposed Project to minimize the impact on vegetation and surface waters. A SWPPP will also be prepared and implemented, and will be made available onsite during Project construction.

(a) Site Restoration and Soil Stabilization

A SWPPP will be developed specifically for the Project and specified BMPs will be implemented during construction to control erosion and sedimentation. Areas where soil has been disturbed will be seeded and mulched to prevent soil erosion and sedimentation. Experience shows that seeding in non-wetland and non-agricultural areas is advantageous to control erosion on areas disturbed by construction activities. In lightly disturbed wetland areas, existing seed banks are quite often capable of quickly reestablishing vegetation that is compatible with the surrounding

wetland. If any unanticipated significant disturbance occurs in wetlands, topsoil will be segregated and replaced so that the existing seed banks will be allowed to revegetate the areas initially. Additional seeding will only take place if the existing seed bank does not repopulate an area. These measures should preserve the aesthetic qualities along the ROW, prevent erosion, and promote habitat diversity.

Construction access routes and staging areas will be selected to minimize impacts to wetlands and streams to the extent practical. Following construction, pole locations, material storage sites, and temporary access roads will be seeded with a suitable grass seed mixture as specified in the SWPPP for restoring these disturbed areas.

(b) Contingency Plan Stream and Wetland Crossings

The Project does not include a stream or wetland crossing by horizontal direction drill. Therefore, a detailed frac-out contingency plan will not be required for the Project.

(c) Demarcation and Protection Methods

Wetlands, streams, and any other environmentally sensitive areas will be clearly staked, flagged, or fenced in accordance with the SWPPP prior to the commencement of any clearing to minimize incidental impacts. BMPs such as utilization of silt fences and construction matting will be implemented as required during construction.

(d) Procedures for Inspection and Repair of Erosion Control Measures

Procedures for inspection and repair of erosion control measures, especially after rainfall events will be outlined in the SWPPP.

(e) Stormwater Runoff Measures

BMPs, including utilization of silt fence or filter socks, will be used as appropriate during construction to minimize runoff and sedimentation of streams and wetlands. Measures to divert stormwater runoff away from fill slopes and other exposed surfaces will be outlined in the SWPPP.

(f) Vegetation Protection Methods

Vegetation that occurs within wetland areas may require periodic cutting. Maintenance cutting of woody vegetation in wetland areas would be hand-cut by chain saws or other non-mechanized techniques. Cutting of woody vegetation in wetlands and near stream banks will be limited to removal of only the cut back required to safely perform construction and continue operation of the transmission line. AEP Ohio Transco will adhere to regulatory permit requirements and conditions that will be obtained or authorized for the Project, including specifying that no mechanized clearing of vegetation be performed within the prescribed distance of a wetland or waterbody as discussed below.

(g) Clearing Methods

AEP Ohio Transco will not conduct mechanized clearing within 25 feet of any stream, and will only clear (using hand cutting techniques) those trees in this area that are tall enough to or have the

potential to interfere with safe and reliable construction and operation of the transmission line. Selective clearing will be required to remove woody vegetation in wetlands that might impede construction, or interfere with operation of the transmission line. Where wooded wetlands occur within the ROW, the trees will be removed. Trees adjacent to the proposed transmission line ROW that are dead, dying, diseased, leaning, significantly encroaching, or prone to failure may require clearing to allow for safe and reliable operation of the transmission line. Vegetative waste (such as tree limbs and trunks) that is generated during the construction phase will be windrowed or chipped and disposed of appropriately, outside of wetlands, depending on landowner requests.

(h) Expected Use of Herbicides

AEP Ohio Transco does not anticipate the use of herbicides on the Project.

(C) LITERATURE SURVEY OF PLANT AND ANIMAL LIFE POTENTIALLY AFFECTED

The Project area is primarily comprised of a rural setting with few residences located on typically larger lots. The developed areas are dominated by residences, pastures, agricultural fields, and existing utility ROW. The remaining area is mostly comprised of upland forests. Both the Preferred and Alternate Routes have potential habitat for wildlife species. Lists of commercial and recreational species were created utilizing professional experience, wildlife sightings, and the ODNR-DOW 2017-2018 Hunting and Trapping Regulations (ODNR-DOW, 2017b).

Lists of protected species are typically based on their range within Brown County, as reported in correspondence from the ODNR-DOW and the review of USFWS county species distribution lists. Details on the expected impacts of construction, operation, maintenance, and mitigation procedures can be found following the threatened and endangered, commercial, and recreational species descriptions as follows.

(1) Project Vicinity Species Descriptions

(a) Protected Species

Coordination with ODNR-DOW was initiated to obtain Environmental Review and Ohio Natural Heritage Database records within a 1-mile buffer area around the Preferred and Alternate Routes (ODNR-DOW, 2017a). ODNR records of state- and federally listed species, provided in September 2017, indicated no records of species located within a 1-mile radius of the Project that were state- or federally-listed. Current information on the species provided through consultation with USFWS (USFWS, 2017b), the USFWS website (USFWS, 2017c) and the ODNR-DOW Ohio Natural Heritage Database is provided in Table 8-6.

A consultation request was submitted to the USFWS on September 22, 2017 and their e-mail response was received on October 18, 2017. USFWS stated that there are no federal wilderness areas, wildlife refuges, or designated critical habitat within the vicinity of the Project area. The USFWS also confirmed that the Project area lies within the range of two federally listed bat species (Table 8-6). A follow-up consultation request was sent to the USFWS on April 19, 2018 to provide more detailed information on the Preferred and Alternate Routes, field-delineated wetlands and

streams, and field observations as they requested in their October 18, 2017 letter. A follow-up response from the USFWS April request was received on April 23, 2018. The USFWS recommended tree cutting between October 1 and March 31. If suitable trees must be cut during summer months, the USFWS recommended that summer surveys be conducted for the Indiana bat between June 1 and August 15. The USFWS also recommended that further consultation occur if any caves or abandoned mine may be disturbed.

A consultation request was submitted to the ODNR on September 22, 2017, and their e-mail response was received on September 27, 2017. The ODNR-DOW recommended that impacts to wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation. The ODNR-DOW also recommended tree cutting between October 1 and March 31. If suitable trees must be cut during summer months, the ODNR-DOW recommended that mist net surveys be conducted for the Indiana bat between June 1 and August 15, prior to any tree cutting. Other comments documented in the ODNR response letter are as follows:

- The Project must not have an impact on freshwater native mussels within the Project area and per the Ohio Mussel Survey Protocol (ODNR-DOW, 2016a), all Group 2, 3, and 4 streams require mussel surveys. No in-stream work is proposed during construction activities and will not directly impact streams crossed by the Project area. Therefore, mussel surveys are not required.

- The ODNR-DOW recommends no in-water work in perennial stream from April 15 through June 30 to reduce impacts to indigenous species and their habitat. Because no in-water work is proposed in any perennial stream within the Project area, the Project is not likely to impact threatened or endangered aquatic species.

- The Project area is within the range of the loggerhead shrike (state-listed as endangered). If thickets or other types of dense shrubbery habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 1 to August 1.

  Note: During CH2M's habitat evaluation of the Project, no potential nesting habitat areas such as thickets, dense shrubs, or habitat otherwise suitable for the loggerhead shrike were observed along the Project Survey Area. Based on no potential nesting habitat observed, the Project is not likely to impact this species.

- The Project is within the range of the Kramer's cave beetle (state-listed as endangered), and the Ohio cave beetle (state-listed as endangered). These species are found only in caves; therefore, the Project is not likely to impact these species.

AEP Ohio Transco will utilize an approximately 100-foot-wide permanent ROW for the Project, as well as approximately 50 feet ROW for access roads, to allow for safe and reliable construction and operation of the transmission line and prevent encroachment. AEP Ohio Transco will not conduct mechanized clearing within 25 feet of any stream, and will only clear (using hand cutting

techniques) those trees in this area that are tall enough to have the potential to interfere with safe construction and reliable operation of the line.

TABLE 8-6
Listed Species in the Project County (Brown)

Common Name (Species Name)[a, b]	Federal Status [a, b]	State Status [b, c]	General Habitat Notes	Recorded Location within Project Vicinity	Potential Habitat in Project Area
Vertebrate Animals					
Indiana bat (*Myotis sodalis*)	Endangered	Endangered	Hibernacula = Caves and mines Maternity and foraging habitat = small stream corridors with well-developed riparian woods and upland forests. [c,d,e]	Presence assumed wherever suitable habitat occurs. [g] No Indiana bat buffer in Project area. [g] No ODNR records within a 1-mile radius. [b]	Yes
Northern long-eared bat *(Myotis septentrionalis*)	Threatened	Threatened	Hibernates in caves and mines; swarms in surrounding wooded areas in autumn. During late spring and summer, roosts and forages in upland forests. [c]	Presence assumed wherever suitable habitat occurs. [g] No ODNR records within a 1-mile radius. [b]	Yes
Loggerhead shrike (*Lanius ludovicianus*)		Endangered	Typically nests found in hedgerows, thickets and fencerows. They hunt over hayfields, pastures, and other grasslands. [l]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Kramer's cave beetle (*Pseudanophthalmus krameri*)		Endangered	Typically occurs in twilight zone or deeper in or on moist soil, often near streams or drip areas within caves. [d]	No ODNR records within a 1-mile radius of the Project area. [b]	Potentially
Ohio cave beetle (*Pseudanophthalmus ohioensis*)		Endangered	Typically occurs in twilight zone or deeper in or on moist soil, often near streams or drip areas within caves. [d]	No ODNR records within a 1-mile radius of the Project area. [b]	Potentially
Northern madtom (*Noturus stigmosus*)		Endangered	Found in deep, swift riffles of large rivers in and around cobbles and boulders. [m]	No ODNR records within a 1-mile radius of the Project area. [b]	Potentially
Shovelnose sturgeon (*Scaphirhynchus platorynchus*)		Endangered	Found in large rivers and prefers sand and gravel substrates with rather fast current. [n]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Goldeye (*Hiodon alosoides*)		Endangered	Found in large rivers and are rather tolerant of (and actually appear to prefer) turbid waters from clay silts. Often found in areas with swift currents. [o]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Mountain madtom (*Noturus eleutherus*)		Threatened	Found in deep swift riffles of large rivers. They usually are found in and around cobbles and boulders. Few remnant populations occur in	No ODNR records within a 1-mile radius of the Project area. [b]	No

TABLE 8-6
Listed Species in the Project County (Brown)

Common Name (Species Name)[a, b]	Federal Status [a, b]	State Status [b, c]	General Habitat Notes	Recorded Location within Project Vicinity	Potential Habitat in Project Area
			parts of the Little Miami, Muskingum, Walhonding, and Tuscarawas Rivers. [c]		
Paddlefish (*Polyodon spathula*)		Threatened	Found in the Ohio River and up to the first dam on its larger tributaries. They prefer sluggish pools and backwater areas of these rivers and streams. Most common it the Ohio River from Portsmouth downstream to the Indiana state line. [c]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Bigeye shiner (*Notropis boops*)		Threatened	Found in pools of small, very clear streams with sand or gravel substrate that often cease to flow in late summer. Species very intolerant of turbid waters. [p]	No ODNR records within a 1-mile radius of the Project area. [b]	No
River darter (*Percina shumardi*)		Threatened	Found in very large rivers typically in areas of swift current. They are found over a gravel or rocky bottom in depths of 3 feet or more .[c]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Channel darter (*Percina copelandi*)		Threatened	Found in large, coarse sand or fine gravel bars in large rivers. [c]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Invertebrate Animals					
Rayed bean (*Villosa fabalis*)	Endangered	Endangered	Generally lives in smaller, headwater creeks, but sometimes is found in large rivers and wave-washed areas of glacial lakes; species prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation. Adults spend their entire lives partially or completely buried in substrate [q]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Sheepnose (*Plethobasus cyphyus*)	Endangered	Endangered	Found in shallow areas of large rivers or streams. Prefers swift to moderate current. [a]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Fanshell	Endangered	Endangered	Medium to large rivers. Found in areas with a moderate current that have sand and gravel. [a]	No ODNR records within a 1-mile radius of the Project area. [b]	No

TABLE 8-6
Listed Species in the Project County (Brown)

Common Name (Species Name)[a, b]	Federal Status [a, b]	State Status [b, c]	General Habitat Notes	Recorded Location within Project Vicinity	Potential Habitat in Project Area
(*Cyprogenia stegaria*)					
Pink mucket (*Lampsilis orbiculata*)	Endangered	Endangered	Found in mud and sand in the shallow riffles of major rivers and their tributaries. [a]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Snuffbox (*Epioblasma triquetra*)	Endangered	Endangered	Small to medium-sized creeks and some larger rivers, in areas with a swift current.	No ODNR record locations within a 1-mile radius. [b]	No
Washboard (*Megalonaias nervosa*)		Endangered	Found in large rivers, inhabiting the main channel areas of a stream. Suitable habitat consists of slow current areas with substrates composed of sand, gravel, or mud. [h]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Ebonyshell (*Fusconaia ebena*)		Endangered	Large rivers in sand or gravel substrates. [r]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Butterfly (*Ellipsaria lineolata*)		Endangered	Large rivers in sand or gravel substrates. [h]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Elephant-ear (*Elliptio crassidens*)		Endangered	Inhabits large rivers in mud, sand or fine gravel. [h]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Yellow sandshell (*Lampsilis teres*)		Endangered	Occurs in medium-sized creeks to large rivers, often in slower current areas of stream borders. [d]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Ohio pigtoe (*Pleurobema cordatum*)		Endangered	Inhabitant of large rivers, found in strong currents on substrates of sand and gravel. [f]	No ODNR records within a 1-mile radius of the Project area. [b]	No
Little spectaclecase (*Villosa lienosa*)		Endangered	Typically inhabits small creeks to medium-sized rivers, usually along the banks in slower currents; soft substrate areas of primarily	No ODNR records within a 1-mile radius of the Project area. [b]	No

TABLE 8-6
Listed Species in the Project County (Brown)

Common Name (Species Name)[a, b]	Federal Status[a, b]	State Status[b, c]	General Habitat Notes	Recorded Location within Project Vicinity	Potential Habitat in Project Area
			smaller streams in lowlands, but also known from large rivers.[d]		
Monkeyface (*Quadrula metanevra*)		Endangered	Found in habitats dominated by stable substrates in water over 6 feet deep.[h]	No ODNR records within a 1-mile radius of the Project area.[b]	No
Wartyback (*Quadrula nodulata*)		Endangered	Can occur in medium to large rivers at depths of up to 15-18 feet on sand and mud substrate.[d]	No ODNR records within a 1-mile radius of the Project area.[b]	No
Threehorn wartyback (*Obliquaria reflexa*)		Threatened	Found in large rivers in sand or gravel; may be locally abundant in impoundments.[g]	No ODNR records within a 1-mile radius of the Project area.[b]	No
Fawnsfoot (*Truncilla donaciformis*)		Threatened	Found in large rivers or the lower reaches of medium-sized streams in sand or gravel.[g]	No ODNR records within a 1-mile radius of the Project area.[b]	No
Long-solid j (*Fusconaia maculata maculata*)		Endangered	Found in medium to large rivers in gravel with strong currents.[d]	No ODNR records within a 1-mile radius of the Project area.[b]	No
Plants[i, j]					
Running buffalo clover (*Trifolium stoloniferum*)	Endangered	Endangered	Disturbed bottomland meadows; disturbed sites that have shade during part of each day[i]	No ODNR records within a 1-mile radius of the Project area.[b]	No

Notes:

a USFWS, 2017b
b ODNR-DOW, 2017a
c ODNR-DOW, 2017b
d NatureServe, 2016
e USFWS, 2007
f USDA, 2002
g USFWS, 2016b
h MDNR, 2017
i USFWS, 2017c
j ODNR-DOW, 2018a
k ODNR-DOW, 2018b
l ODNR-DOW, 2018a
m ODNR, 2012a
n ODNR, 2012b
o ODNR, 2012c
p ODNR, 2012d
q USFWS, 2012
r INHS, 2018

(b) Commercial Species

The commercially important species along the proposed routes consist of those hunted or trapped for fur or other byproducts, including the following species. This information was obtained from ODNR-DOW Species Guide Index (ODNR-DOW, 2016b).

Beaver (*Castor canadensis*): Beavers occur in forested ponds, lakes, and rivers. In rivers, beavers make burrows with an underwater entrance in the riverbank. However, in streams, lakes and ponds, beavers usually build dams that incorporate a lodge. Based on the habitat present along the routes, beavers could potentially inhabit only a few locations. Evidence of beaver-chewed trees was present within the Project area.

Coyote (*Canis latrans*): Historically, coyotes prefer open territory, but in Ohio, they have adapted to various habitat types. Coyotes are a very adaptable species that has prospered despite the expanding presence of human impact. This species is likely found near or within the Project area, but was not observed during field investigations.

Gray Fox (*Urocyon cinereogentus*): The gray fox prefers wooded areas and partially open brush land with little human presence. Based on habitat present along the routes, this species is not likely found near or within the Project, and was not observed during field investigations. However, they are nocturnal animals.

Long-tailed weasel (*Mustela frenata*): The long-tailed weasel is an adaptable animal that can be found in terrestrial habitats near water. Based on habitat present along the routes, this species is potentially found near or within the Project, but was not observed during field investigations. However, they are generally nocturnal animals.

Mink (*Mustela vison*): Mink are usually found near water, both running and standing. Minks prefer wooded or brushy areas. This species was not observed during the field investigations.

Muskrat (*Ondatra zibethicus*): The muskrat is a large freshwater rodent. This species was not observed during the field investigations, but it could inhabit select locations along the routes.

Raccoon (*Procyon lotor*): The raccoon is widespread in Ohio, even in many suburban and urban areas. Raccoons prefer wooded areas with water nearby. This nocturnal species was not observed during the field investigations, but it is likely present throughout the area.

Red fox (*Vulpes vulpes*): The red fox inhabits a wide range of habitats. This species was not observed during field surveys.

River otter (*Lontra canadensis*): River otters live in aquatic habitats such as rivers, lakes, and marshes. They prefer tributaries of large, clean drainages where there is minimal human disturbance. This habitat does not occur within the Project area, and therefore is not likely to be found in the Project area.

Striped skunk (*Mephitis mephitis*): The skunk is an adaptable animal that occupies both rural and suburban areas. Their dens may be located under buildings, in open fields, on hillsides, or under logs in the woods, which may have been self-created or formerly used by other animals. This primarily nocturnal species was not observed during the field investigations, but it likely exists along the routes.

Virginia opossum (*Didelphis virginiana*): This marsupial's preferred habitat is an area interspersed with woods, wetlands, and farmland; however, they are an adaptable animal that can also be found in urban and suburban areas. This species was not observed during the field investigations, but it likely exists along the routes.

(c) Recreational Species

Recreational terrestrial species consist of those hunted as game. Recreational species expected to inhabit areas along the ROW include the following. This information was obtained from ODNR-DOW Species Guide Index (ODNR-DOW, 2016b).

(i) Fowl

American crow (*Corvus brachyrhynchos*): The American crow is found in all Ohio counties. They prefer habitats with open fields and trees. American crows were observed during the field investigations along most of the routes.

American woodcock (*Scolopax minor*): Woodcock prefer open, interspersed, early successional habitats with moist loam soils, which provide earthworms. The largest populations occur in northeast, north-central, and central regions of Ohio. The American woodcock was observed during the field investigations along the Preferred Route.

Geese: Several geese species can be found in Ohio, although typically during migration: snow geese (*Chen caerulescens*), greater white-fronted geese (*Anser albifrons*), cackling geese (*Branta hutchinsii*), and brant (*Branta bernicla*). The Canada goose (*Branta canadensis*) is commonly found throughout Ohio, both as residents and migrants. Habitat for Canada geese was observed along the routes and Canada geese were the only wild goose species observed during field surveys.

Mourning dove (*Zenaida macroura*): Mourning doves are found near rural and suburban residences, nesting in shrubs and trees. They are also frequent in rural farmlands nesting in fencerows and edge habitats. Habitat for this species is present throughout the routes. This species was observed frequently during field surveys.

Mergansers: Several merganser species can be found in Ohio, such as the common merganser (*Mergus merganser*), red-breasted merganser (*Mergus serrator*), and hooded merganser (*Lophodytes cucullatus*). Habitat for these species includes freshwater rivers and lakes (Cornell Lab of Ornithology, 2017a), wooded lakes and ponds, and inland waters of coastal states, respectively. Habitat for these species is present along the routes in select areas. This species was not observed during field surveys.

Northern bobwhite quail (*Colinus virginianus*): The northern bobwhite quail is a forest edge species. This species could exist in select locations along the routes; however, it was not observed during field surveys.

Ring-necked pheasant (*Phasianus colchicus*): This species can be found primarily along agricultural edges. Pheasants succeed where farming is intensive if there is adequate undisturbed cover for nesting, and sufficient food and cover during winter. This species likely inhabits select locations along the routes; however, no pheasants were observed during field surveys.

Ruffed Grouse (*Bonasa umbellus*): Grouse habitat includes mixed hardwood shrub and forest stands. Large stands of mixed hardwood shrub and forests were not present within the Project area, and therefore it is unlikely that the ruffed grouse occurs within the Project area.

Teal: Several teal species could be found in Ohio. The cinnamon teal (*Anas cyanoptera*), green-winged teal (*Anas crecca*), and blue-winged teal (*Anas discors*) are waterfowl. They are usually birds of fresh, shallow marshes and rivers instead of large lakes and bays. Habitat for these species is not present along the routes in select areas, and no species were observed during field surveys.

Various duck species: Various duck species can be found in Ohio, most of which are present only during migration. The American black duck (*Anas rubripes*), redhead (*Aythya americana*), greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), canvasback (*Aythya valisineria*), and northern pintail (*Anas acuta*) are usually only found in Ohio during migration and could be found near the proposed routes at that time. The mallard (*Anas platyrhynchos*) and wood duck (*Aix sponsa*) are two duck species that regularly reside and migrate through Ohio.

- Mallard: Most mallards occupy extensive wetlands; however, they are very adaptable. Mallards can be found inhabiting small farm ponds, ditches with flowing water, streams, lakes, and ponds in urban areas. Habitat for this species does exist throughout the Routes. This species was not observed during field surveys.

- Wood Duck: The wood duck prefers mature riparian corridors, quiet backwaters of lakes, ponds bordered by large trees, and secluded wooded swamps. Habitat for this species was not present along the Routes. This species was not observed during field surveys.

Wild turkey (*Meleagris gallopavo*): Wild turkeys are adaptable animals. Although they prefer mature forests, they can thrive in areas with as little as 15 percent forest cover. Habitat for this species was observed along the Routes.

(ii) Mammals

Eastern cottontail rabbit (*Sylvilagus floridanus*): This species is found in both rural and urban areas. They prefer open areas bordered by thickets or brush areas. This species' preferred habitat and presence was observed throughout the routes.

Gray, red, and fox squirrels (*Sciurus carolinensis, Tamiasurius hudsonicus,* and *Sciurus niger*, respectively): The fox squirrel is primarily an inhabitant of isolated woodlots 10 to 20 acres in size with a sparse understory. The eastern gray squirrel prefers more extensive woodland areas. The red squirrel prefers coniferous and mixed forests. Squirrels were observed during the field surveys along the routes.

White-tailed deer (*Odocoileus virginianus*): White-tailed deer are found in rural and suburban areas. Indirect evidence along the routes. White-tailed deer were observed during the field surveys along the routes.

Woodchuck (*Marmota monax*): Woodchucks live in open grasslands, pastures, and woodlands. This species was not observed during field surveys, but is likely present throughout the routes.

(iii) Game Fish

Based upon the hydrologic connectivity and the nature of the surface water habitats known to occur within the Project area, diverse game fish species are not anticipated to inhabit the streams that are crossed by the Routes. A list of game fish known to occur in Ohio was obtained from ODNR-DOW's Sport Fish of Ohio Identification Guide (ODNR-DOW, 2012). The list was narrowed to fish most likely to be found within the Project area based on professional judgment and experience, and as such, the list of species presented in this section is not an exhaustive list of all species potentially present in the Project area. The listed species are known to be regionally common and likely to occur on a case-by-case basis, within the surface water features proposed to be crossed or encroached. Neither aquatic species nor habitat surveys were completed as part of the field surveys.

Bluegill (*Lepomis macrochirus*): Bluegill are found throughout the state, preferring clear ponds and lakes with rooted vegetation. This species may occur in streams and ponds along the routes.

Bullhead Catfish (*Ameiurus* sp.): Bullhead catfish are common throughout the state. Brown bullheads prefer clean, clear water, while black bullheads can tolerate more turbid water. Yellow bullheads prefer areas with heavy vegetation. Bullhead catfish could potentially be found within the Project area.

Common Carp (*Cyprinus carpio*): Carp can be found in throughout the state, preferring turbid waters rich in organic matter. It is likely that common carp are present in streams along the routes.

Green Sunfish (*Lepomis cyanellus*): Green sunfish are present in most lakes and streams throughout the state and are tolerant of turbid water. They are regularly associated with some type of structure such as brush, vegetation, or rocks. This species is likely to occur in streams and ponds along the routes.

Largemouth Bass (*Micropterus salmoides*): Largemouth bass are found in ponds, lakes, and slow sluggish streams throughout the state. This species is likely to be found in the Project area.

Longear Sunfish (*Lepomis megalotis*): Longear sunfish are found in streams and lakes throughout the state. They prefer sluggish, clear streams of moderate size with beds of aquatic vegetation. This species is likely to be found in the Project area.

Rock bass (*Ambloplites rupestris*): Rock bass are widespread throughout the state. They prefer clear streams with coarse gravel and boulders. This species may occur in streams along the routes.

(2) Construction Impacts on Identified Species

Based on the nature of the proposed Project activities and habitat characteristics of the surrounding vicinity, construction impacts to protected species are not anticipated. Winter tree clearing (October 1 through March 31) to avoid impacts to bat species, and no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species, will be adhered to. The construction impact on other specific identified species (recreational and commercial) is expected to be minor because equivalent habitat that would be impacted during construction exists immediately adjacent to the construction ROW, and the identified species are mobile.

(3) Operation and Maintenance Impacts on Identified Species

Minimal impacts are anticipated to protected wildlife during operation and maintenance of the transmission line. Clearing of secondary growth vegetation will be required along some portions of the ROW; however, approximately 9.4 percent of the Preferred Route and approximately 19.5 percent of the Alternate Routes are undeveloped, allowing it to retain its current vegetative community. Operational activities and periodic maintenance of the ROW are not anticipated to impact wildlife significantly because of the minimal permanent ground disturbance and available adjacent habitat available.

(4) Mitigation Procedures

If areas are identified during the informal consultation process with USFWS and ODNR that are of special concern, AEP Ohio Transco will coordinate with these agencies to develop appropriate mitigation measures. The mitigation measure will be implemented if the area of special concern is located within the route approved by the OPSB.

(D) SITE GEOLOGY

(1) Site Geology

Both routes are located within the Till Plains Section of the Central Lowland Province of the Interior Plains. The Project is specifically located within the Illinoian Till Plain, a rolling ground moraine of older till generally lacking ice-constructional features, with elevations ranging from 600’ – 1100’ above sea level. Soils in the area are generally silt-loam, high lime, Illinoian-age till with loess cap. The area is underlain by Ordovician- and Silurian-age carbonate rocks and calcareous shales (ODNR, 1998).

There are two bedrock units that underlay the Project area. The Drowning Creek Formation is a Silurian-age Formation composed primarily of limestone and also contains shale interbedded with moderate to abundant fossils (USGS, 2005a). Approximately 9 percent of the area within 1,000 feet of the Preferred Route and approximately 23 percent of the area within the 1,000 feet of the Alternate Route occurs atop the Drowning Creek Formation. The Preacherville Member of the Drakes Formation, Waynesville, and Arnheim Formation, Undivided, is an Ordovician-age Member composed primarily of shale, limestone, and dolomite interbedded (USGS, 2005b). Approximately 91 percent of the area within 1,000 feet of the Preferred Route and approximately 77 percent of the area within the 1,000 feet of the Alternate Route occurs atop this Member.

Portions of the Project area, specifically the northeastern portions, may be in a karst terrain. Karst terrain is defined as regions that contain karst features, such as sinkholes, caves, springs, and disappearing streams (ODNR-DGS, 2015). Karst features are typically formed in carbonate bedrock in Ohio, however some features occur on evaporite rock as well (ODNR-DGS, 2015). Limestone is a carbonate rock that underlays the Project in both the Drowning Creek Formation and the Preacherville Member of the Drakes Formation, Waynesville, and Arnheim Formation Undivided.

A karst survey was conducted within the Sugar Tree Ridge 7.5-Minute Quadrangle, which includes the northeastern portion of the Project area. This survey identified one suspected karst-feature southeast of the intersection of Busch Road and Katterman Road (approximately 0.4 miles south east of the Preferred Route). Several field-verified karst features are located within two miles of the northern Project area (Aden, 2016). Karst features may pose infrastructure complications due to subsidence risk (Aden, 2016).

An updated map of areas with probable karst in Ohio was published in 2006. This updated map incorporated additional data to further refine areas of probable karst throughout Ohio. The additional data includes bedrock geology, drift thickness, and the glacial margin extents. This updated map shows areas of probable karst in northeast Brown County, but no occurrences of known karst (Powers, Hull, 2006).

(2) Slopes and Foundation Soil Suitability

Slopes exceeding 12 percent, obtained from the NRCS, are identified in Figures 8-2A through 8-2F and Figures 8-3A through 8-3H. Less than one percent of the slopes in the area within 1,000 feet of the Preferred Route occurs where slopes exceed 12 percent (less than 0.5 acre). Slopes exceeding 12 percent occur within less than one percent of the area within 1,000 feet of the Alternate Route (approximately one acre). During construction, AEP Ohio Transco will implement a SWPPP and associated BMPs as necessary to control erosion and sedimentation in areas with slopes exceeding 12 percent. Once construction is complete, soils will be revegetated and stabilized. As a result, no erosional impacts resulting from slopes exceeding 12 percent are expected.

The bedrock geologies consisting primarily of limestone, secondarily shale, and overlaying soils consisting of primarily high-lime silt loams, present along both routes. To obtain further site-specific details on the suitability of the soils for foundation construction, AEP Ohio Transco will conduct detailed engineering design and geotechnical soil borings. Engineering design and geotechnical test drilling will likely be completed soon after the Project is certificated by OPSB and engineering plans and boring logs will be provided to the staff shortly thereafter.

At a minimum, geotechnical soil borings will provide the following information to be utilized for structure placement and foundation design engineering as needed:

(1) Subsurface Soil Properties
(2) Static Water Level
(3) Rock Quality Description
(4) Percent Recovery
(5) Depth and Description of Bedrock Contact

AEP Ohio Transco anticipates that foundations will only be required at some angle structures that will be ultimately determined during the engineering design. When required, foundations will be engineered based on the results of geotechnical soil borings to ensure they are in locations considered suitable based on soil and rock properties and surface slope.

(E) ENVIRONMENTAL AND AVIATION REGULATION COMPLIANCE

(1) Licenses, Permits, and Authorizations Required for the Facility

AEP Ohio Transco anticipates submitting a Notice of Intent for coverage under the OEPA General National Pollutant Discharge Elimination System (NPDES) Permit. Coverage under USACE's Nationwide Permit 12 for wetland and waterbody impacts associated with Utility Line Activities may be required, but will be determined once the construction plan is finalized and therefore impacts to waters can be determined. It is also anticipated that multiple road crossing permits will be required.

(2) Construction Debris

The site will be kept clean of debris resulting from the work. Debris associated with construction of the proposed transmission line will likely include conductor scrap, construction material packaging including cartons, insulator crates, conductor reels and wrapping, and used stormwater erosion control materials. Clearance poles, conductor reels and other materials with salvage value will be removed from the construction area for reuse or salvage. Construction debris will be disposed of in accordance with state and federal requirements in an OEPA-approved landfill or other appropriately licensed and operated facility. Where vegetation must be cleared, the resulting brush will be removed or windrowed along the edge of the ROW or as requested by individual property owners. Marketable timber will generally be cut into appropriate lengths for sale or disposition by the landowner.

(3) Stormwater and Erosion Control

A SWPPP will be prepared, BMPs implemented to minimize soil erosion and sedimentation and other pollutant discharges, and these will be made available onsite during Project construction. The SWPPP will include the following General Conditions, at a minimum:

Erosion and Sediment Controls

Implementation of erosion and sediment control practices will be based on the methods and standards described in the ODNR *Rainwater and Land Development* manual (ODNR, 2014); and the OEPA NPDES Permit Program for the discharge of stormwater from construction sites.

Wetlands, streams, and other environmentally sensitive areas will be clearly marked before the start of clearing or construction. No construction or access will be permitted in these areas unless clearly specified in the SWPPP.

No permanent impacts to streams or headwaters are anticipated. No H-frame structures/poles are anticipated to be located in streams and no permanent stream crossings are anticipated. Streams, including beds and banks, if disturbed during construction, will be re-stabilized immediately after in-channel work is completed.

Grubbing activities are not anticipated. Sediment basins, traps, and perimeter sediment controls will be implemented within 7 days of grubbing activities. Sediment controls will continue to function until disturbed areas are permanently stabilized.

Silt Fence: Silt fencing or other appropriate BMPs for erosion control will be installed as needed before ground-disturbing work begins. Silt fence will be installed according to the methods recommended in the *Rainwater and Land Development* manual (ODNR, 2014) before upslope land disturbance begins. In general, silt fence will be used where there is the possibility that sheet flow will carry sediment-laden water into downstream creeks or wetlands. Other methods will be used where flow in ditches, channels or gullies is anticipated. The following installation guidelines will be followed:

- Silt fence will be constructed before upslope land disturbance begins.
- All silt fences will be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
- Ends of the silt fences will be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
- Silt fences will be placed on the flattest area available.
- Where possible, vegetation will be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it will be reestablished within 7 days from the installation of the silt fence.

- The height of the silt fence will be a minimum of 16 inches above the original ground surface.
- The silt fence will be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench will be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
- The silt fence will be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile will be below the ground surface. Excess material will lay on the bottom of the 6-inch deep trench. The trench will be backfilled and compacted on both sides of the fabric.
- Seams between sections of silt fence will be spliced together only at a support post with a minimum 6-inch overlap prior to driving into the ground.

Soil Stabilization: Disturbed areas that remain unworked for more than 21 days will be stabilized with seed and mulch no later than 14 days after the last construction in that area.

Maintenance and Inspection: Erosion and sediment control practices will be inspected at least once every 7 days and within 24 hours after any storm event greater than 0.5 inch of rain per 24-hour period.

AEP Ohio Transco will maintain erosion control measures in good working order. If a repair is necessary, it will be initiated within 24 hours of report. Silt fencing will be inspected for depth of sediment, for tears, for assurance fabric is securely attached to the fence posts, and to ensure that the fence posts are firmly in the ground. Seeded areas will be inspected for evidence of bare spots or washouts. Permanent records of the maintenance and inspection must be maintained throughout the construction period. Records will include, at a minimum, the name of the inspector, major observations, date of inspection, certification of compliance, and corrective measures taken.

(4) Disposition of Contaminated Soil and Hazardous Materials

All materials stored onsite will be kept in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure. Products will be kept in their original containers with the original manufacturer's label. Manufacturer's recommendations for proper use and disposal will be followed. Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) will be retained and available onsite at all times.

The following General Conditions will also be included in the SWPPP to address disposition of contaminated soil and hazardous materials generated or encountered during construction:

Spill Prevention

The following spill prevention methods and procedures are proposed:

- All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled.
- Secondary containment will be provided for all onsite fuel storage tanks required during construction.
- All sanitary waste will be collected in portable units and emptied regularly by a licensed sanitary waste management contractor, as required by local regulations.
- All spills will be cleaned up immediately after discovery. Manufacturer's recommended methods for spill cleanup will be followed. Materials and equipment necessary for spill cleanup will be kept in a designated storage area onsite.
- Spills will be reported to the appropriate government agency as required.
- Suspected hazardous materials encountered during construction will be reported to the regional environmental coordinator by the transmission construction representative. In addition, the Project Manager will be notified.

The Project requires a Spill Prevention Plan to be created and available for review onsite. This Spill Prevention Plan will cover proper handling techniques for all electrical equipment, materials and construction equipment that require a MSDS. AEP Ohio Transco also requires its employees and contractors to follow all federal and state-mandated material-handling requirements.

AEP Transmission follows an internal Spill Prevention Notification Plan that is closely aligned to AEP Ohio Transco's Spill Response and Cleanup – Field Guide. This Spill Response and Cleanup – Field Guide covers the following procedures:

- Oil/Polychlorinated Biphenyl (PCB) Spill Response and Cleanup Procedure
- When to Report an Oil/Polychlorinated Biphenyl (PCB) Spill to the Region Environmental Coordinator
- Hazardous Substance Spill Response Procedure
- Region Environmental Coordinator Contact List

This field guide outlines spill response and cleanup procedures as well as the reporting that is required. The Spill Response and Cleanup – Field Guide will be available upon request.

(5) Maximum Height of Above Ground Structures

The height of the tallest anticipated aboveground structure and construction equipment is designed to be approximately 90 feet. The nearest airport, Alexander Salamon Airport, located in Winchester Ohio, is approximately 11 miles southeast of the southern terminus of the Project.

The Federal Aviation Administration (FAA) Form 7460-1, "Notice of Proposed Construction or Alteration," is used for FAA notification. This can be filed electronically or by standard U.S. mail. A 7.5-minute quadrangle topographic map showing the proposed construction must be attached to the completed Form 7460-1. The Form 7460-1 must be submitted 45 days prior to the proposed start of construction.

Additionally, a permit from the ODOT, Office of Aviation, must be obtained prior to the start of any construction on or near airports in Ohio that are open to the public. A duplicate of the federal filing fulfills the state permit application requirements as set forth in O.A.C. 5501:1-10-06.

(a) Filing Criteria

The FAA Form 7460-1 must be filed for any construction or alteration of more than 200 feet in height. Additionally, any construction or alteration extending outward and upward more than specific slope angles in reference to aircraft take-off or landings on airport runways may require filing with the FAA. Upon completion of the final design, AEP Ohio Transco will review the need for any permitting with the FAA and will follow recommendations made by the FAA.

(6) Dusty or Muddy Conditions Plan

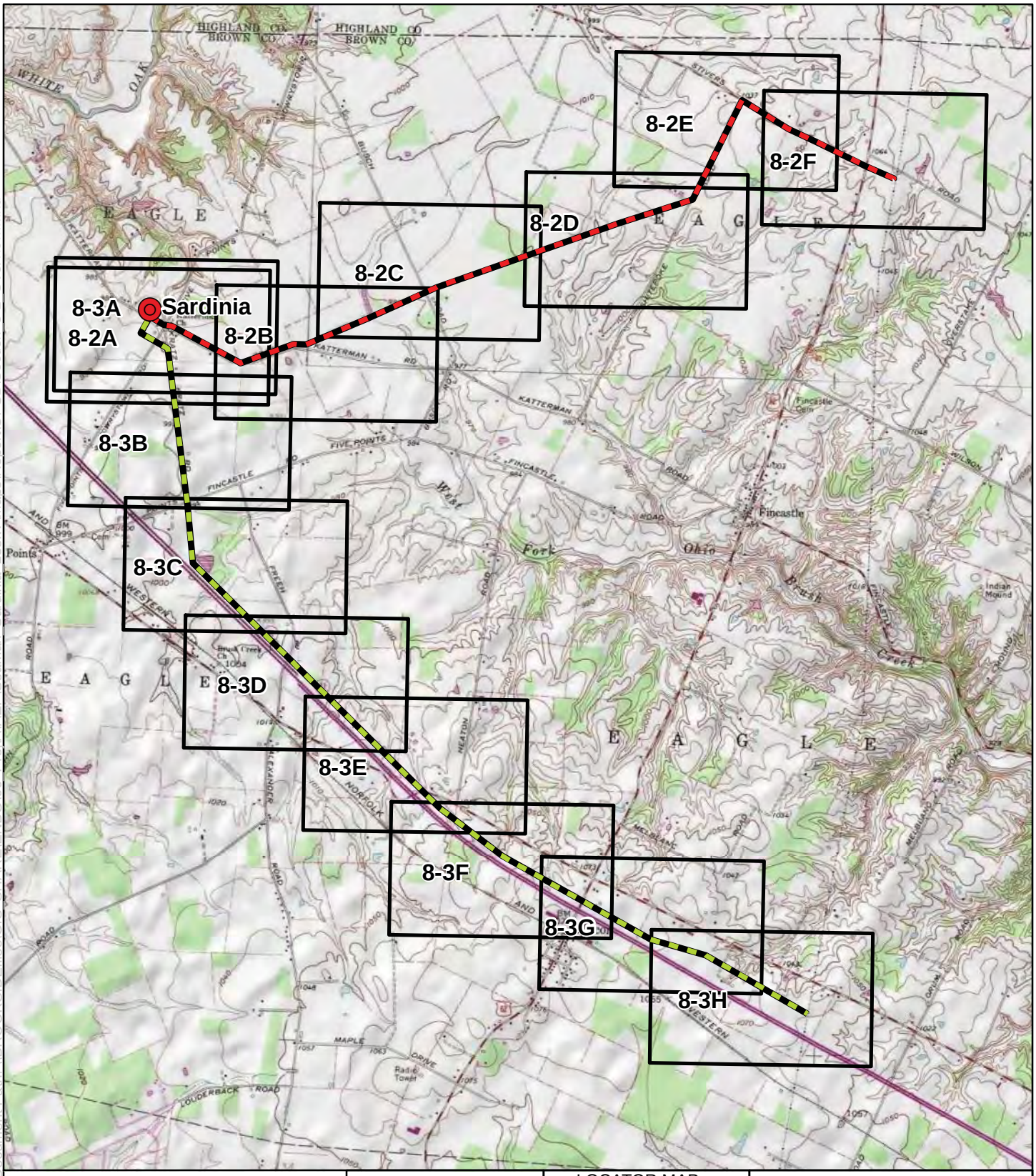
Dust Control

The site and surrounding areas will be kept free from dust nuisance resulting from site activities. During excessively dry periods of active construction, dust suppression will be implemented where necessary through irrigation, mulching, or application of tackifier resins.

Excessive Muddy Soil Conditions

Construction entrances will be established and maintained to a condition that will prevent tracking or flowing of sediment onto public ROW. Accumulated sediment spilled, dropped, washed, or tracked onto public ROWs will be removed as soon as practical.

Figures



Legend

- Project Substation
- Preferred Route
- Alternate Route
- Figure Key

BASE MAP SOURCE:
USGS 7.5-minute
Topographic Quadrangles:
Sardinia, Sugar Tree Ridge,
Ash Ridge, Winchester

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:80,000

April 19, 2018

LOCATOR MAP

Figure 8-1
Wetland and Waterbody
Overview Map

Sardina Area
Improvements Project
Brown County, Ohio

0 0.5 1
Miles

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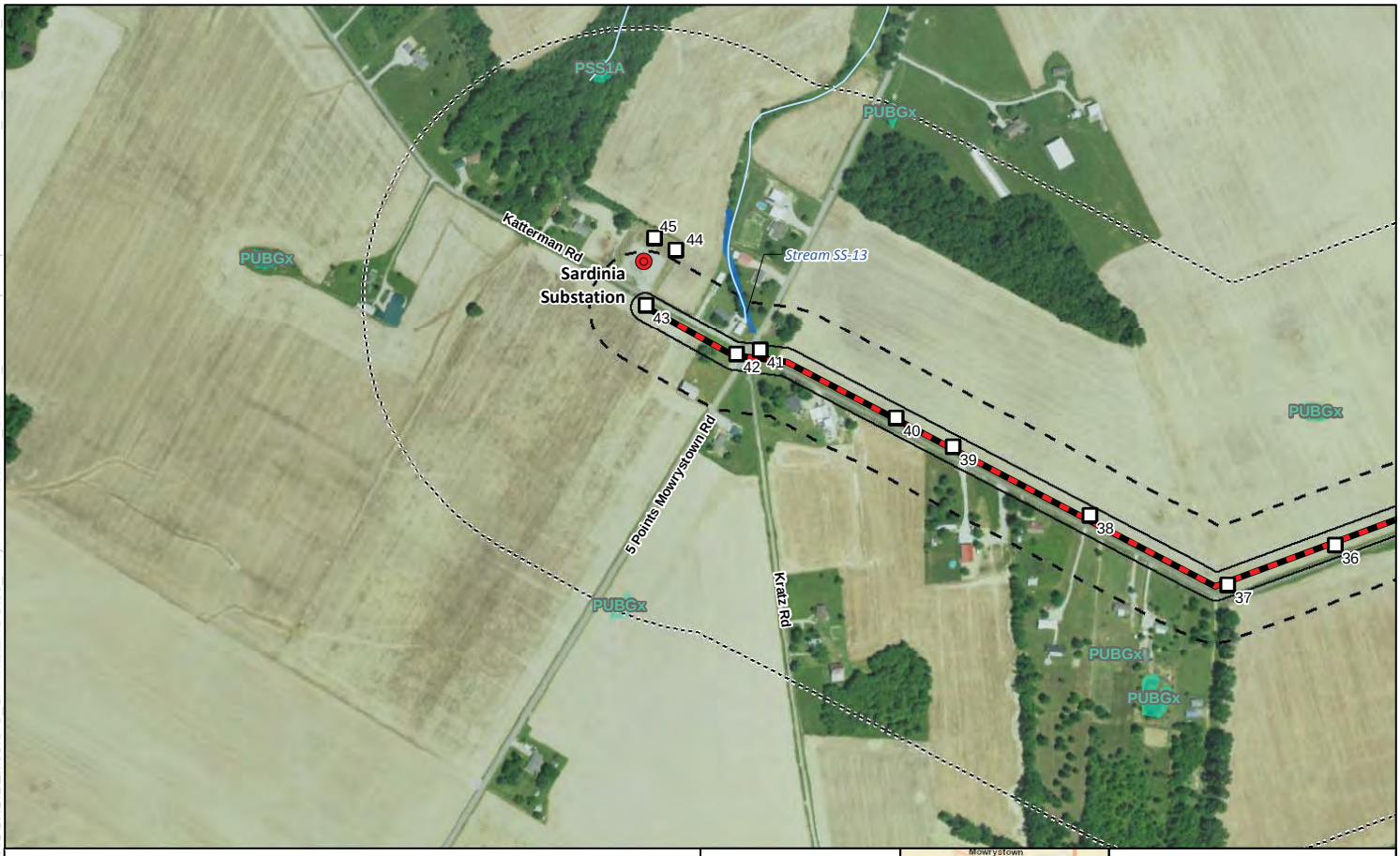


Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 19, 2018

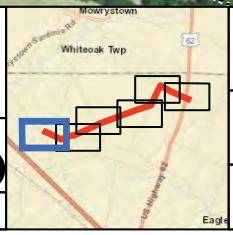


FIGURE 8-2A
Preferred Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 19, 2018

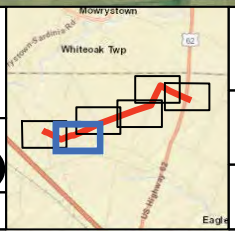
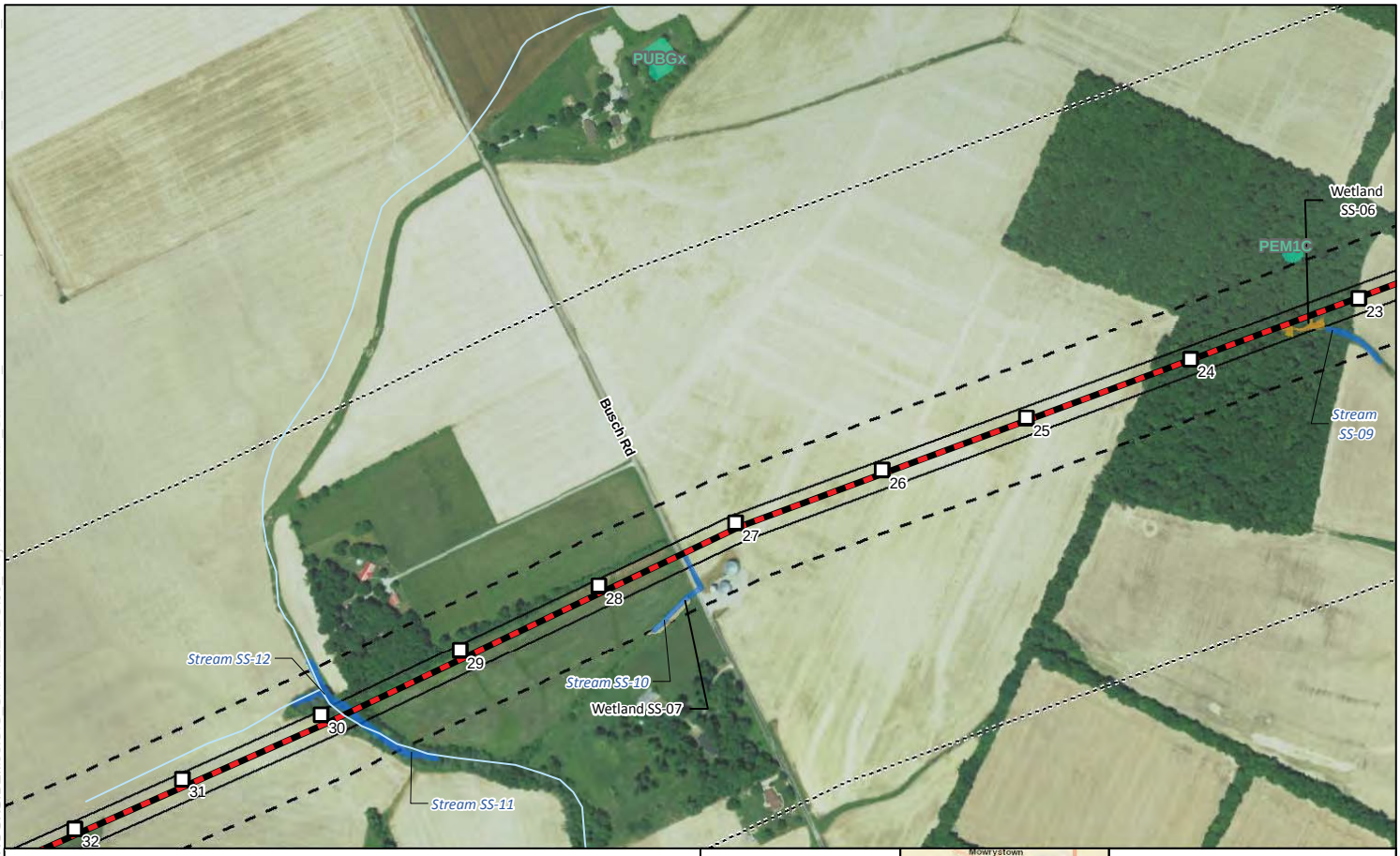


FIGURE 8-2B
Preferred Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 19, 2018

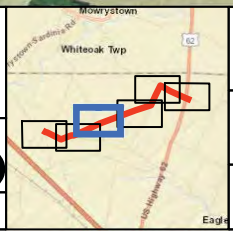
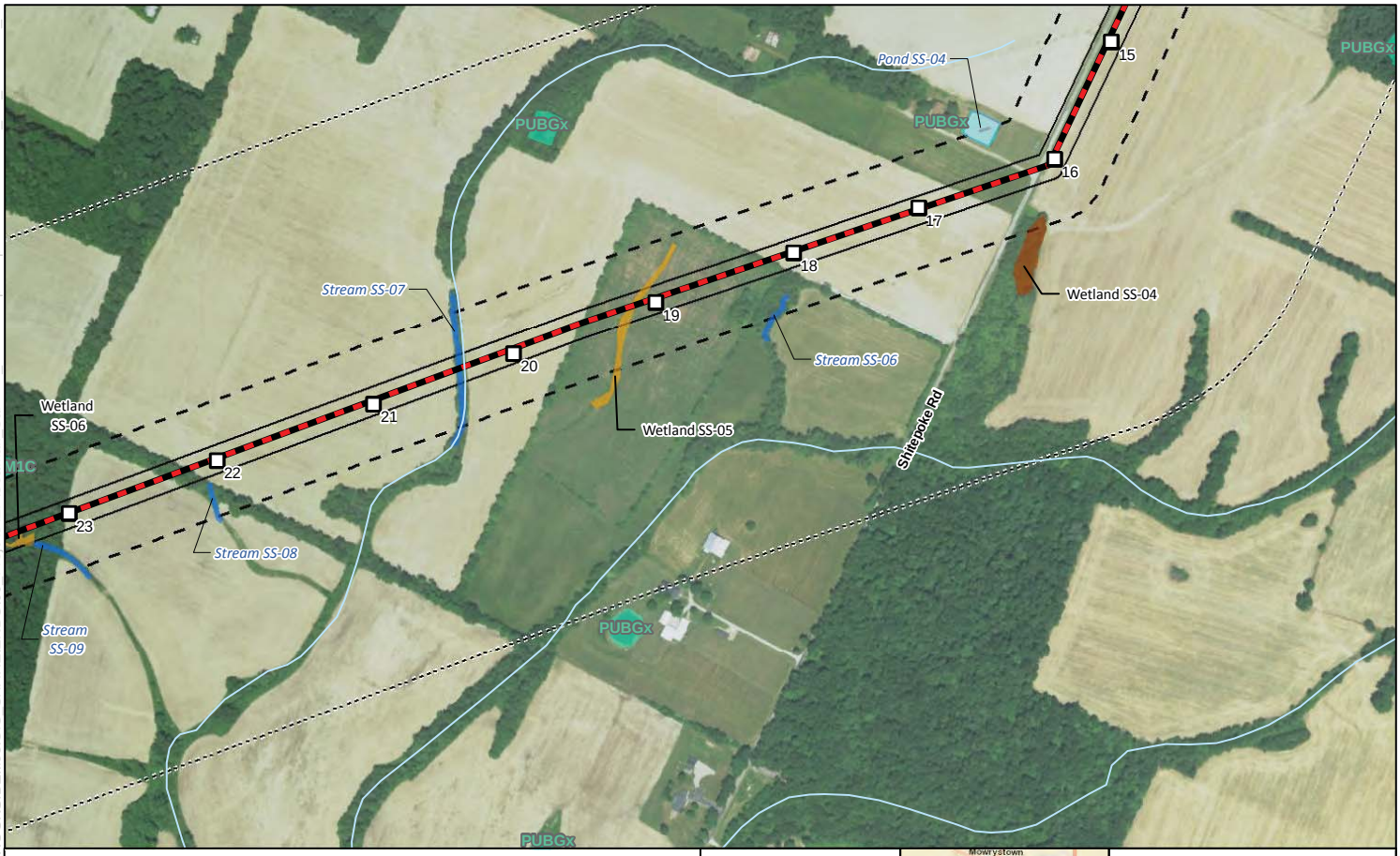


FIGURE 8-2C
Preferred Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 19, 2018

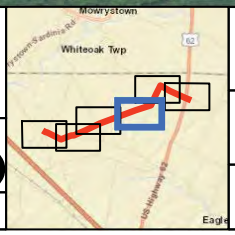
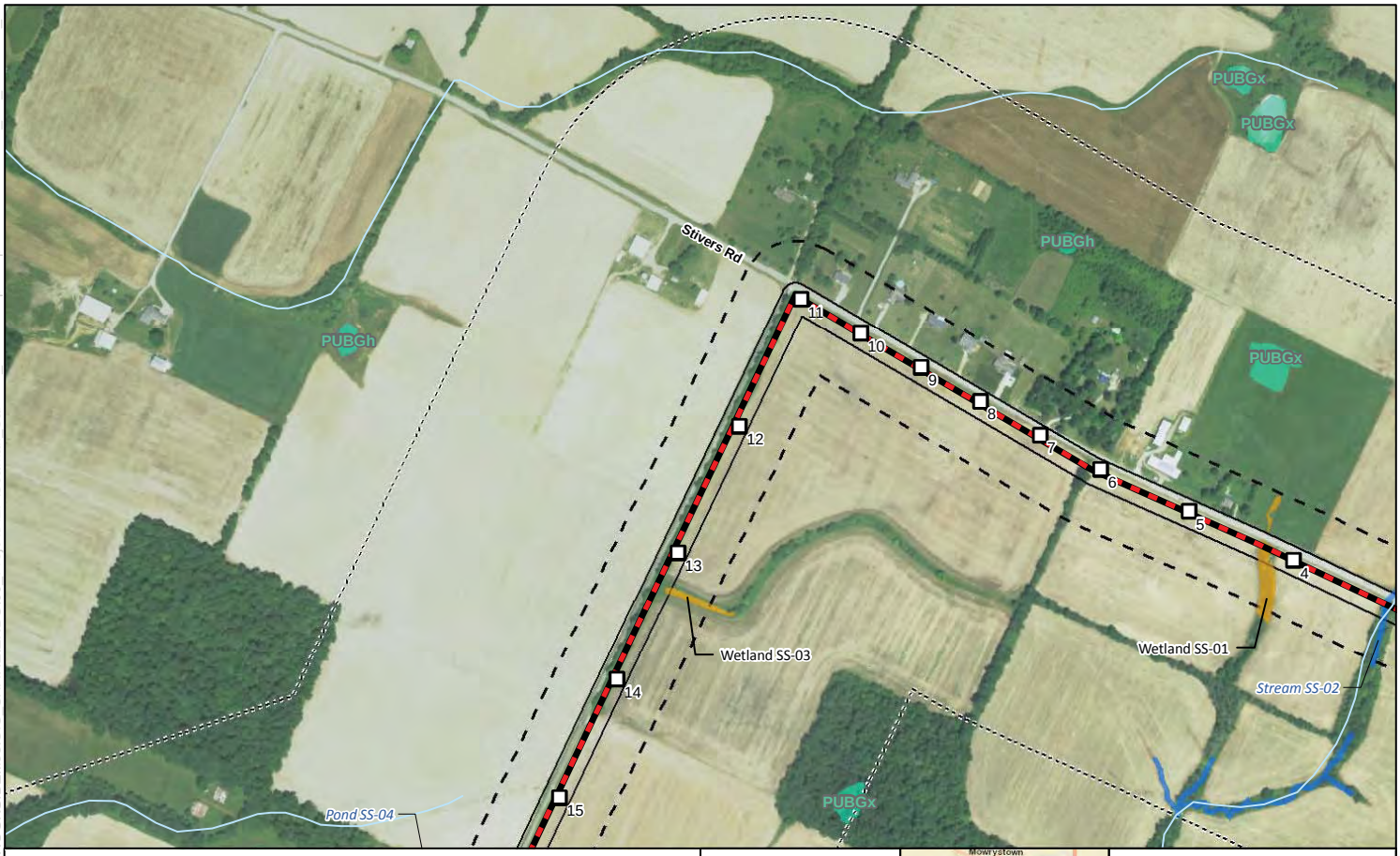


FIGURE 8-2D
Preferred Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale 1:6,000

April 19, 2018

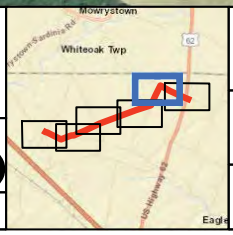
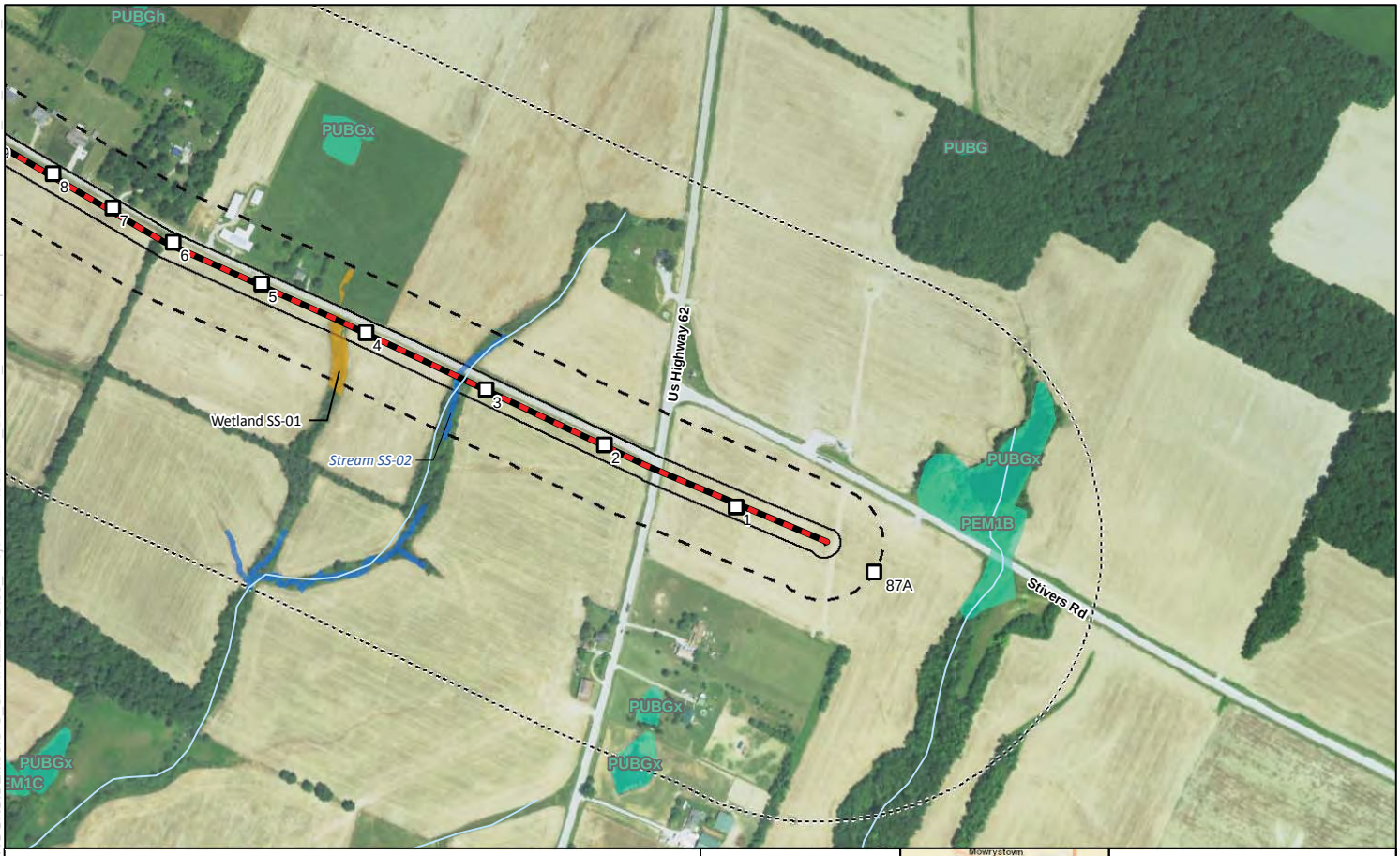


FIGURE 8-2E
Preferred Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Proposed Structure
- Substation
- Preferred Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
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April 19, 2018

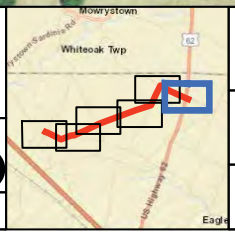

FIGURE 8-2F
Preferred Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
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April 20, 2018

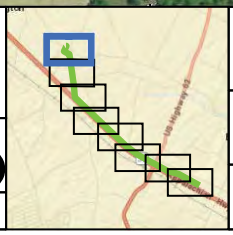

FIGURE 8-3A
Alternate Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
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- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
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- Vernal Pool

BASE MAP SOURCE:
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Coordinate System: State Plane Ohio South FIPS 3402 Feet
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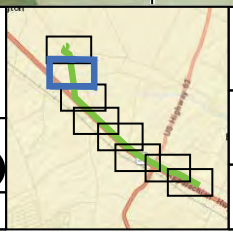

FIGURE 8-3B
Alternate Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE: National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
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April 20, 2018

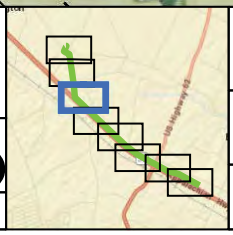
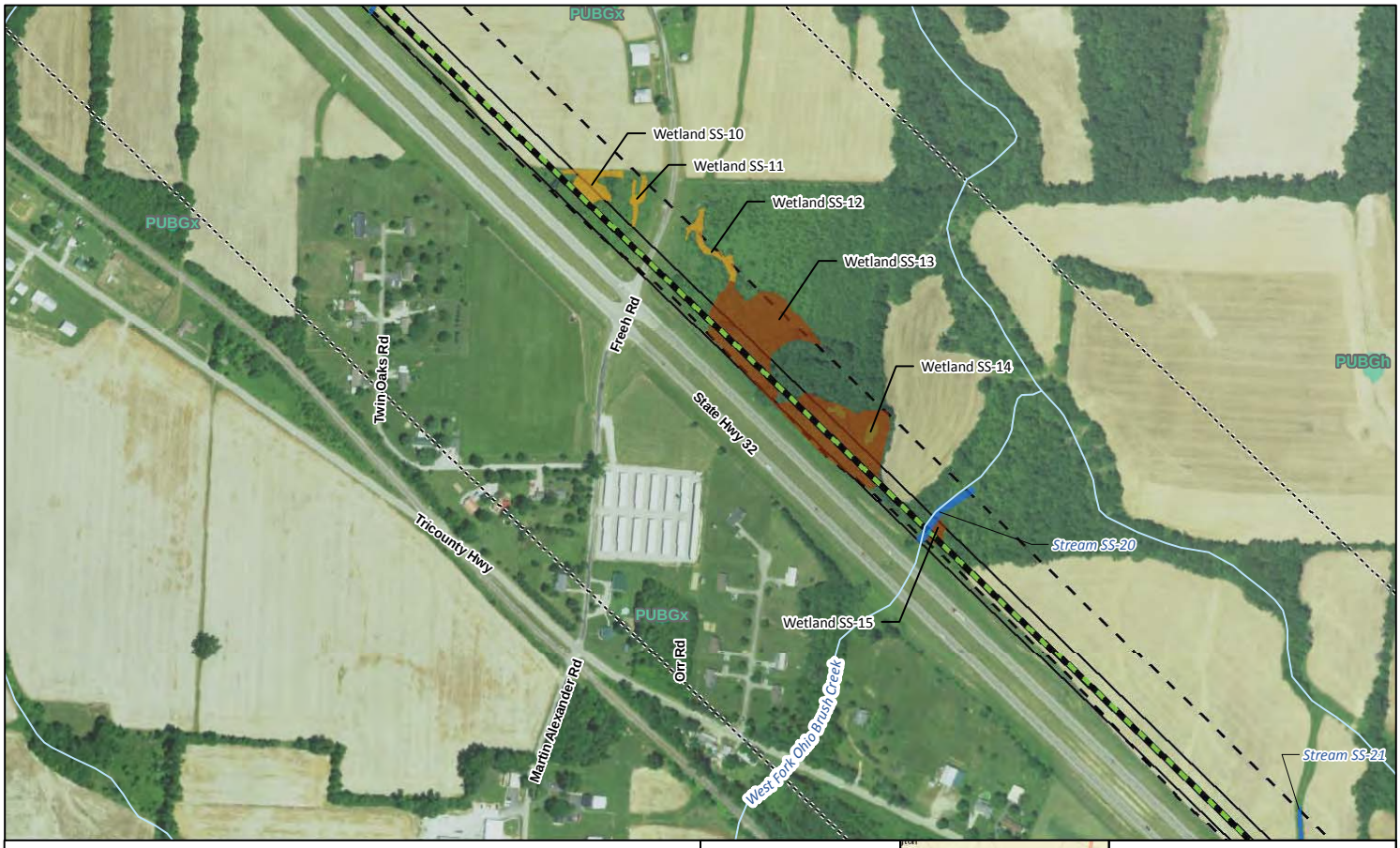


FIGURE 8-3C
Alternate Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

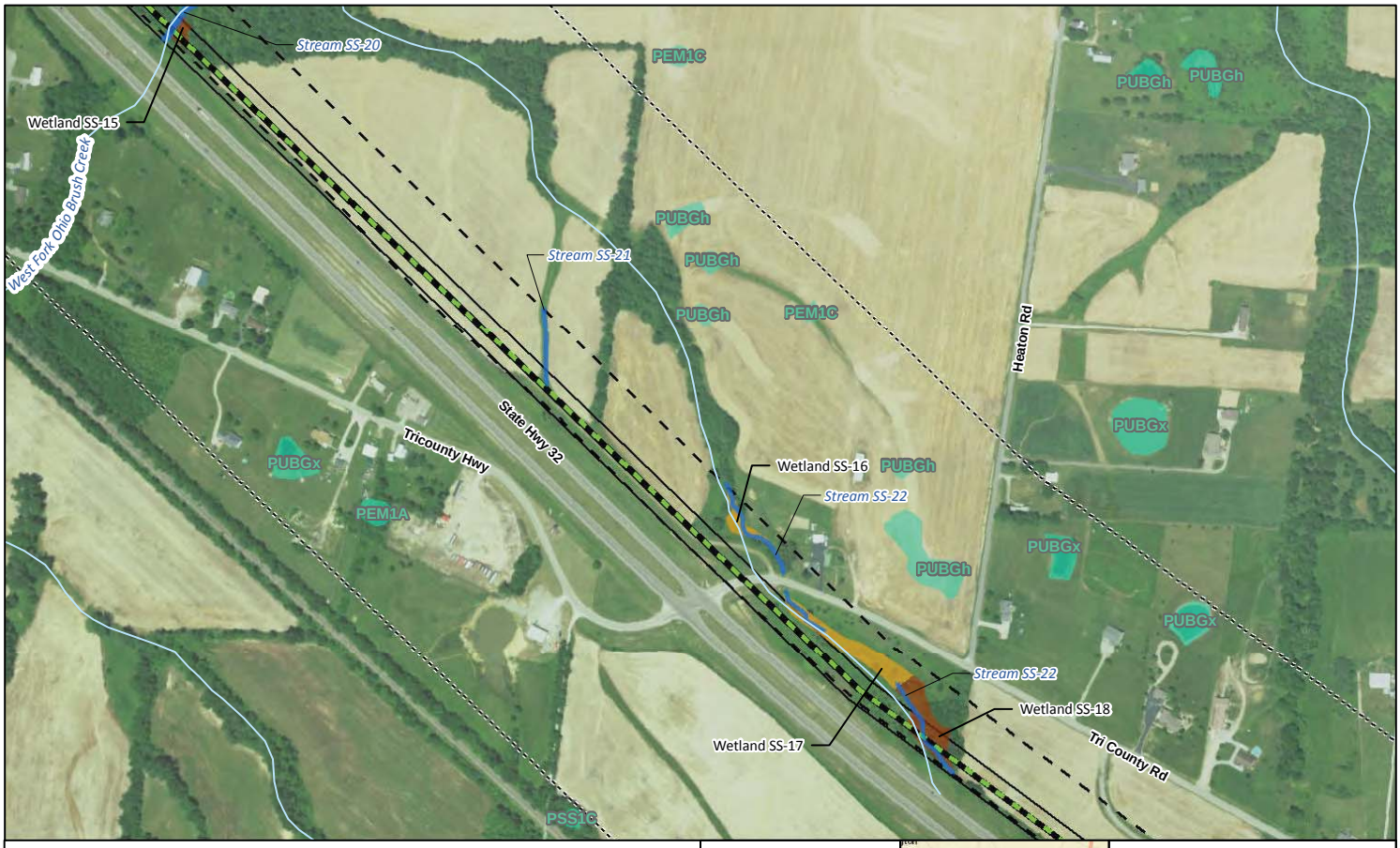
Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale: 1:6,000

April 20, 2018

FIGURE 8-3D
Alternate Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
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- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale: 1:6,000

April 20, 2018

FIGURE 8-3E
Alternate Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

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Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
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Coordinate System: State Plane Ohio South FIPS 3402 Feet
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April 20, 2018

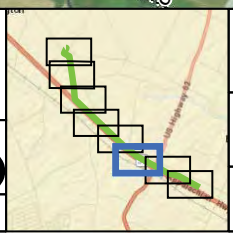
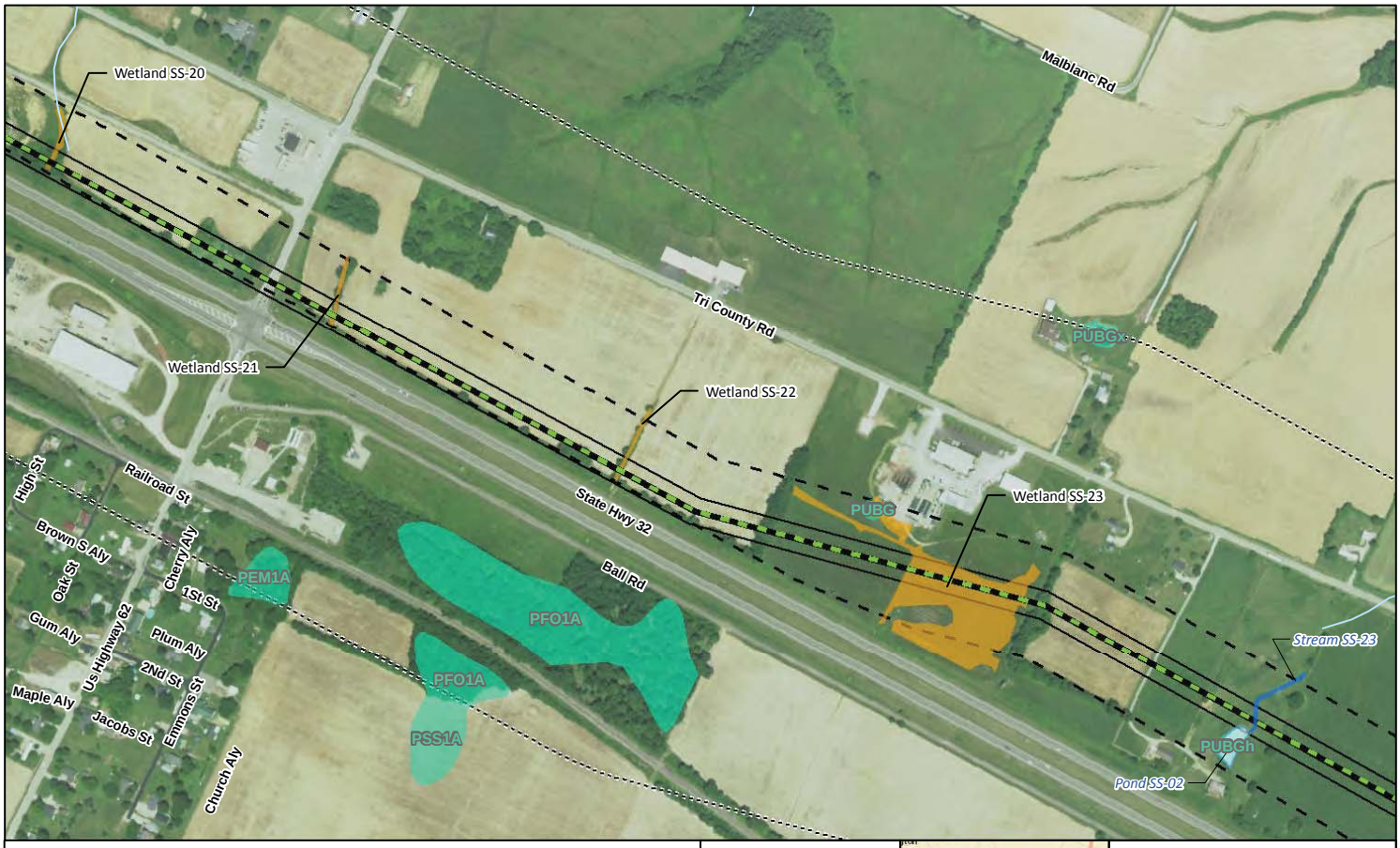


FIGURE 8-3F
Alternate Route Delineated Wetland and Waterbodies Map

AEP OHIO

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane Ohio South FIPS 3402 Feet
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April 20, 2018

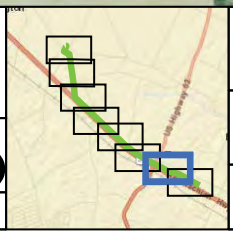
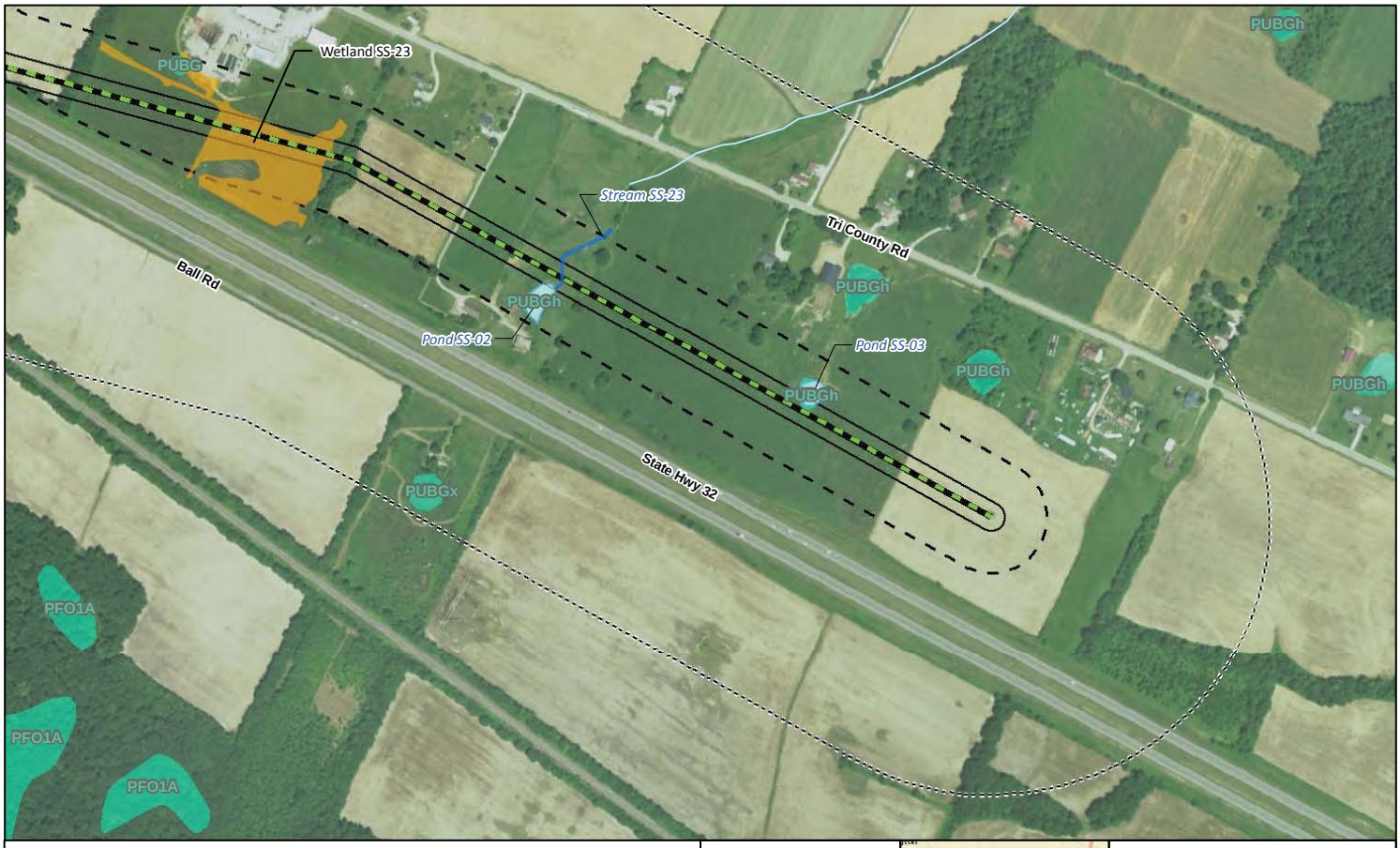


FIGURE 8-3G
Alternate Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet



Legend

- Substation
- Alternate Route
- Right-of-Way
- Survey Corridor
- 1,000-Foot Buffer
- Stream (NHD)
- Wetland (NWI)
- Slope > 12%
- Delineated Stream
- Delineated Pond

Delineated Wetland

- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Vernal Pool

BASE MAP SOURCE:
National Agricultural Imagery Program, 2017

Coordinate System: State Plane
Ohio South FIPS 3402 Feet
Datum: NAD 1983
Scale: 1:6,000

April 20, 2018

FIGURE 8-3H
Alternate Route Delineated Wetland and Waterbodies Map

Sardinia Area Improvements Project
Brown County, OH

0 400 800
Feet

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Summary: Application (Seaman-Sardinia 138kV Transmission Line Project (a/k/a the Sardinia Area Improvements Project)) electronically filed by Ms. Christen M. Blend on behalf of AEP Ohio Transmission Power Company, Inc.