APPLICATION TO THE OHIO POWER SITING BOARD FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

OPSB Case No.
14-0469-EL-BTX

The Dayton Power and Light Company

West Milton-Eldean 138 kV Transmission Line Project

May 2018

Prepared by:
GAI Consultants, Inc.

Prepared for:
The Dayton Power and Light Company

Application to the Ohio Power Siting Board For a Certificate of Environmental Compatibility and Public Need

The Dayton Power and Light Company

West Milton-Eldean 138 kV Transmission Line Project

OPSB Case No. 14-0469-EL-BTX

May 2018

gai consultants

DP&L

BEFORE THE OHIO POWER SITING BOARD

Certificate Application for Electric Transmission Facilities

The Dayton Power and Light Company

West Milton-Eldean 138 kV Transmission Line Project

TABLE OF CONTENTS

SECTION **PAGE**

4906-15-01 PROJECT SUMMARY AND FACILITY OVERVIEW 01-1

(A) PROJECT SUMMARY AND FACILITY OVERVIEW..... 01-1
(1) Statement Explaining General Purpose..... 01-1
(2) Description of Proposed Facility..... 01-2
(3) Description of Site Selection Process..... 01-2
(4) Principal Environmental and Socioeconomic Considerations of the Sites or Routes 01-3
(a) Land Use Impacts..... 01-3
(b) Economic Impacts 01-3
(c) Ecological Impacts..... 01-4
(d) Cultural Impacts..... 01-5
(5) Project Schedule 01-5
(B) GENERAL OVERVIEW 01-6
(C) ELECTRONIC COPY OF DATA..... 01-6

4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT 02-1

(A) STATEMENT OF NEED..... 02-1
(1) Purpose of Proposed Facility 02-1
(2) Specific Projections of System Conditions..... 02-2
(3) Relevant Load Flow Studies..... 02-2
(4) Transcription Diagrams Depicting System Performance with and without Proposed Project..... 02-2
(B) EXPANSION PLANS 02-2
(1) Electric Transmission Lines and Associated Facilities..... 02-2
(a) Long Term Forecast Report 02-2
(b) Regional Expansion Plans 02-2
(2) Gas Transmission Lines..... 02-3
(C) IMPACT OF THE FACILITY ON ELECTRIC POWER SYSTEM ECONOMY AND RELIABILITY 02-3
(D) OPTIONS CONSIDERED TO ELIMINATE NEED FOR CONSTRUCTION OF A TRANSMISSION LINE 02-3
(E) REASON FACILITY WAS SELECTED FOR PROJECT NEED..... 02-3
(F) FACILITY SCHEDULE..... 02-3
(1) Proposed Schedule (bar chart format)..... 02-3
(2) Delays..... 02-3

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

4906-15-03 ROUTE ALTERNATIVES ANALYSIS 03-1

(A) ROUTE SELECTION STUDY 03-1

4906-15-04 TECHNICAL DATA 04-1

(A) ROUTE ALTERNATIVES DATA 04-1
(1) Geography and Topography 04-1
(a) Transmission Line Alignments, Including Proposed Turning Points 04-1
(b) Proposed Substation Site Locations 04-2
(c) Major Highway and Railroad Routes 04-2
(d) Air Transportation Facilities 04-2
(e) Utility Corridors 04-2
(f) Proposed Permanent Access Roads 04-3
(g) Lake, Ponds, Reservoirs, etc 04-3
(h) Topographic Contours 04-3
(i) Soil Associations or Series 04-3
(j) Population Centers and Legal Boundaries of Cities, Villages, Township, Counties 04-3
(2) Slope and Soil Mechanics 04-4
(a) Slopes 04-4
(b) Soil Suitability 04-5
(B) LAYOUT AND CONSTRUCTION 04-5
(1) Site Activities 04-5
(a) Surveying and Soil Testing 04-5
(b) Grading and Excavation 04-6
(c) Access Road Construction 04-6
(d) Stringing of Cable 04-6
(e) Post Construction Reclamation 04-7
(2) Layout for Associated Facilities 04-7
(a) Site Map (1:2,400 Scale) 04-7
(b) Reasons for Proposed Layout and Unusual Features 04-7
(c) Future Modifications Plans 04-7
(C) TRANSMISSION EQUIPMENT 04-8
(1) Transmission Line Design Data 04-8
(a) Design Voltage 04-8
(b) Transmission Pole Structures, Conductor Data, and Insulator Configuration 04-8
(c) Base and Foundation Design 04-9
(d) Underground Cable Design 04-10
(e) Other Major Equipment or Special Structures 04-10
(2) Electrical Substation Design Data 04-10
(3) Not Applicable (Gas Transmission Lines) 04-10

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

(D) ENVRONMENTAL AND AVIATION COMPLIANCE INFORMATION 04-10
(1) List and Discussion of Permits Required 04-10
(2) Descriptions, Quantification, and Disposal of Construction Debris 04-10
(3) Storm Water and Erosion Control 04-11
(4) Contaminated Soil and Hazardous Materials 04-12
(5) Height of Tallest Anticipated Above Ground Structures 04-13
(6) Construction Plans in Poor Soil Conditions 04-14

4906-15-05 FINANCIAL DATA 05-1

(A) OWNERSHIP..... 05-1
(B) ELECTRIC CAPITAL COSTS 05-1
(C) GAS CAPITAL COSTS..... 05-2

4906-15-06 SOCIOECONOMIC AND LAND USE IMPACT ANALYSIS..... 06-1

(A) SOCIOECONOMIC CHARACTERISTICS 06-1
(B) TRANSMISSION ROUTES, SUBSTATION SITES, AND LAND USE..... 06-2
(1) Transmission Line Alignments 06-2
(2) Substation Sites 06-3
(3) General Land Use..... 06-3
(a) Residential..... 06-3
(b) Commercial..... 06-3
(c) Industrial..... 06-3
(d) Cultural 06-3
(e) Agricultural 06-3
(f) Recreational..... 06-4
(g) Institutional 06-4
(4) Transportation Corridors 06-4
(5) Existing Utility Corridors..... 06-4
(6) Noise Sensitive Areas..... 06-5
(7) Agricultural and Agricultural District Land 06-5
(C) LAND USE IMPACTS 06-5
(1) Number of Residential Structures..... 06-6
(2) Construction Impacts..... 06-7
(a) Residential Use..... 06-8
(b) Commercial Use 06-8
(c) Industrial Use..... 06-8
(d) Cultural Sites & Structures..... 06-8
(e) Agricultural Use 06-9
(f) Recreational Use 06-9
(g) Institutional Use 06-9
(3) Operation and Maintenance Impacts..... 06-9
(a) Residential Use..... 06-9

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

(b) Commercial Use 06-10
(c) Industrial Use....06-10
(d) Cultural Use 06-10
(e) Agricultural Use....06-10
(f) Recreational Use 06-10
(g) Institutional Use 06-10
(4) Mitigation 06-10
(a) Residential Use....06-11
(b) Commercial Use 06-11
(c) Industrial Use....06-11
(d) Cultural Use 06-11
(e) Agricultural Use....06-11
(f) Recreational Use 06-11
(g) Institutional Use 06-11
(D) PUBLIC INTERACTION INFORMATION....06-11
(1) Counties, Townships, Villages, and Cities 06-11
(2) Public Officials Contacted....06-12
(3) Public Information Program....06-12
(4) Liability Compensation....06-12
(5) Public Interest, Convenience, and Necessity 06-12
(6) Tax Revenues 06-12
(7) Impact on Regional Development 06-13
(E) HEALTH, SAFETY AND AESTHETIC INFORMATION 06-13
(1) Compliance with Safety Regulations....06-13
(2) Electric and Magnetic Fields 06-14
(a) Electric Field Strength Results....06-16
(b) Magnetic Field Strength Results 06-18
(c) Current State of EMF Knowledge 06-20
(d) Company's Line Design Considerations 06-21
(e) Procedures for Addressing Public Inquiries Regarding EMF....06-22
(3) Aesthetic Impacts....06-22
(a) Views of the Proposed Facility 06-23
(b) Structure Design Features 06-23
(c) Facility Effect of the Site and Surrounding Area....06-23
(d) Visual Impact Minimization....06-23
(4) Estimate of Radio and Television Interference 06-24
(F) IMPACTS ON CULTURAL RESOURCES....06-24
(1) Cultural Resources Studies and Agency Correspondence....06-24
(2) Construction Impacts....06-26
(3) Operation and Maintenance Impacts....06-26
(4) Mitigation Procedures 06-26
(G) NOISE EMISSIONS....06-27
(1) Construction 06-27
(a) Dynamiting or Blasting Activities....06-27
(b) Operation of Earth Moving & Excavating Equipment. 06-27

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

(c) Driving Piles 06-29
(d) Erection of Structures 06-29
(e) Truck Traffic 06-29
(f) Installation of Equipment 06-29
(2) Operation and Maintenance 06-29
(3) Mitigation Procedures 06-29
(H) OTHER SIGNIFICANT ISSUES 06-30
(I) REFERENCES 06-30

4906-15-07 ECOLOGICAL IMPACT ANALYSIS 07-1

(A) SUMMARY OF ECOLOGICAL IMPACT STUDIES 07-1
(B) ECOLOGICAL FEATURES 07-2
(1) Transmission Line Alignments 07-2
(2) Substation Locations 07-2
(3) All Areas Currently Not Developed for Agricultural, Residential, Commercial, Industrial, Institutional, or Cultural Purposes 07-2
(a) Streams and Drainage Channels 07-2
(b) Lakes, Ponds, and Reservoirs 07-5
(c) Marshes, Swamps, and Other Wetlands 07-6
(d) Woody and Herbaceous Vegetation Land 07-7
(e) Locations of Threatened and Endangered Species 07-7
(4) Soil Associations 07-10
(C) STREAMS AND BODIES OF WATER 07-11
(1) Construction Impact 07-11
(2) Operation and Maintenance Impact 07-11
(3) Mitigation Procedures 07-11
(D) WETLAND IMPACTS 07-11
(1) Construction Impacts 07-11
(2) Operation and Maintenance Impact 07-12
(3) Mitigation Procedures 07-13
(E) VEGETATION IMPACT 07-13
(1) Construction Impacts 07-13
(2) Operation and Maintenance Impact 07-14
(3) Mitigation Procedures 07-14
(F) COMMERCIAL, RECREATIONAL, AND THREATENED/ENDANGERED SPECIES IMPACT 07-14
(1) Construction Impacts 07-15
(a) Commercial Species 07-15
(b) Recreational Species 07-16
(c) Protected Species 07-17
(2) Operation and Maintenance Impacts 07-19
(3) Mitigation Procedures 07-19

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

(G) SLOPE AND ERODIBLE SOILS 07-19
(1) Construction Impact 07-19
(2) Operation and Maintenance Impact 07-19
(3) Mitigation Procedures 07-19
(H) SITE SPECIFIC INFORMATION 07-20

LIST OF TABLES

Tables:

2-1 Load Flow Analysis Results with and Without the Proposed Facility
5-1 Estimates of Applicable Intangible and Capital Costs for the Preferred and Alternate Routes
6-1 Study Area Demographics of the Preferred and Alternate Route
6-2 Land Use within the Preferred and Alternate Route Study Areas (within 1,000 feet)
6-3 Residential Structures within 100 feet of the Preferred and Alternate Routes
6-4 Conductor Position Coordinates for Each Modeled Cross-Section (Relative to Centerline and Ground Level)
6-5 Electric And Magnetic Field Results Summary Listing of the Calculated rms Field Magnitudes; Electric Fields in Kv/M and Magnetic Fields in Units of milligauss (mG) at Both Sides EROW and Maximum Beneath the Line.
6-6 Circuit Power Ratings for Three Load Scenarios Used for Magnetic Field Calculations
6-7 Typical Construction Noise Sources
7-1 Delineated Streams within 100 Feet of the Preferred and Alternate Routes
7-2 Delineated Wetlands within 100 Feet of the Preferred and Alternate Routes
7-3 ODNR and USFWS Listed Species with the Project Area

LIST OF FIGURES

Figure:

1-1 Preferred And Alternate Routes
2-1 Project Schedule
4-1 Land Use and Constraint Map
6A Two Transmission Lines Cross-Section Models used to Calculate Electric and Magnetic Fields
6B Calculated rms Electric Field Magnitudes for the Three Representative Cross-Section at One Meter Height
6C Calculated Magnetic Fields from Three Cross-Sections under the Summer Normal Load Scenario.
6D Calculated Magnetic Fields from Three Cross-Sections under Short-Term Emergency Load Scenario
6E Calculated Magnetic Fields from Three Cross-Sections under the Winter Normal Load Scenario
7-1 Wetland Delineation and Stream Assessment Map

APPENDICES

3-1 Route Selection Study Report
6-1 Local Public Officials Served Copy of Certificate Application
6-2 Public Information Meetings
7-1 Photographs Of Aquatic Resources
7-2 Ohio EPA Headwater Habitat Evaluation Index Forms and Qualitative Habitat Evaluation Index Stream Assessment Forms
7-3 Wetland Data Forms - U.S. Army Corps of Engineers Forms and Ohio Rapid Assessment Method Forms
7-4 Regulatory Agency Correspondence – U.S. Fish and Wildlife Service and Ohio Department of Natural Resources

(CULTURAL RESOURCES LITERATURE REVIEW REPORT –provided to OPSB under separate cover)

4906-15-01 PROJECT SUMMARY AND FACILITY OVERVIEW

(A) PROJECT SUMMARY AND FACILITY OVERVIEW

This Application seeks a Certificate of Environmental Compatibility and Public Need from the Ohio Power Siting Board ("Board") for the proposed West Milton-Eldean 138 kV Transmission Line Project ("Project"). This Project is being proposed by The Dayton Power and Light Company ("DP&L"), a wholly owned subsidiary of AES Corporation. The scope of the proposed Project involves the construction of the proposed single circuit 138 kV transmission line within Miami County, Ohio. DP&L would construct, maintain, operate and own the transmission line. The proposed Preferred and Alternate Routes for the Project, both of which are 16.6 miles in length, are described in this Application.

The Board has jurisdiction over major electric transmission installations located wholly within the state of Ohio. As such, DP&L is required to file this application for a Certificate of Environmental Compatibility and Public Need for the proposed Project with the Board. This application contains specific project details regarding environmental, socioeconomic, technical, ecological, justification of need, and financial matters.

(1) Statement Explaining General Purpose

The proposed, West Milton-Eldean 138 kV circuit will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation (NERC) reliability standards. It was through the PJM Regional Transmission Organization's planning process that the need for the proposed project was identified. Specifically, the Regional Transmission Expansion Planning (RTEP) contingency analysis showed that under the multiple contingency of DP&L's Shelby – Sidney 138 kV Circuit and DP&L's Miami – Eldean 138 kV Circuit, voltages would be below the minimum acceptable level per NERC reliability criteria at eight transmission buses. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and ensure compliance with the mandatory NERC reliability standards.

(2) Description of Proposed Facility

The proposed, West Milton-Eldean transmission line will consist of the construction and operation of a single 138 kV circuit line for improved reliability of electric service for DP&L's northwest area of their service territory. Some portions of the transmission line will be underbuilt with a 12.5 kV electric distribution line where the proposed route is co-located with an existing overhead electric distribution line (primarily along public road right-of-way). The Project will originate at the existing West Milton Substation located just south of the village of West Milton in Miami County, Ohio (Union Township). The transmission line Project would extend along the west side of West Milton (outside of the village's limits) to a point south of the town of Ludlow Falls, then head east adjacent to State Route 55, north adjacent to Forest Hill Road and then across agricultural land toward the northwest (Concord Township) until the route reaches the Eldean Substation located on Experiment Farm Road. Both the Preferred and Alternate Route are 16.6 miles in length.

(3) Description of Site Selection Process

GAI Consultants, Inc. (GAI) was contracted by DP&L to conduct the Route Selection Study to identify generally broad route corridors, specify route alternatives within the general corridors, define and quantify the physical attributes (land use, ecological, cultural, and engineering), systematically score and rank the route alternatives, and select a Preferred and Alternate route. The Route Selection Study is included as Appendix 3-1. The objective of the Route Selection Study was to identify and evaluate potential route alternatives between the two existing substations and ultimately select the alternative having the least impact on the overall human environment and sensitive ecological resources while being cost effective and technically feasible to construct and operate. DP&L and GAI incorporated public input received during and after two public informational meetings and various meetings with individual landowners which further optimized the Routes. The location of the Preferred and Alternate Route is shown in Figure 1-1 (following this section), Figure 4-1 of Section 4 (sheets 1 through 5, topographic base map) as well as Figure 7-1 of Section 7 (sheets 1 through 5) with an aerial image base map.

(4) Principal Environmental and Socioeconomic Considerations of the Sites or Routes

A general socioeconomic survey of the study area was performed as part of this Application. This included a field review, review of land use maps, review of current population estimates and projections for the area, consideration of compatibility of the Project with local and regional development plans, and an assessment of the impact of the Project on the surrounding community.

(a) Land Use Impacts: The Project is located predominantly in a rural, agricultural setting but portions of the transmission line routes occur along road right-of-way where there are intermittent residences located in this rural setting. Approximately 80% and 76% of the corridor review area (200 feet wide) for the Preferred and Alternate Routes, respectively, are comprised of agricultural land. Much of the remainder of the land for both routes consists of open land, residential lots, pasture land and forests. Impacts to agricultural land uses due to operation and maintenance are expected to be relatively minor in light of the overall percent of crop land that may be removed from cultivation due to new transmission structures. No recreational land or activities are anticipated to be impacted by the Project. No adverse impacts to commercial or industrial operations and businesses are anticipated to result from the Project.

Furthermore, the Preferred and Alternate Routes are co-located with either road right-of-way or existing transmission line right-of-way (DP&L-owned) that accounts for 11.2 miles and 8.9 miles, respectively, of the total 16.6-mile lengths. One primary area of industrial land use consists of a rock quarry within an approximate 550-foot section of the Preferred Route. A small summer camp facility consisting of sleeping cabins is located adjacent to the Preferred Route approximately 0.3-mile west of the West Milton Substation.

The number of residences within 1,000 feet of the Preferred Route is 195. Twenty (20) of the residences are within 100 feet of the route. There are 297 residences within 1,000 feet of the Alternate Route, 10 of which are within 100 feet.

(b) Economic Impacts: The Project could have a positive impact on regional development in Miami County due to the benefits of improved reliability of electric power. The Project would also produce additional tax revenue for local schools and the community. DP&L projects that the new transmission line will contribute between approximately $588,247 and $593,638 in total property taxes to Miami County, Union Township, and Concord Township over the first year after the

Project is completed. No negative impacts on regional development are foreseen for this Project.

(c) Ecological Impacts: An ecological survey was conducted for the Preferred Route and 94% of the Alternate Route within a 200-foot-wide corridor along the proposed routes to assess the presence and quality of streams and wetlands as well as suitable habitat for threatened and endangered species that may exist in the Project area. As noted in Section 4906-15-07 of this Application, three properties on the Alternate Route were inaccessible at the time of the field review as landowner approvals had not yet been granted. Published literature and maps containing relevant information were also researched prior to field reconnaissance reviews.

Seven streams (three of which are ephemeral type) including the Stillwater River (a State-designated scenic river) were observed along the Preferred Route and documented for physical habitat quality. Stream impacts during construction will be minimal as any equipment crossings will be controlled through methods outlined in the Project stormwater control plan. The Stillwater River would not be impacted by construction as the transmission line will only span the river. An overhead distribution line exists within the same alignment, and would be consolidated with the new transmission line structures. Only two small wetlands (less than 0.11-acre in the survey corridor) of the palustrine emergent type were observed on the Preferred Route and can be avoided by construction equipment as they do not fully encompass the construction corridor. Ten streams including the Stillwater River would be crossed by the Alternate Route.

Through correspondence with the U.S. Fish and Wildlife Service (USFWS), only the federally listed endangered Indiana bat, the federally listed threatened northern long-eared bat, and two mussel species were identified as potentially being present in the project vicinity. The mussel species, if present, would be limited to the Stillwater River and this river will not be disturbed during construction. Some forest areas, estimated at approximately 2.7 acres, may need to be partially or completely cleared for construction of either the Preferred or Alternate Route which could result in the removal of Indiana bat and northern long-eared bat habitat. DP&L would clear any trees during the winter season to avoid impacts to the Indiana bat. The Ohio Department of Natural Resources (ODNR) also provided correspondence stating that the same two bat species and two mussel species as noted by the USFWS, plus one mussel listed as a state species of concern and one threatened plant may occur in the vicinity of the Project. Impacts to all of these species are expected to be avoidable. The threatened plant species was identified several years ago well outside of the Project corridor, the only known occurrence in the area.

(d) Cultural Impacts: The following is a brief summary of cultural resources near the Project based on literature research:

Preferred Route: One historic structure, no National Register of Historic Places (NRHP) sites, and no historic districts were identified within 1,000 feet of this Route. Eight archaeological sites were recorded within 1,000 feet of the Preferred Route; three archaeological sites were recorded within 100 feet located within or near the right-of-way of State Route 55, approximately 0.4-mile east of the Stillwater River. These three small sites would be avoided for pole structure placement during engineering design. One cemetery is located within 1,000 feet of the Preferred Route near the West Milton Substation.

Alternate Route: Due to the Alternate Route being common with the Preferred Route along State Route 55, the same results apply to the Alternate Route for the specific State Route 55 section near the Stillwater River. For the entire Alternate Route, three historic structures, no NRHP sites, and no historic districts were identified within 1,000 feet of this Route. Twelve archaeological sites were recorded within 1,000 feet of the Alternate Route; three archaeological sites were recorded within 100 feet located within or near the right-of-way of State Route 55. One cemetery is located within 1,000 feet of the Alternate Route near the West Milton Substation.

Further research and possible field investigations will potentially be undertaken in specific areas along the Preferred Route (pending consultation with the Ohio Historic Preservation Office). Formerly discovered archaeological sites and new sites can typically be avoided through strategic transmission structure placement and planned access road placement or mitigation measures. Certain areas may also be excluded for construction equipment in order to prevent soil surface disturbance if warranted.

(5) Project Schedule

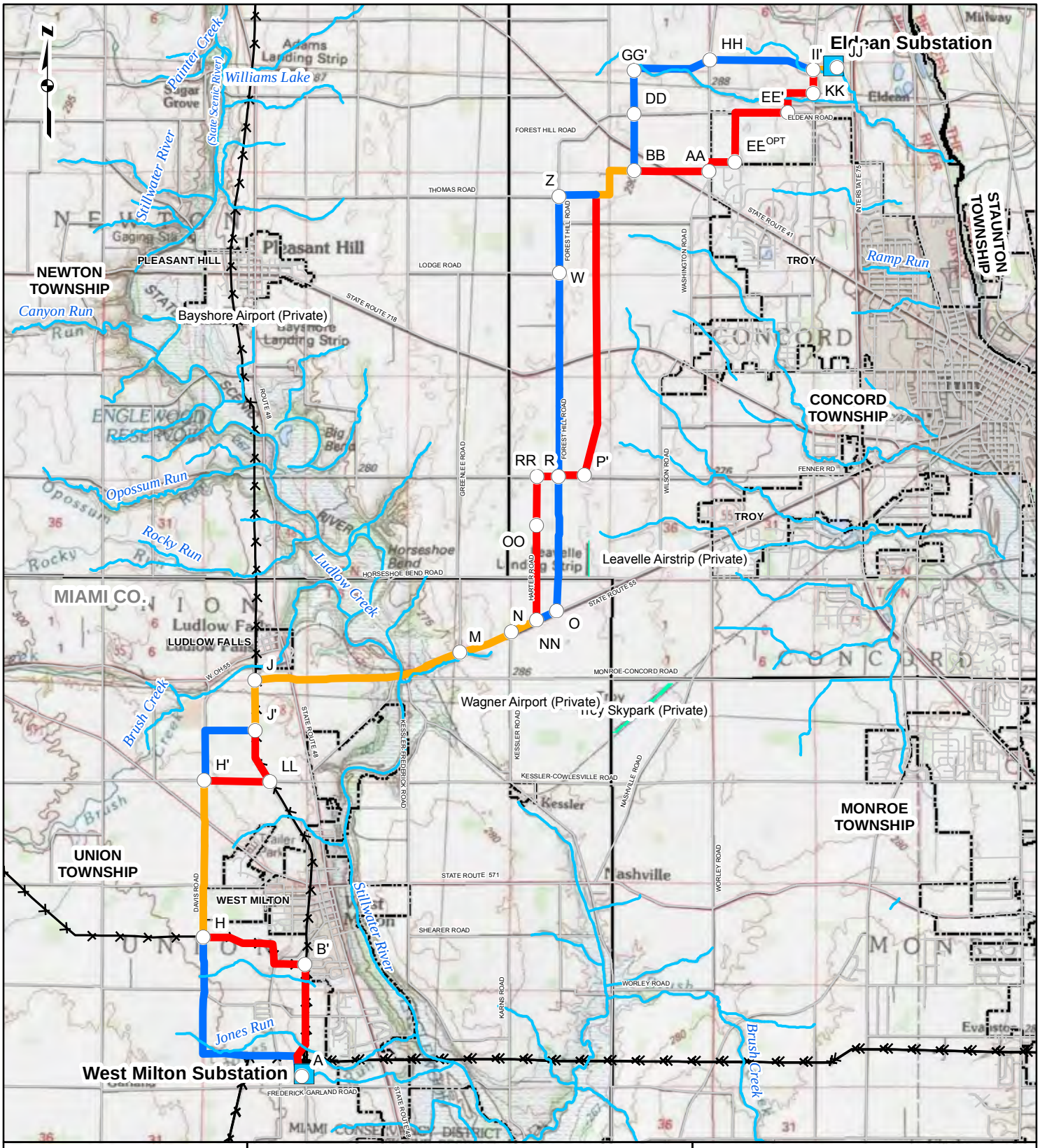
DP&L plans to commence construction of the transmission line in summer 2017 with an estimated in-service date by mid-2018. In the meantime, this Application will be under review by the Board, engineering design will be completed, and right-of-way acquisition from property owners will be conducted. Figure 2-1 in Section 2 provides additional details regarding the proposed Project schedule.

(B) GENERAL OVERVIEW

Information filed by the Applicant in response to the requirements of this section is not deemed responses to any other section of the application requirements.

(C) ELECTRONIC COPY OF DATA

The Applicant, DP&L, has prepared the required hard copy maps using digital, geographically referenced data. An electronic copy of all such data, excluding data obtained by the Applicant under a licensing agreement which prohibits distribution, has been provided to the Board staff concurrent with submission of the application.



PROJECT LOCATION

MIAMI COUNTY, OHIO

Node
Substation
NHD Waterway
Preferred Route
Common Route
Alternate Route
Existing Transmission Line- Approximate
Road Centerline
Waterbody
Airport
City Limit
Township Boundary
County Boundary

0 3,500 7,000 14,000 Feet

FIGURE 1.1
PREFERRED AND ALTERNATE ROUTES

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

gai consultants

DP&L

DRAWN BY: TDB DATE: 10/22/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: PIQUA (1986,) DAYTON, OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. ODNR, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\3_4_DPL_WEST_MILTON_ELDEN_OVERVIEW_2015_10_22.mxd

4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT

(A) STATEMENT OF NEED

(1) Purpose of the Proposed Facility

The proposed West Milton-Eldean 138 kV Transmission Project will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation ("NERC") reliability standards. The State of Ohio is located in the Reliability First Corporation ("RFC"), one of eight regions comprising the NERC, and DP&L is a member of RFC. The NERC and RFC are empowered by the Federal Energy Regulatory Commission ("FERC") to enforce utility industry compliance with the mandatory reliability standards to ensure the integrity of the bulk electric system.

DP&L is also a member of the PJM Interconnection (PJM), a regional transmission organization, which coordinates the movement of wholesale power in all or parts of 13 states, including Ohio, and the District of Columbia. PJM conducts a Regional Transmission Expansion Planning ("RTEP") process annually to ensure its transmission footprint, including the DP&L system, is in compliance with the mandatory NERC reliability standards. Both PJM and the member companies collaboratively conduct studies to identify potential violations of the mandatory NERC reliability standards and evaluate projects to resolve the violations. Ultimately, the PJM Board is responsible for approval of the proposed projects. The projects are then filed with FERC to obtain its approval.

It was through the PJM RTEP process that the need for the proposed project was identified. Specifically, RTEP contingency analysis showed that under the multiple contingency of DP&L's Shelby – Sidney 138 kV Circuit and DP&L's Miami – Eldean 138 kV Circuit, voltages would be below the minimum acceptable level per NERC reliability criteria, at the following eight transmission buses: Halterman 138 kV, Springcreek 138 kV, Eldean 138 kV, Eldean 69 kV, Sidney 138 kV, Sidney 69 kV, Amsterdam 138 kV, and Amsterdam 69 kV. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and ensure compliance with the mandatory NERC reliability standards. The project has been approved by both the PJM Board and FERC.

(2) Specific Projections of System Conditions

DP&L requested that PJM re-evaluate the needed timing for the project, in light of the much lower recent PJM load projections for the Dayton zone, as compared to those PJM had assumed when it originally identified the need for the project in 2010. Based on its re-evaluation, PJM moved the required in-service date for the project to 2022. Below is a link to the PJM website, showing the revised, PJM-required in-service date for the project – baseline upgrade ID b1572.

http://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx

(3) Relevant Load Flow Studies

Table 2-1 provides a summary of the load flow analysis results with and without the proposed project, based on PJM's updated load forecast.

Table 2-1 Load Flow Analysis Results With and Without the Proposed Facility

Issue	Contingency	Limiting Facility	kV	Without Proposed Project (% voltage)	With Proposed Project (% voltage)
Voltage	Shelby-Sidney 138 + Miami-Eldean 138	Amsterdam	138	95.9	99.8
		Eldean	138	78.1	100.4
		Halterman	138	78.2	99.5
		Sidney	138	78.6	98.8
		Springcreek	138	78.3	99.4

(4) Transcription Diagrams Depicting System Performance with and without proposed project

An electronic copy of DP&L's load flow data, developed as a load flow case with and without the proposed facility, can be provided upon request of the OPSB staff

(B) EXPANSION PLANS

(1) Electric Transmission Lines and Associated Facilities

(a) Long-Term Forecast Report: The proposed project is referenced on page 77 of Section 4901:5-5-04 of DP&L's 2018 Long-Term Forecast Report (LTFR).

(b) Regional Expansion Plans: As referenced above, the proposed project is a result of the PJM RTEP process, which ensures regional coordination and compliance with the mandatory NERC reliability standards.

(2) Gas Transmission Lines

The proposed facility is not a Gas Transmission Line; therefore, this section does not apply.

(C) IMPACT OF THE FACILITY ON ELECTRIC POWER SYSTEM ECONOMY AND RELIABILITY

The proposed project will ensure that the northwest area of DP&L's transmission system complies with the mandatory NERC reliability standards. The proposed project is the least-cost means to ensure compliance.

(D) OPTIONS CONSIDERED TO ELIMINATE NEED FOR CONSTRUCTION OF A TRANSMISSION LINE

The addition of capacitor banks was considered as an option; however, this option is not feasible due to space and other constraints, and it would not provide an effective means to address the voltage issues noted above.

(E) REASON PROPOSED FACILITY WAS SELECTED TO MEET PROJECT NEED

The proposed project was selected because it is the best option to resolve the potential voltage issues noted above from both transmission system performance and cost perspectives.

(F) FACILITY SCHEDULE

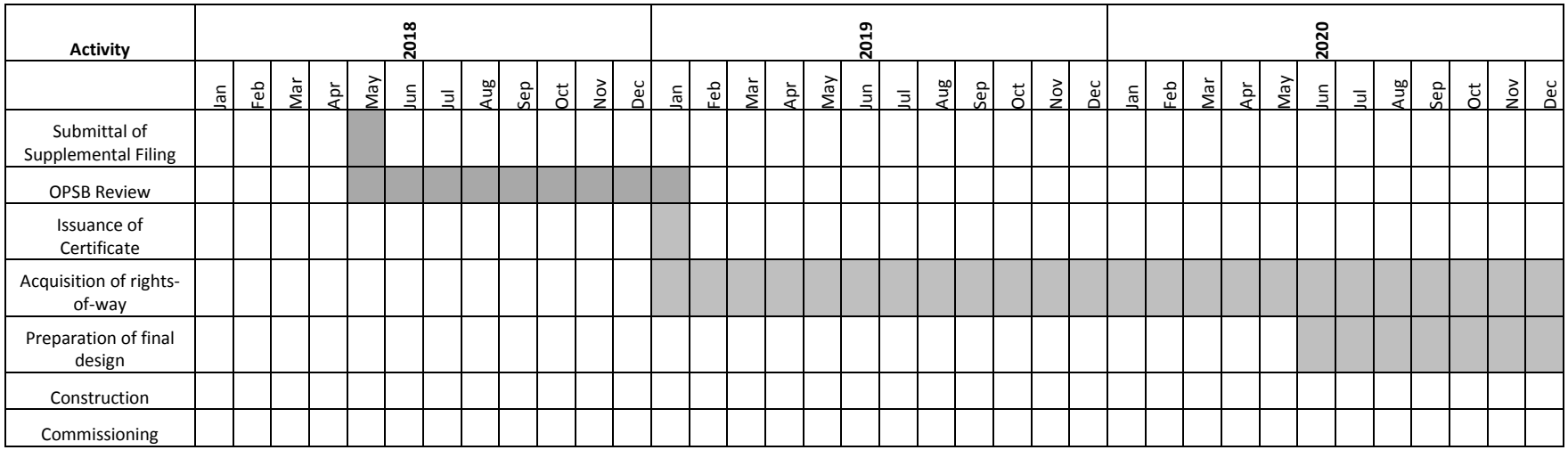
(1) Proposed Schedule (bar chart format)

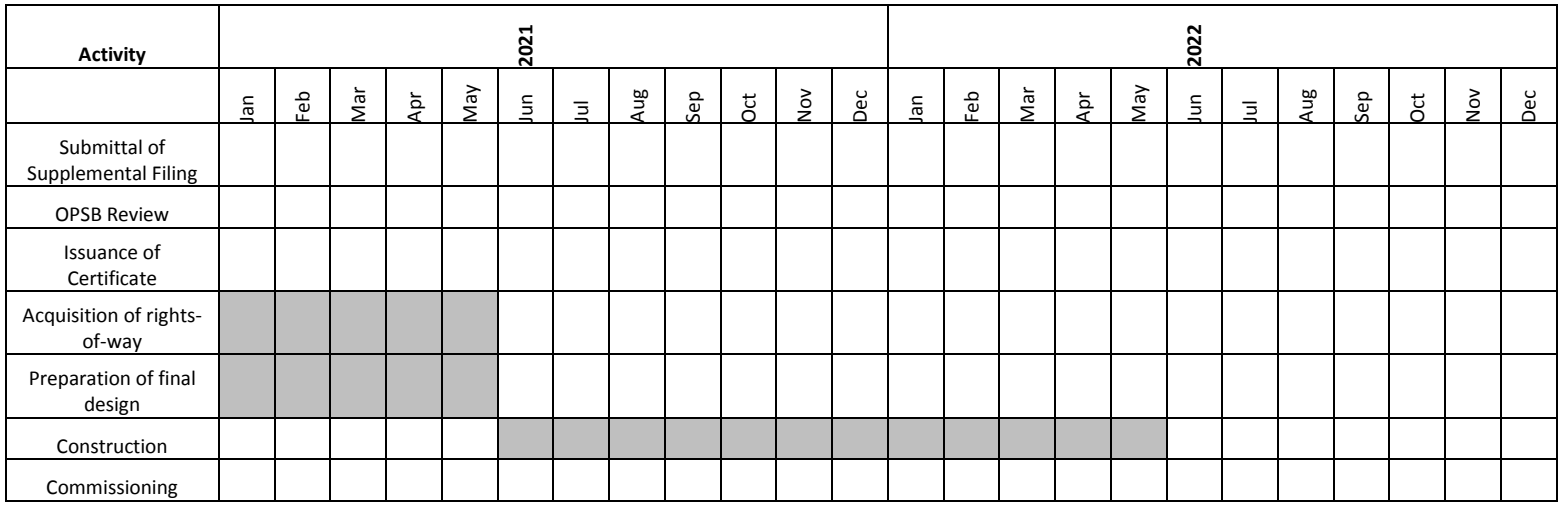
Figure 2-3 presents the schedule for the Application preparation and submittal to the Board, the planning and engineering design, acquisition of rights-of-way, construction and in-service dates in bar chart format.

(2) Delays

Any critical delays in the major activities outlined for the Project would further delay compliance with the NERC regulations and the in-service date of the transmission line.

Figure 2-1 Project Schedule





4906-15-03 ROUTE ALTERNATIVES ANALYSIS

(A) ROUTE SELECTION STUDY

This section presents a summary of the Route Selection Study ("RSS" or "Study") for the West Milton-Eldean 138 kV Transmission Line Project ("Project"). As required by Ohio Administrative Code 4906-15-03(A) and (B), the Study defines the geographic boundaries of the area studied for potential route alternatives, identifies the potential transmission line route alternatives on maps, defines and reports on the attribute data for each route alternative evaluated, and describes the siting criteria and methods employed to rank the routes and determine the most feasible routes including the Preferred and Alternate Routes.

The objective of the Study was to identify and evaluate potential route alternatives to connect the existing West Milton Substation located (south of West Milton, Ohio) to the existing Eldean Substation located northwest of Troy, Ohio, and ultimately select the transmission route that has the least, or among the least, impact on the human environment and sensitive ecological resources while also achieving project requirements of technical feasibility and cost effectiveness in terms of construction and long-term operation. The Dayton Power and Light Company ("DP&L") and their consultant, GAI Consultants, Inc. ("GAI"), utilized the results of the Study, as well as input received from public informational meetings, to establish the Preferred and Alternate Routes. The RSS involved defining the study area, the collection, evaluation and analysis of various environmental, socioeconomic, and engineering data to identify many unique transmission line route alternatives that were subsequently scored to determine the ranking of each route. GAI's Route Selection Study is included as Appendix 3-1. The RSS fulfills the rules within the Ohio Administrative Code 4906-15-03(A) and (B) in terms of the report content and the protocols for route siting and selection.

The RSS involved the identification of 105 route alternatives for quantification of the various attributes, scoring of each route on a relative basis, and then ranking the routes by score. A public informational meeting was held March 25, 2014 to present two of the most viable routes, based on quantitative scores and the consideration of qualitative factors. The vast majority of comments received by DP&L during the meeting, and the comments received afterwards by DP&L and the Ohio Power Siting Board ("Board"), were opposed to the route that utilized the Greenlee Road corridor (blue/orange in Figure 2 of the RSS in Appendix 3-1). Residents cited the adverse effect

of views of the landscape horizon where no overhead lines currently exist (but rather are underground), including the view toward, and from, the 150-acre Brukner Nature Center (privately owned) west of Greenlee Road, and the adverse effect on a historic "Bicentennial Farm" (as designated by the Ohio Department of Agriculture) immediately adjacent to the route alternative. The Brukner Nature Center is located 2,600 feet west of the Greenlee Road route alternative and the nature center property extends for a length of 1.0 mile along this route alternative (separated by flat agricultural fields). The nature center land contains six miles of hiking trails. Other residents (other than Greenlee Road residents) opposed sections of the two route alternatives crossing agricultural land which bisects parcels – instead they preferred that the routes follow existing property lines more closely if properties having such land use must be part of the routes.

The siting team fully considered the public's comments from the March 2014 meeting, from the majority opinion on the Greenlee Road route to individual landowner requests for minor route adjustments, and devised several new route alternatives that utilized the Forest Hill Road corridor (where existing overhead distribution lines parallel the majority of the roadway), as well as routes that utilize the immediately surrounding agricultural lands and property lines. Five new routes were developed, as well as minor adjustments to selected previous routes as landowners suggested, bringing the total number of routes to undergo a second round of quantitative scoring and ranking to 110 route alternatives. The lower numeric scores again indicated the more viable or favorable route alternatives. The scores ranged from a high of 4,587 (least viable or favorable) to 2,114 (most viable) based on quantitative scoring of the attribute values. Based on the quantitative score coupled with DP&L's consideration of a limited amount of qualitative route selection criteria, Route #135 (score of 2,237) which was ranked third overall, was selected as the most viable route to be presented during the second public meeting in order to seek comments. In addition to Route #135, two variations of this route and another largely unique route (Route #128) that utilized property lines in agricultural fields (in the midsection of the project area, or in the Forest Hill Road vicinity), were selected for the public's review. Route #128 has a reasonably low percentage of its route in common (34%) with Route #135.

The second public information meeting was held on July 9, 2014 to present the newly selected route alternatives that are among the more favorable scores (Route #135), including the additional route options or variations as mentioned above that utilize property lines across agricultural land (including Route #128), in order to solicit the public's input. The vast majority

of the members of the public in attendance submitted written and verbal comments in favor of Route #135 (blue/orange route depicted in Figure 4 of the RSS in Appendix 3-1) over the blue route segment options (or variations) and Route #128 (the red/orange route).

The highest ranking, most viable route alternative that results in the overall least impacts on the human and ecological environment, combined with the route alternative being most acceptable to the community based on solicited comments, was determined to be Route #135 which is ranked third in overall quantitative scoring. Route #128, ranked 31st by overall quantitative scoring, was determined to be the most viable Alternate Route having the least amount of route in common (34%) with the Preferred Route. DP&L was granted a variance by an Administrative Law Judge from the requirement that the alternate route have not more than 20% in common with the preferred route [Ohio Administrative Code 4906-05-04(A)].

Subsequent to the public meetings, three requests were made of DP&L by landowners to consider adjustments to the alignment of the Preferred Route (in two cases) and the Alternate Route (in one case) specifically on their properties to, in their view, optimize the route alignments for their planned uses of the land. All three of these route adjustments are further discussed in Section 3.6, and shown in Figures 5 through 7 of the RSS included as Appendix 3-1. In one case for the Preferred Route, for the area located just south of route node BB, the alignment was moved to the property boundary line instead of an approximate 1,800-foot diagonal orientation across the land parcel (agricultural land) as was originally planned. In the second case for the Preferred Route, located between nodes GG' and HH, the landowner similarly requested that the alignment follow their property boundary versus being aligned through the mid-section of the agricultural crop field which spanned approximately 0.77 feet.

For the Alternate Route, one landowner in the area of nodes AA and EE (shown as EE^{OPT} on map figures) requested that the route be relocated to their rear property boundary (consisting of agricultural crop land) versus being adjacent to their residence and along road right-of-way (Washington Road and Eldean Road). This route optimization resulted in reducing the length of Alternate Route's alignment along road right-of-way by approximately 0.74-mile and instead increasing the length of agricultural land crossed.

Subsequent to the submission of the Application for Certificate of Environmental Compatibility and Public Need in February 2015, DP&L decided to substitute or switch a 1.6-mile section of the Preferred Route with a parallel segment of the Alternate Route. This section of the Preferred

Route begins at State Route 55 on Harter Road and extends to the intersection of Fenner Road and Forest Hill Road. In effect, the originally designated Alternate Route segment, which begins on State Route 55 then heads north mostly along Forest Hill Road (small section of field), was changed to or became the revised Preferred Route. This substitution of route segments was made by DP&L to alleviate a major landowner's objection to placing transmission facilities over a 1.0-mile length of crop land. This modification of the Preferred Route is incorporated throughout this revised Application.

Appendix 3-1
Route Selection Study Report

Route Selection Study

The Dayton Power and Light Company

West Milton to Eldean

138 kV Transmission Line Project

Miami County, Ohio

GAI Project Number: G121196.00

October 2015

Prepared for: The Dayton Power and Light Company
1900 Dryden Road
Dayton, Ohio 45439

Prepared By: GAI Consultants, Inc.
Cincinnati Office
1830 Airport Exchange Boulevard, Suite 220
Erlanger, Kentucky 41018

Table of Contents

1.0 Introduction and Purpose 1

2.0 Route Selection Methodology 2
- 2.1 Defining the Study Area 3
- 2.2 Siting Attributes and Constraints 3
- 2.3 Selection of Candidate Route Alternatives 5
- 2.4 Route Scoring Process 6

3.0 Route Evaluation and Ranking Results 6
- 3.1 Initial Route Scoring Results and Rankings 6
- 3.2 Public Input and Supplemental Route Development 8
- 3.3 Supplemental Route Alternatives Analysis and Ranking 10
- 3.4 Second Public Meeting Input on Revised Route Alternatives 11
- 3.5 Selection of Preferred and Alternate Routes 12
- 3.6 Route Adjustments for Optimizing Alignments 14

TABLES:

Table 3-1 Quantitative Route Scoring Criteria
Table 3-2 Initial Route Alternative Scoring Results
Table 3-3 Supplemental and Updated Route Alternatives Scoring Results

FIGURES (embedded with narrative text):

Figure 1 Project Overview Map and Study Area
Figure 2 Route Alternatives for Public Input – March 2014 Meeting
Figure 3 Revised Route Alternatives Based on Public Input (March 2014)
Figure 4 Revised Route Alternatives for Public Review – July 2014 Meeting
Figure 5 Preferred and Alternate Routes
Figure 6 Preferred Route – West of Washington Road Route Adjustment
Figure 7 Alternate Route – Eldean Road / Washington Road Intersection Route Adjustment

FIGURES (following text):

Figure 3.1 Project Location Map
Figure 3.2 Project Study Area Map
Figure 3.3 Route Alternatives
Figure 3.4 Preferred and Alternate Routes
Figure 3.5 Route Alternatives Maps (1 inch = 1,000 feet scale)

© 2015 GAI Consultants, Inc.

1.0 Introduction and Purpose

The Dayton Power and Light Company (DP&L) is planning to construct a new 138 kV transmission line to improve the reliability of electric power in the northwest area of the DP&L transmission system. The West Milton to Eldean 138 kV Transmission Line Project (Project) area is located in the vicinity of West Milton, Ohio, west of the city of Troy in Miami County (Townships of Union and Concord), as illustrate din Figure 1 below. The new transmission line will be constructed to connect the West Milton Substation and the Eldean Substation which are 11 miles apart based on a straight linear path.

Figure 1
Project Overview Map and Study Area

The proposed new 138 kV circuit will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation (NERC) reliability standards. A recent contingency analysis conducted by Regional Transmission Expansion Planning indicated that, under a multiple contingency condition for two DP&L circuits in the area, voltages would be below the minimum acceptable level at eight transmission buses according to Pennsylvania, New Jersey, Maryland Interconnection (PJM) reliability criteria. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and ensure compliance with the mandatory NERC reliability standards.

This purpose and overall objective of this Route Selection Study is to assist in determining the best transmission line route alternatives that avoid or minimize adverse environmental and social impacts to the extent practical, considering technical and economic feasibility. The Route Selection Study involved the acquisition and evaluation of environmental, land use, cultural and engineering data to develop several route segments that could be combined to create various route alternatives for comparative analysis and ultimate ranking to meet the above objective. The study will result in the selection of preferred and alternate routes to advance into application development. The siting criteria employed for establishing route segments and complete route alternatives were as follows:

- avoidance or minimization with existing and proposed future land uses (e.g., by utilizing existing transmission line or road corridors where possible);
- avoidance or minimization of effects on human, natural, visual, and cultural resources;
- avoid or minimize visibility from densely populated areas;
- minimize impacts to construction and maintenance costs by selecting shorter, more direct routes;
- locate routes through terrain where economical construction and mitigation techniques can be employed; and
- consistency with DP&L's transmission needs, schedule, regulatory agency directives, and environmental regulations.

Construction of a 138 kV transmission line of this length requires that DP&L prepare and submit and Application for a Certificate of Environmental Compatibility and Public Need to the Ohio Power Siting Board (OPSB). To that end, this route selection study serves as the first component to fulfill the application development process, and ultimately gaining regulatory approval to construct the line.

2.0 Route Selection Methodology

GAI Consultants, Inc. (GAI) and DP&L assembled a team of environmental scientists, design engineers, geographic information specialists, and a cultural resource specialist to conduct this route selection study. The methodology of the study is designed to identify transmission line route alternatives that minimize the overall effects on ecology, sensitive land uses, and cultural resources to the greatest extent practical while maintaining economic and engineering or technical feasibility. GAI utilized techniques adapted from the methods reported by Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) (2009). The study process relies on detailed land use, ecological and cultural resource data from many public sources and other providers which is confirmed to the extent possible and supplemented through field observations. This process results in a comprehensive assessment of the study area and the candidate route alternatives that is presented in this report. The data and analysis process presented herein also allows comparison of additional route alternatives or modifications in response to public input or regulatory agency reviews.

2.1 Defining the Study Area

The first step in the siting process involved the identification of a study area encompassing the Milton and Eldean Substations and intervening areas. The 53-square mile study area, measuring 10.7 miles (north-south) by 7.3 miles (east-west) based on the longest sides of the study area, generally encompasses the town of West Milton, a portion of the Stillwater River watershed area, sparsely populated communities to the south, and largely rural land to the north. The study area is situated west of the city of Troy, Ohio, outside of the city boundaries and is shown in Figure 3.1, Project Location Map and Figure 3.2, Project Study Area, both of which follow the text of this report.

The boundaries of the study area were determined based on a review of United States Geological Survey (USGS) maps and aerial photography. Significant siting features such as urban or densely populated areas, water bodies, large forested and riparian areas, utility corridors, and transportation routes, and the fixed terminus points of the proposed transmission line were principally used to define the boundaries for the study. The eastern study boundary was generally positioned to avoid the western developed suburban areas of Troy, Ohio while capturing the rural lands for possible route corridors. The western study area limit was established just west of the DP&L's 69 kV transmission line (oriented north-south) in order to evaluate co-location or paralleling of this transmission corridor.

The selected study area offers the flexibility to consider a wide range of route corridors and route segments while maintaining reasonable distances of route alternatives to connect the Milton and Eldean Substations. Furthermore, the east to west breadth of the study area allows for route options that would cross the Stillwater River at a variety points north to south.

2.2 Siting Attributes and Constraints

The key objective of the Route Selection Study is to systematically determine the most viable routes for construction of the transmission line while avoiding or minimizing effects on ecological features, sensitive lands, densely populated areas, and cultural sites while maximizing the economical feasibility and the construction practicability. GAI and DP&L defined a variety of siting attributes and siting constraints. Attributes are generally features or factors that are favorable or desirable (e.g., shorter route lengths, paralleling utility corridors, minimizing turn angles, etc.) for construction and operation of a transmission line. Siting constraints are generally those features or factors that are undesirable, to be minimized or avoided to the extent practical, in proximity to a transmission line. The attributes and constraints utilized for the study area are summarized in Table 3-1.

Table 3-1
Quantitative Route Scoring Criteria

Siting Attributes and Constraints[1]	Score Weighting
Ecology	
Number of Perennial Streams Crossed	30%
Wetlands Crossed, acres in ROW (National Wetland Inventory data)	
Forests Lands Crossed, acres to be cleared	
Threatened and Endangered Species Sitings/Listings, within 1,000 feet	
Land Use	
Residences, # within 100 feet of centerline (accounts for 70% within subcategory "Residences")	30%
Residences, # within 100 to 1000 feet (accounts for 30% within subcategory "Residences")	
Number of Properties Crossed	
Institutional Uses, number within 1,000 feet (schools, hospitals, churches)	
State Scenic River Area, feet crossed in undeveloped zones ("area" includes 1000 feet adjacent to river)[2]	
Other Sensitive Areas Crossed (parks, preserves, trails, agency-managed areas, golf courses, public-use airports or airstrips), linear feet (70% within "sensitive areas" category)	
Number of Other Sensitive Areas within 1,000 feet (parks, preserves, trails, agency-managed areas, golf courses, public-use airports or airstrips) (30% within "sensitive areas" category)	
Cultural	
National Register of Historic Places listed sites or structures, within 1,000 feet	10%
Ohio Historic Structure/Sites Inventory, # within 1,000 feet	
Known Archaeological Sites, # within 100 feet	
Cemeteries, # within 100 feet	
Engineering	
Route Length, feet	30%
Paralleling Existing ROW (utility or road), linear feet	
Number of Highway, Road, or Railroad Crossings	
Length of Route with Slope >20%, feet	
Number of Turn Angles >10 degrees	

Notes:

1. Where applicable, right-of-way (ROW) required to be cleared or disturbed is assumed to be 75 feet, or 37.5 feet if parallel to road ROW or existing transmission line ROW.
2. "Undeveloped zones" are defined as areas without residences or other structures, or where agricultural land is in use.

Following establishment of the study area, GAI utilized aerial photography from the Ohio State Imagery Program (Miami County, 2011), USGS topographic mapping, and published data to compile an attributes and constraints map based on geographic information system (GIS) software programs. This mapping was primarily utilized to identify major siting features, avoidance areas, and socioeconomic attributes and constraints.

2.3 Selection of Candidate Route Alternatives

After defining the limits of the study area, various geographical data and aerial imagery (2012) were assembled and organized using a GIS program to produce maps consisting of readily available data sources (locations of rivers and streams, National Wetland Inventory data, floodplains, forests, scenic or public preservation areas, regulatory-protected species, residences, airports, churches, cemeteries, cultural resource and historic sites, public-use areas such as golf courses, etc.). The geographical area between the two substations can generally be described as three subareas, 1) the vicinity of West Milton, its suburbs, and the Stillwater River corridor, 2) middle area consisting of hamlets of Kessler and Nashville south of State Route 55 and sparse groupings of residences and agricultural fields, and 3) the northern subarea that is largely used for agricultural crops with sparse farm residences, small groupings of residences, and the western residential developments of Troy.

DP&L's guidelines in commissioning this study included evaluating both road or existing transmission line ROW corridors and "cross-country" corridors (largely agricultural fields), where land use may be suitable, for potential siting of a transmission line in terms of construction, operation and maintenance. For possible "cross-country" routes, following property lines was preferred over diagonal crossing when practical. GAI and DP&L selected some avoidance areas based on land use, relatively dense residential areas, and preserved natural areas (mainly the Stillwater River vicinity) to be considered for avoidance or minimization while identifying possible route corridors. Route alternative corridors crossing the Stillwater River, a State Scenic River, were chosen to coincide with bridges or existing aerial electric line (distribution or transmission lines) crossing points. A windshield survey was conducted on several occasions from February 2012 to May 2014 to view the general study area for potential corridors as well as constraints or avoidance areas as defined above that may not be apparent based solely on GIS data and mapping sources. GAI also consulted with the Ohio Department of Natural Resources to obtain location data for protected species for consideration in siting the route corridors.

All of the route segments utilized to form the various route alternatives that were devised for analysis and scoring are depicted in Figure 3.3 which is located at the end of the report text. There were four potential route corridors selected in the immediate vicinity of the West Milton Substation, which begin with connection to the substation itself. Three of the four corridors follow existing DP&L-owned transmission lines including various voltages (69 kV, 138 kV, and 345 kV). The fourth corridor follows a road ROW (Frederick Garland Road) toward the east. In general, four largely unique route corridors were identified which span from the southern study area limit to the north section of the study area. These corridors were selected to provide a full range of options for analysis, including paralleling of road ROW, and crossing through agricultural lands aligning with property boundaries to the extent practical. In addition, one corridor was established from south to north on the west side of West Milton, due to the presence of schools and existing area development. This corridor diverges toward the north (north of Ludlow Falls community) to offer two additional route candidate corridors to cross the Stillwater River.

In the north and northwest portion of the study area approaching Eldean Substation, several route candidates (approximately five general corridors with additional segments for optional routing between the five primary corridors) were developed and analyzed. These route alternatives offered a combination of agricultural land and road ROW for comparative analysis. All route segments were assigned a node for each end of the segment (letter A through JJ during the first study phase) as a system to track and identify route segments.

2.4 Route Scoring Process

After all potential route segments were created, segment combinations were then assembled to create individual route alternatives to span between the two substations. All possible segment combinations were assigned a route identification number. Segment combinations that would require backtracking, thus increasing distance and potential effects, were not considered. During the initial scoring process, a total of 105 route alternatives were analyzed and scored through a comparative analysis process. As described below the number of route alternatives evaluated and scored was increased to 110 for the supplemental (second) scoring process following several route adjustments and newly identified route segments.

Relative Scaling of Attribute Data: In order to compare attribute measurements on a relative scale and to obtain a score that could be compared across the different alternatives, each summed data result for each attribute for a particular route alternative was normalized, or mathematically proportioned, to a scale of one to 100. The normalized values for each attribute/constraint, the total normalized score for each route alternative, and the overall rank of the route alternatives after applying weighting factors was then calculated. In this procedure the alternative with the highest value (less favorable result) for individual attributes receives a relative score of 100; that with the lowest value (more favorable result) receives a relative score of 0. (Note: If all alternatives have an impact value of zero for a specific attribute criterion, then the weighted value is set to zero). Note that the value system for the attribute of paralleling existing ROW (distance) is converse of that described above. Thus, the attribute values are transformed to a relative scale from one to 100 to obtain relative scores for each attribute criterion that was considered in the analysis and scoring. Using the relative score position, or rank, of the alternative in comparison to the values for all alternatives provided an indication of how a particular alternative compares overall. The normalized attribute scores within each category (ecological, land use, engineering, cultural resources) were then averaged for each route alternative, then all category scores were summed to determine the overall route score. The formula used for normalizing the data to achieve a relative scale is as follows, as based on a methodology suggested by EPRI/GTC (2009) and Gaige, et al. (1991):

*Normalized score value = (x – minimum value) / range] * 100, where x = actual attribute value*

Weighting of Attributes and Constraints: The weighting factors applied to individual attributes for route selection study were based on the Project planning team's (DP&L and GAI staff) professional judgment based on Project objectives and previous route study experience on similar projects. Certain attributes and constraints have more impact on the ecological features, humans and their activities, socioeconomic features, the engineering design specifications and construction implementation processes relative to other attributes. Based on these premises, the Project planning team developed the following weighting values for each attribute category: Ecological (30%), Land Use (30%), Cultural Resources (10%), and Engineering/Construction (30%).

3.0 Route Evaluation and Ranking Results

3.1 Initial Route Scoring Results and Rankings

Table 3-2 summarizes the criteria category scores, with weighting values applied, and the overall relative ranking of all route alternatives for the initial route scoring process for 105 route alternatives. The total route scores ranged from 1,838 to 4,425 out of a possible range from zero to 10,000. The weighting values were applied by multiplying the normalized score by the actual percent weighting value (rather than dividing the percent value by 100) in order to arrive at overall route scores expressed in the "thousands" for ease of comparison (versus decimal values). Based on the route scoring system and process, a lower overall score indicates a more favorable route alternative and conversely a higher score indicates a more inferior route alternative given the variety of attributes that were measured.

The results of the initial scoring process indicated that the 12 highest ranked routes (Routes 103, 132, 131, 104, 133, 113, 107, 115, 106, 105, 114, and 119) all utilize the same western route segments from the West Milton Substation (with the exception of the H'-LL-J' segment), and follow the same route to roughly reach halfway toward the Eldean Substation in the vicinity of nodes M, N, and O on State Route 55. This western route (segments A-H-H') consists of both cross-country and road ROW route portions and crosses the Stillwater River along the State Route 55 bridge and ROW where an overhead distribution line exists. The A-H-H'-J'-J-M combination is favored, based on the overall scores and the fact that it is common to 12 of the top 15 route scores, in comparison to other route alternatives exiting the West Milton Substation to the north and east.

From the vicinity of nodes M, N, and O, the top 15 route alternatives diverge on five different route paths to reach the northern section of the study area. Four of the top nine route alternatives utilize the N-O-P-BB route segment combination, including the top three scoring routes, for traversing the central portion of the study area which mostly consists of agricultural land. Five of the top 15 scoring routes include paralleling portions of Forest Hill Road (segments N-O-R and N-O-R-W). Four of the top 15 routes parallel Greenlee Road (segments M-S-V-X) to reach the north section of the study area.

For the northern portion of the study area, 11 of the top 15 ranked route alternatives utilize the GG-HH-II-JJ segments to reach the Eldean Substation terminus. However, other route segment combinations in the Eldean Road vicinity (e.g., segment DD-EE-EE') scored high as well. These various segments consist of both road ROW and cross-country (agricultural land) routes.

New route segments were added on Markley Road starting at node H' and extending to new node LL, then turning north alongside DP&L's existing 69 kV circuit and ROW. The additional route offers a second alternative for reaching node J', and attempts to achieve a route alternative having less in common with the other route to node J'.

Initially, the segments A-B-C-G-N and A-D-G-N (refer to Figure 3.5) were devised as a route corridor option existing the West Milton Substation toward the east across the Stillwater River then heading north for a more direct access to the center of the study area to the north. Although this route corridor would pass by the privately owned Wagner air/landing strip (a single grass turf runway), the corridor was evaluated early in the Route Selection Study (RSS) to determine if the routes in this corridor would score relatively high. The routes were evaluated due to the air strip's unknown status (active or no longer operational) and potential availability for purchase. While some routes in this corridor scored moderately high, DP&L decided to remove this corridor from further consideration due to the logistical issues of the route proximity to the private Wagner air strip. For the same reasons (although all routes would run parallel with the air strip), the route segment (P-BB) near the Leavelle air strip (private, turf single runway) was abandoned due to the potential logistics and unknown status as to its current operational status.

Based on the initial scoring results, DP&L staff reviewed several of the top ranked routes for qualitative aspects that were not necessarily fully considered in the route analysis and scoring process. The section of State Route 55 used for the majority of the top ranked routes (segments J-M-N-O) is heavily traveled and presents challenges for transmission line construction due to the heavier traffic, shared ROW with highway maintenance operations, and other overhead utilities adjacent to the highway. Most notably, the existing communication cables near State Route 55 presents a potential set back issue (further from road edge) as transfer of such cables to DP&L's proposed future pole structures is not guaranteed. Additionally, it was DP&L's preference to minimize the number of residential parcels crossed by or adjacent to the proposed route. DP&L concluded that Route 120 and 128 as the most viable and feasible two routes to be presented to the public for soliciting input.

Route 120 (A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ) was ranked 14 overall. Route 128 was selected as one of the highest ranked route alternatives having the lowest percentage of route in common with Route 120 at 28%. The commonality of this route with the Preferred Route exceeds the

OPSB rule, Administrative Rule 4906-05-04(A), that states: "Two routes shall be considered as alternatives if not more than 20% of the routes are in common". However, it is within the acceptable range for a variance request from the OPSB given the study area (which was ultimately granted). Route 128 consists of the following segments: A-H-H'-LL-J'-J-M-N-O-R-P'-BB-AA-EE-EE'-KK-II-JJ. Although this route presents the logistical challenges noted above for segments J-M-N-O, it was considered a viable route that is constructible and capable of meeting transmission operational needs. The two routes are depicted below in Figure 2.

3.2 Public Input and Supplemental Route Development

DP&L held the first public meeting on March 25, 2014 to present Route 120 (displayed as the blue/orange route in Figure 2) and Route 128 (red/orange route) to residents and stakeholders interested in the Project. The public meetings, which are required by OPSB rules, are intended to inform the public of DP&L's route alternatives being considered for an application to the OPSB and to allow the public to make inquires about the route selection process and to make comments and suggestions on the two route alternatives. Public input was received during the meeting, including both verbal and written comments, as well as residents' comments received subsequent to the meeting through direct communication to DP&L staff and filing letters with the OPSB.

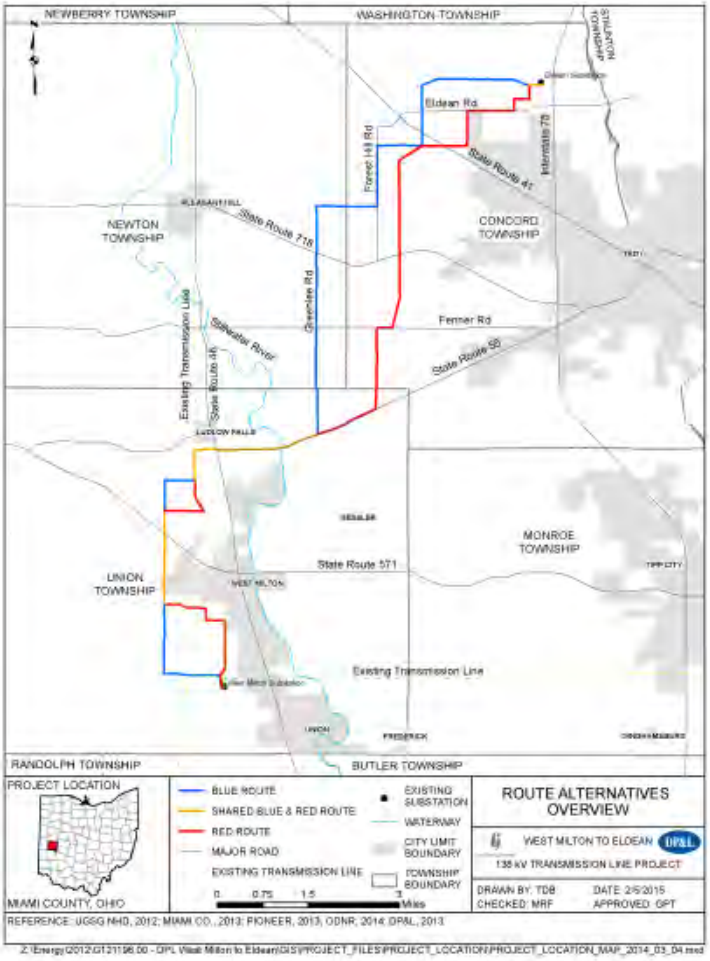


Figure 2
Route Alternatives for Public Input – March 2014 Meeting

The vast majority of comments (87%) generated from the public meeting were offered by residents of Greenlee Road which is the primary north-south road corridor that comprises 3.8 miles of Route 120 (blue/orange route). Additionally, Greenlee Road residents submitted several comment letters to the OPSB including a signed petition in opposition to the Greenlee Road portion of Route 120. The comments primarily concerned 1) the effect on landscape aesthetics, in particular where no overhead utilty lines currently exist, and the viewshed toward and from land owned by the Brukner Nature Center, 2) the potential and/or perceived adverse effect on a farm on Greenlee Road considered to be of historical significance (a "Bicentennial Farm" as designated by the Ohio Department of Agriculture), and 3) lower property values as a result of a transmission line along road frontage, among other documented concerns. A few comments were also received from residents or landowners crossed by Route 128 (red/orange route) expressing concerns and opposition to this route due to various effects on their property including its impacts to crop cultivation.

Following DP&L's consideration and review of all public comments received during and after the March 25, 2014 public meeting, several new route segment alternatives were developed for evaluation in the vicinity of the southern Forest Hill Road vicinity, in lieu of the Greenlee Road option.

To avoid new route segments that would parallel Forest Hill Road along a number of residential lots, routes were devised to cross agricultural fields and align with property boundaries where feasible. Refer to Figure 3, Revised Route Alternatives Based on Public Input (March 2014). Starting at a new node NN on State Route 55, one new route segment heads north along Harter Road then continues for one mile through agricultural fields until Fenner Road is reached, then turns to the east to re-join the existing route segment on Forest Hill Road where residential lots are relatively sparse.

Additionally, new route segments were added at node OO to provide options for more length through agricultural fields, further to the north, following the Concord and Newton Township boundary (north-south). Several complete route alternatives (from substation to substation) were assembled using the supplemental route segments in the southern Forest Hill Road vicinity. The new routes were then analyzed, scored, and ranked against all previous route alternatives as describe in the next section.

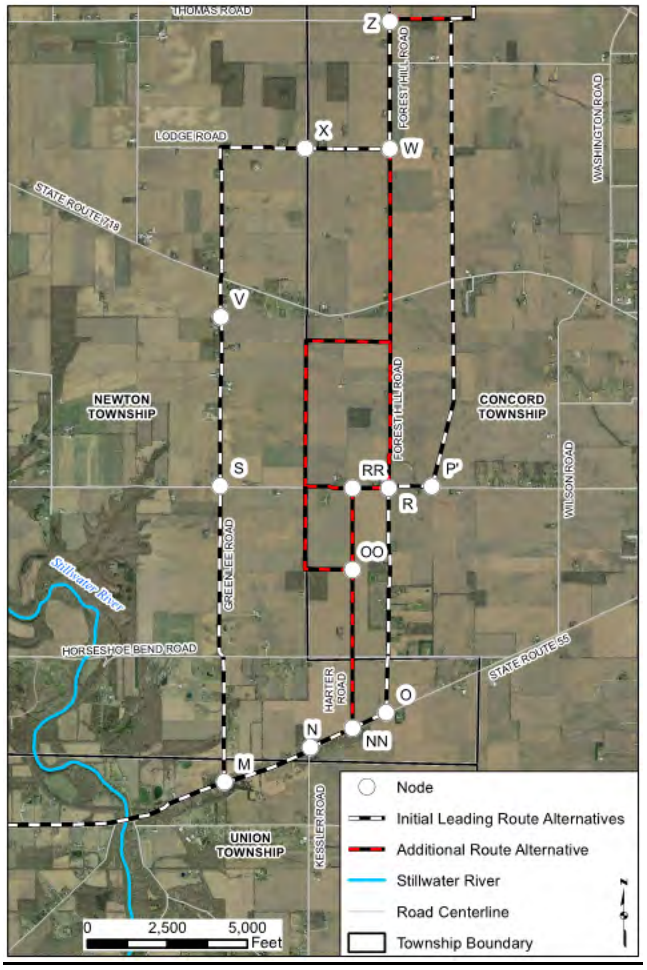


Figure 3
Revised Route Alternatives Based on Public Input (March 2014)

3.3 Supplemental Route Alternatives Analysis and Ranking

As a result of developing the above-mentioned supplemental route segments, after considering input received from the March 25th public meeting, the analysis and route scoring process described in Section 2.4 was performed. The purpose was to produce a relative comparison of all of the route alternatives including the new supplemental route segments used to form several new route alternatives. A total of 110 route alternatives were analyzed and processed with resulting scores ranging from 2,114 (best scoring alternative) to 4,587.

Table 3-3 summarizes the scoring results of the 110 route alternatives including the attribute category rankings for each route. The top 10 route alternatives consisted of three unique route segments in the central portion of the RSS study area, which indicates that the three different route segments are comparatively close in scoring. The central part of the study area is generally the south end of the Forest Hill Road, State Route 55, and vicinity, which is where supplemental route options were added. Three of the top 10 routes consisted of the agricultural field option from State Route 55 to Fenner Road (NN-OO-RR), three routes consisted of the Forest Hill Road alignment (O-R), and four routes included the Greenlee Road alignment (M-S-V or M-S-R).

The top ranked route segments in the northern section of the Project entering the Eldean Substation were DD-GG'-HH-II'-JJ (all of which crosses agricultural fields) and DD-EE-EE'-KK-II' (utilizing Eldean

Road, a short segment of agricultural land, and Experiment Farm Road). The DD-GG'-HH-II'-JJ segment combination ranks slightly better for ecological, land use and cultural resources criteria categories than the alternate leading segment entering the substation.

The alternative route segments exiting the West Milton Substation include the A-B'-H segment which heads north and the A-H segment that heads westward from the substation then north. The A-H segment is ranked higher for the ecological category (due to likely fewer wetland crossings), but A-H is ranked lower for the land use (primarily due to a summer camp located adjacent to the alignment), cultural resources, and engineering (due to less co-location with existing transmission corridor) categories.

The scoring process resulted in the highest ranked route being Route 138 which utilizes the new supplemental segment NN-OO-RR crossing agricultural fields, then crossing over Forest Hill Road toward the east, then turning north through agricultural fields (P'-BB) then entering the Eldean Substation utilizing the northern-most segment combination (DD-GG-HH-II). Route 138, considered a "cross-country" route, would span and bisect several agricultural field parcels in the P'-BB segment, which is less desired than routes that follow agricultural field property boundaries or road ROW to the extent practical. The second highest ranked route, Route 139, utilizes Greenlee Road (from State Route 55) and then the northernmost route segments to enter the Eldean Substation. For the reasons discussed above concerning Greenlee Road, this is not a viable route based on public input.

The #3 ranked route, Route 135, was ultimately selected by DP&L as one of two routes to advance for presentation at a second public informational meeting. Refer to Figure 4 below for a map of this route (shown as the blue/orange route). Besides the route being one of the highest scoring, Route 135 offers the advantage of a combination of routing along rural roads (e.g., Forest Hill Road) and crossing agricultural fields aligning with property boundaries where practical.

The second selected route alternative for presentation to the public should ideally have <20% in common with the other route alternative being considered for possible selection as the Preferred Route. Early in the RSS, DP&L and GAI recognized that the <20% in common requirement would be difficult to achieve for the Project and requested a waiver of the rule, and suggested approximately 30% or less in common, from the OPSB. The OPSB granted this waiver of the rule to DP&L. The next highest favorably ranked route that approaches 30% or less in common was Route 128. Route 128, having 34% in common with the alternative selected Route 135, was ranked 31st overall out of 110 route alternatives. It utilizes segments that diverge from Route 135 in several locations including exiting the West Milton Substation from the north and utilizing the Markley Road option to utilize more existing DP&L transmission ROW. Route 125 runs roughly parallel with Route 135 north of State Route 55 but spans much more agricultural fields and a shorter and different section of Forest Hill Road to the south. The route is depicted on the Figure 4 map below as the red/orange route.

3.4 Second Public Meeting Input on Revised Route Alternatives

Following the development of supplemental route segments resulting from the first public meeting, and the identification, evaluation and scoring of supplemental route alternatives, a second public informational meeting was held on July 9, 2014. Similar to the first meeting, the purpose of the meeting was to seek public input and comments on the two revised route alternatives (blue/orange Route 135 and red/orange Route 128 as shown in Figure 4) being considered for an application to the OPSB.

Public comments were received during the meeting as well as two comments submitted to the OPSB several weeks subsequent to the meeting. The majority of comments were supportive of the blue/orange route, which consisted of the longest section paralleling Forest Hill Road (Route 135). Few public comments supported the red/orange route alternative (Route 128) which consists of a larger percentage of agricultural fields in the central portion of the study area.

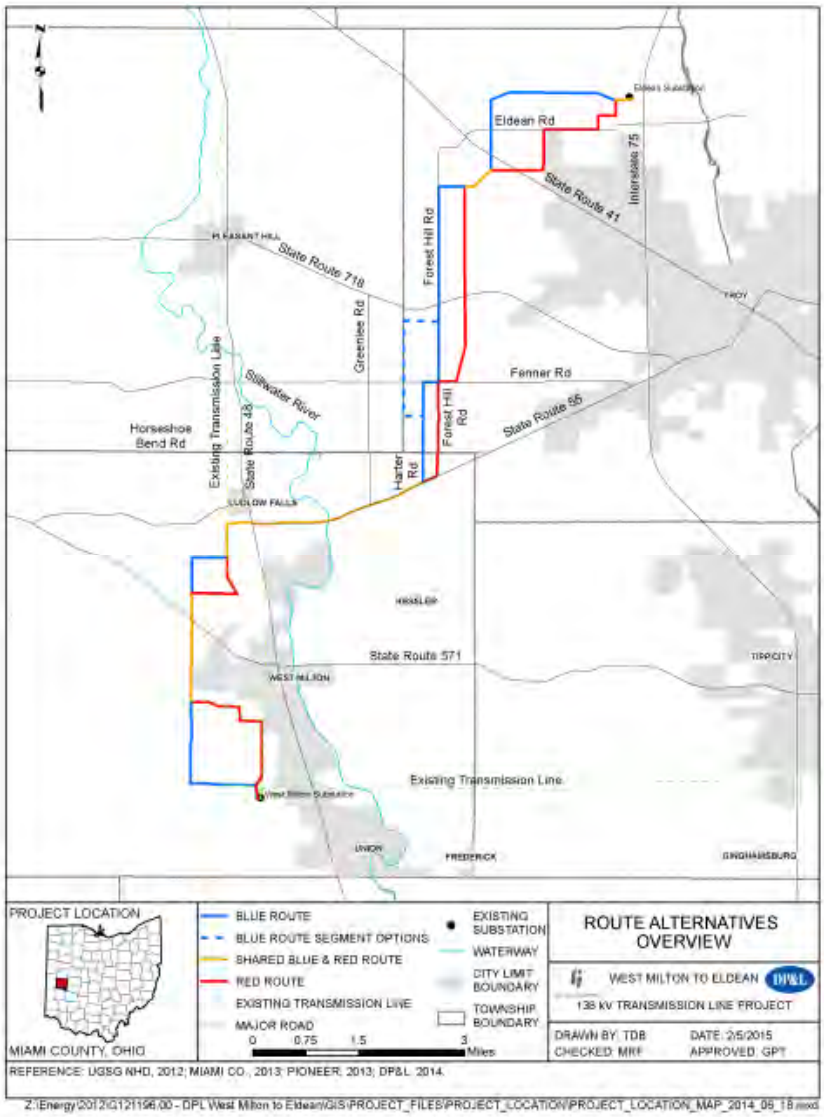


Figure 4
Revised Route Alternatives for Public Review – July 2014 Meeting

3.5 Selection of Preferred and Alternate Routes

Based on the results of the public meeting and a qualitative review of the route alternatives (depicted in Figure 4), the Preferred and Alternate Routes were selected by the DP&L siting team. The primary qualitative factors considered in the final selection were the minimization of route lengths that bisect land parcels (mainly agricultural fields) to the extent practical, minimization of routes proximal to residences along road ROW, and the feasibility of construction and maintenance of the transmission line.

3.5.1 Preferred Route

The Preferred Route was determined to be Route 135 (blue/orange route in Figure 5). The route is the 3rd highest scoring route overall and received comments of support based on the

second public meeting. The ranking of individual attribute categories for Route 135 are as follows (in terms of higher rank being more favorable): 12th for ecological rank, 17th for land use rank, 5th for cultural resources rank, and 39th for engineering rank.

3.5.2 Alternate Route

The Alternate Route was determined to be Route 128 (red/orange route in Figure 5). The route is the 31st highest scoring route overall and has 34% in common with Route 128. The ranking of individual attribute categories for the Alternate Route are: ecological rank of 27th, land use rank of 15th, cultural resources rank of 90th, and engineering rank of 93rd. This is the highest overall ranked route that approaches the 30% range for in-common percentage with the Preferred Route – all other higher ranked routes that could be considered for the alternate have more than 34% in common with the Preferred Route.

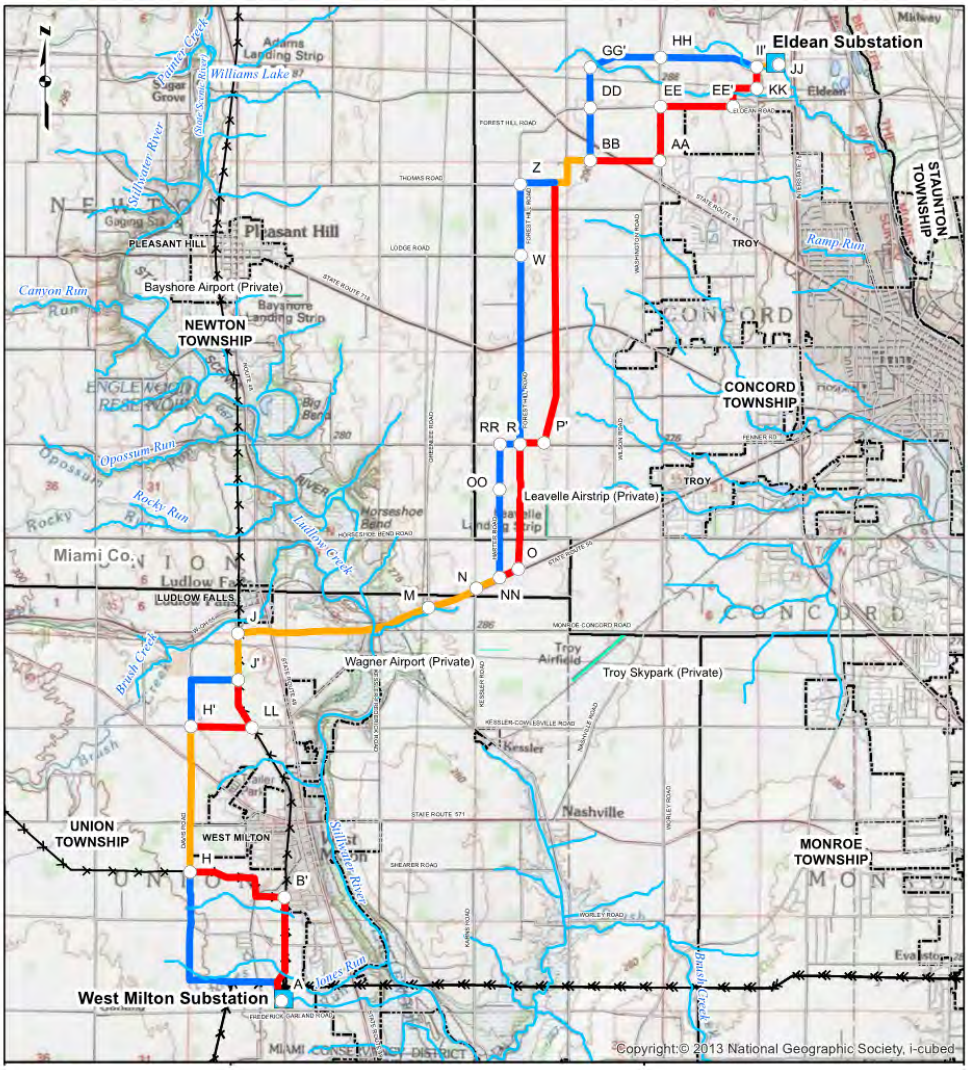


Figure 5
Preferred (Blue/Orange) and Alternate (Red/Orange) Routes

3.6 Route Adjustments for Optimizing Alignments

Following the selection of the Preferred and Alternate Routes, DP&L responded to a few landowners' request for meetings to discuss the proposed transmission alignment on their properties. These requests for changing the alignment, exclusively within an individual landowner's property, were evaluated on a case-by-case basis to determine the impact on ecological features, land use, socioeconomics, and engineering design and constructability. One area on the Preferred Route, one area on the Alternate Route, and one area on the common route were determined to be reasonable requests to optimize the alignment of these route segments, which are described below.

3.6.1 Common Route – South of State Route 41

A route adjustment relocated the proposed centerline from a diagonal orientation (1,750 feet length) over an agricultural field to the landowner's nearby property line requiring the addition of a right angle turn in the transmission line (the common route south of node BB). The optimized route segment is now 2,470 feet in length and will have less impact on agricultural crop operations. One residence is located 540 feet from this optimized route segment.

3.6.2 Preferred Route – West of Washington Road North

A request was made of DP&L to adjust the Preferred Route from the previous alignment through the middle of an agricultural crop land parcel (a 0.77-mile segment of the route) to a parallel alignment that would be situated along the landowner's property boundary in the same crop land parcel. The landowner requesting this optimization of the route has the property registered as an Ohio Agricultural District land parcel and the shift in alignment will result in a lesser impact to agricultural crop operations. The adjusted route is shown in Figure 6 below. The new alignment will also shift the line from the middle of the agricultural field of the adjacent landowner's parcel (to the west) to the property boundary (near node GG'). The overall length of the optimized route is 0.79 miles compared to 0.77 miles for the former route segment. The route will be positioned closer to an un-named ephemeral or intermittent tributary, which drains crop land and is partially parallel with the property boundary; however, the stream would be outside of the ROW with the exception of one crossing of the route. One residence is located 180 feet, and nine residences are located from 230 feet to 1,000 feet, from the optimized route. This is reasonably comparable to the previous Preferred Route where eight residences were located within 1,000 feet of the route segment.

Figure 6
Preferred Route – West of Washington Road Route Adjustment

3.6.3 Alternate Route – Area of Eldean Road / Washington Road Intersection

Similar to the previously described route adjustments for the Preferred Route, a request was received from the owner of the agricultural land, including their residence (<100 feet from the Alternate Route), located southeast of the intersection of Eldean Road and Washington Road on the Alternate Route. The adjusted route is shown in Figure 7 below between nodes AA-EE^{OPT}-EE'. The landowner, having crop land registered as Ohio Agricultural District land, requested that the route be shifted from the 0.74-mile road frontage route to the opposite side of their land and property boundary line. The optimized route segment is 0.74 miles in length through crop land, essentially the same as the previous Alternate Route (also 0.74 miles along road ROW and the edge of the crop land). Approximately a 1,300-foot portion the route

adjustment (segment AA-EE^{OPT}) is situated parallel with the rear property boundary of 15 residences (located on Parkwood Drive) but the route's centerline is more than 100 feet distance to any of these residences. The previous Alternate Route alignment was within 1,000 feet of 59 residences compared to 65 residences within 1,000 feet of the new route adjustment. There is no difference in ecological impacts – no streams, wetlands, or forested areas exist within the planned ROW of the optimized route.

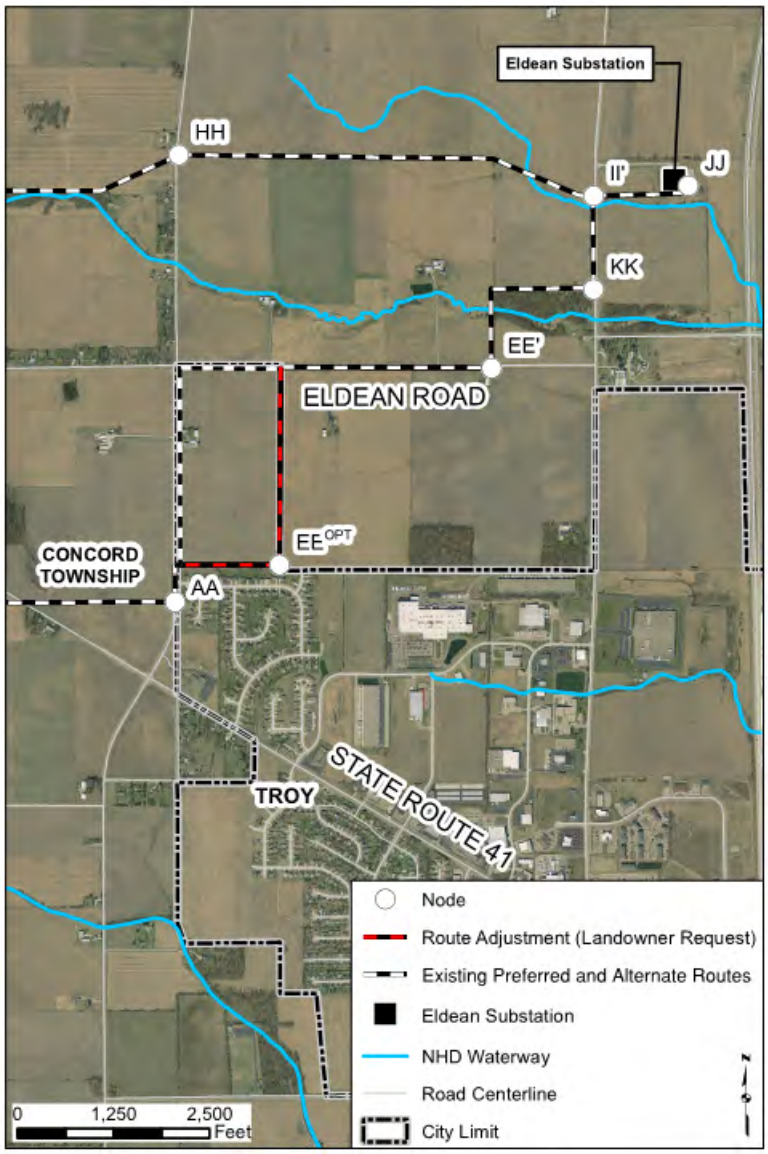


Figure 7
Alternate Route – Eldean Road / Washington Road Intersection Route Adjustment

3.6.4 Preferred and Alternate Route Substitution – State Route 55 and Forest Hill Road

Subsequent to the submission of the Application for Certificate of Environmental Compatibility and Public Need in February 2015, and the OPSB's initial review of the Application, DP&L decided to substitute or switch a 1.6-mile section of the Preferred Route with a parallel segment of the Alternate Route. This section of the Preferred Route begins at State Route 55 on Harter Road and extends to the intersection of Fenner Road and Forest Hill Road. The area and route change is shown in Figure 8 below. In effect, the originally designated Alternate Route segment, which begins on State Route 55 then heads north mostly along Forest Hill Road (small section of field), was changed to or became the revised Preferred Route. This substitution of route segments was made by DP&L to alleviate a major landowner's objection to placing transmission facilities over a 1.0-mile length of crop land. No ecological impacts are anticipated from this route change as compared to the original Preferred Route through the agricultural field. The new Preferred Route along Forest Hill Road will be in closer proximity to more residences in comparison to the former Preferred Route alignment, but will most likely be co-located with DP&L's existing distribution lines (underbuilt onto new transmission facilities).

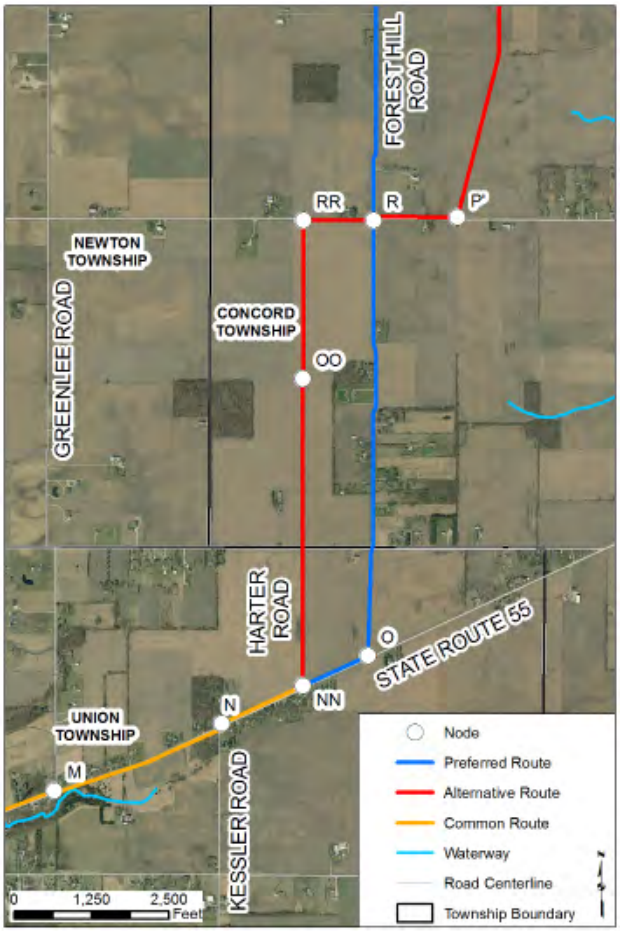


Figure 8
Preferred and Alternate Route Switch – Between Node NN and R / Forest Hill Road and State Route 55

TABLES

Preferred Route
Alternate Route

TABLE 3-2
INITIAL ROUTE ALTERNATIVES SCORING RESULTS

			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
103	A-H-H'-J'-J-M-N-O-R-P'-BB-DD-GG-HH-II-JJ	16.4	198	9	442	20	63	1	1,136	72	1,838	103	1
132	A-H-H'-LL-J'-J-M-N-O-R-P'-BB-DD-EE-EE'-KK-II-JJ	16.5	69	3	675	73	63	1	1,063	50	1,869	132	2
131	A-H-H'-LL-J'-J-M-N-O-R-P'-BB-DD-GG-HH-II-JJ	16.6	55	2	665	71	63	1	1,119	67	1,902	131	3
104	A-H-H'-J'-J-M-S-V-X-Y-FF-GG-HH-II-JJ	16.8	143	4	634	63	63	1	1,096	62	1,935	104	4
133	A-H-H'-LL-J'-J-M-S-V-X-Y-FF-GG-HH-II-JJ	17.0	0	1	857	92	63	1	1,030	39	1,950	133	6
113	A-H-H'-J'-J-M-N-O-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.3	213	13	457	28	94	16	1,181	86	1,945	113	5
107	A-H-H'-J'-J-M-N-O-P'-BB-AA-EE-EE'-MM-KK-II-JJ	16.3	213	13	445	23	94	16	1,209	94	1,961	107	7
115	A-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-DD-GG-HH-II-JJ	16.7	246	21	507	38	63	1	1,163	81	1,978	115	8
106	A-H-H'-J'-J-M-N-O-R-W-Z-CC-FF-GG-HH-II-JJ	16.5	193	8	470	32	63	1	1,255	102	1,980	106	9
105	A-H-H'-J'-J-M-S-R-W-Z-CC-FF-GG-HH-II-JJ	16.9	147	5	500	37	63	1	1,292	103	2,002	105	10
114	A-H-H'-J'-J-M-S-V-X-W-Z-CC-FF-GG-HH-II-JJ	16.8	147	5	641	65	63	1	1,156	79	2,006	114	11
119	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	200	10	537	44	63	1	1,217	97	2,016	119	12
68	A-B'-H-H'-J'-J-M-N-O-P'-BB-DD-GG-HH-II-JJ	16.4	382	30	208	1	344	34	1,088	59	2,023	68	13
120	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	200	10	679	74	63	1	1,096	61	2,038	120	14
130	A-B'-H-H'-J'-J-M-N-O-R-P'-BB-DD-EE-EE'-KK-II-JJ	16.3	396	42	218	3	344	34	1,081	57	2,038	130	15
116	A-H-H'-J'-J-M-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	16.8	147	5	649	68	63	1	1,210	95	2,069	116	16
117	A-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	16.6	261	23	523	42	94	16	1,191	91	2,069	117	17
129	A-B'-H-H'-LL-J'-J-M-N-O-R-P'-BB-DD-GG-HH-II-JJ	16.6	239	20	432	19	344	34	1,072	54	2,087	129	18
45	A-B'-H-H'-J'-J-M-S-V-X-Y-FF-GG-HH-II-JJ	16.9	327	25	400	15	344	34	1,016	35	2,087	45	19
58	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-FF-GG-HH-II-JJ	16.5	377	29	237	5	344	34	1,158	80	2,115	58	22
121	A-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.1	200	10	687	76	63	1	1,167	83	2,116	121	23
122	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	216	15	553	48	94	16	1,245	100	2,108	122	20
66	A-B'-H-H'-J'-J-M-N-O-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.4	398	43	224	4	375	62	1,117	66	2,114	66	21
118	A-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	16.6	261	23	511	40	94	16	1,252	101	2,118	118	24
123	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	216	15	694	77	94	16	1,125	69	2,129	123	25
63	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-DD-GG-HH-II-JJ	16.7	430	51	274	7	344	34	1,099	63	2,146	63	26
39	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-FF-GG-HH-II-JJ	16.9	332	26	266	6	344	34	1,212	96	2,153	39	27
124	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	216	15	541	47	94	16	1,306	104	2,157	124	28
128	A-B'-H-H'-LL-J'-J-M-N-O-R-P'-BB-AA-EE-EE'-KK-II-JJ	16.6	253	22	428	18	344	34	1,142	74	2,167	128	29
52	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-FF-GG-HH-II-JJ	16.9	332	26	408	16	344	34	1,092	60	2,175	52	30
44	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	33	304	10	344	34	1,152	78	2,185	44	33
125	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	216	15	683	75	94	16	1,186	89	2,178	125	31
64	A-B'-H-H'-J'-J-M-N-O-P'-BB-AA-EE-EE'-MM-KK-II-JJ	16.4	398	43	212	2	375	62	1,194	92	2,179	64	32
57	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	33	445	22	344	34	1,032	40	2,206	57	34
46	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	16.9	332	26	416	17	344	34	1,145	75	2,237	46	35
61	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	16.6	446	54	290	9	375	62	1,127	70	2,238	61	36
67	A-B'-H-H'-J'-J-M-N-O-P'-BB-DD-EE-HH-II-JJ	16.5	382	30	390	14	344	34	1,138	73	2,254	67	37
51	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	33	454	25	344	34	1,103	64	2,285	51	39
42	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	400	45	320	12	375	62	1,181	87	2,276	42	38
65	A-B'-H-H'-J'-J-M-N-O-P'-BB-AA-EE-HH-II-JJ	16.5	382	30	378	13	344	34	1,182	88	2,286	65	40
59	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	16.7	446	54	278	8	375	62	1,188	90	2,287	59	41
55	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	400	45	461	30	375	62	1,061	49	2,297	55	42
40	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	400	45	308	11	375	62	1,242	99	2,325	40	43
53	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	400	45	449	24	375	62	1,122	68	2,346	53	44
62	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-DD-EE-HH-II-JJ	16.8	430	51	456	27	344	34	1,148	76	2,378	62	46
49	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	400	45	469	31	375	62	1,131	71	2,376	49	45
60	A-B'-H-H'-J'-J-M-N-O-R-W-Z-CC-BB-AA-EE-HH-II-JJ	16.8	430	51	444	21	344	34	1,176	85	2,394	60	47
43	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	33	486	34	344	34	1,202	93	2,416	43	49
47	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	400	45	458	29	375	62	1,176	84	2,408	47	48

TABLE 3-2
INITIAL ROUTE ALTERNATIVES SCORING RESULTS

			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
41	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	33	474	33	344	34	1,230	98	2,432	41	50
56	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	33	627	62	344	34	1,082	58	2,437	56	51
54	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	33	615	60	344	34	1,109	65	2,453	54	52
48	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	33	624	61	344	34	1,163	82	2,515	48	53
50	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	33	636	64	344	34	1,152	77	2,516	50	54
134	A-H-H'-LL-J'-J-M-N-O-R-P'-BB-AA-EE-EE'-KK-II-JJ	18.0	234	19	739	79	94	16	1,556	105	2,623	134	55
126	A-H-J-U-T-V-X-W-Z-CC-FF-GG-HH-II-JJ	17.0	713	56	764	86	250	28	1,042	45	2,768	126	56
69	A-B'-H-H'-J'-J-M-N-O-P-Q-AA-EE-EE'-MM-KK-II-JJ	16.1	763	58	832	91	375	62	808	19	2,778	69	57
70	A-B'-H-H'-J'-J-M-N-O-P-Q-AA-EE-HH-II-JJ	16.2	747	57	998	99	344	34	796	16	2,885	70	58
84	A-B'-H-J-U-T-V-X-W-Z-CC-FF-GG-HH-II-JJ	17.0	898	59	530	43	531	74	978	29	2,937	84	59
89	A-B'-H-J-U-T-V-X-W-Z-CC-BB-DD-GG-HH-II-J	17.2	951	61	568	49	531	74	918	25	2,968	89	60
77	A-B'-H-J-U-T-S-V-X-Y-FF-GG-HH-II-JJ	17.0	1,001	72	589	56	531	74	887	24	3,008	77	61
90	A-B'-H-J-U-T-V-X-Y-Z-CC-FF-GG-HH-II-JJ	17.0	898	59	539	46	531	74	1,048	46	3,016	90	62
71	A-B'-H-J-U-T-S-R-W-Z-CC-FF-GG-HH-II-JJ	17.1	1,005	73	455	26	531	74	1,050	47	3,042	71	63
95	A-B'-H-J-U-T-V-X-Y-Z-CC-BB-DD-GG-HH-II-J	17.2	951	61	576	52	531	74	989	30	3,047	95	64
87	A-B'-H-J-U-T-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	966	67	583	55	563	96	947	26	3,059	87	65
76	A-B'-H-J-U-T-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.3	1,058	75	492	35	531	74	991	31	3,073	76	66
109	A-D-E-F-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.9	1,183	85	986	97	219	27	691	9	3,078	109	67
85	A-B'-H-J-U-T-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	966	67	572	50	563	96	1,008	34	3,108	85	68
93	A-B'-H-J-U-T-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	966	67	592	58	563	96	1,017	36	3,138	93	69
74	A-B'-H-J-U-T-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	1,074	81	508	39	563	96	1,020	37	3,164	74	70
78	A-B'-H-J-U-T-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	17.1	1,005	73	605	59	531	74	1,033	41	3,175	78	71
91	A-B'-H-J-U-T-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	966	67	580	54	563	96	1,078	55	3,187	91	72
88	A-B'-H-J-U-T-V-X-W-Z-CC-BB-DD-EE-HH-II-JJ	17.3	951	61	750	82	531	74	968	27	3,199	88	73
83	A-B'-H-J-U-T-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.3	1,058	75	642	66	531	74	974	28	3,206	83	74
86	A-B'-H-J-U-T-V-X-W-Z-CC-BB-AA-EE-HH-II-JJ	17.3	951	61	738	78	531	74	996	32	3,215	86	76
72	A-B'-H-J-U-T-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	1,074	81	496	36	563	96	1,080	56	3,213	72	75
3	A-B-C-D-E-F-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.7	1,870	103	803	87	94	16	453	4	3,220	3	77
127	A-H-J-U-Y-FF-GG-HH-II-JJ	17.2	1,510	86	755	83	250	28	747	13	3,262	127	78
94	A-B'-H-J-U-T-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.3	951	61	758	85	531	74	1,038	43	3,278	94	79
92	A-B'-H-J-U-T-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.3	951	61	746	81	531	74	1,066	52	3,294	92	80
75	A-B'-H-J-U-T-S-R-W-Z-CC-BB-DD-EE-HH-II-JJ	17.3	1,058	75	674	72	531	74	1,040	44	3,304	75	82
81	A-B'-H-J-U-T-S-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	1,074	81	658	69	563	96	1,003	33	3,297	81	81
73	A-B'-H-J-U-T-S-R-W-Z-CC-BB-AA-EE-HH-II-JJ	17.3	1,058	75	662	70	531	74	1,068	53	3,320	73	83
4	A-B-C-D-E-F-K-L-Q-AA-EE-HH-II-JJ	15.8	1,855	102	969	96	63	1	441	3	3,327	4	84
110	A-D-E-I-P-O-R-P'-BB-DD-GG-HH-II-JJ	16.7	975	71	832	90	500	73	1,037	42	3,344	110	85
79	A-B'-H-J-U-T-S-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	1,074	81	646	67	563	96	1,063	51	3,346	79	86
96	A-B'-H-J-U-Y-FF-GG-HH-II-JJ	17.2	1,694	92	522	41	531	74	683	8	3,430	96	87
82	A-B'-H-J-U-T-S-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.3	1,058	75	824	89	531	74	1,023	38	3,437	82	88
80	A-B'-H-J-U-T-S-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.3	1,058	75	812	88	531	74	1,051	48	3,453	80	89
2	A-B-C-D-E-F-L-Q-AA-EE-HH-II-JJ	16.2	1,716	94	1,313	101	63	1	368	1	3,460	2	90
97	A-B'-H-J-U-Y-Z-CC-FF-GG-HH-II-JJ	17.3	1,699	93	538	45	531	74	796	17	3,564	97	91
1	A-B-C-D-E-F-L-Q-AA-EE-EE'-MM-KK-II-JJ	16.0	1,732	95	1,361	102	94	16	381	2	3,568	1	92
102	A-B'-H-J-U-Y-Z-CC-BB-DD-GG-HH-II-J	17.5	1,752	96	576	51	531	74	737	11	3,595	102	93
12	A-B-C-D-E-I-P-O-R-P'-BB-DD-GG-HH-II-JJ	16.5	1,662	87	863	93	313	30	800	18	3,638	12	94
9	A-B-C-D-E-I-P-O-R-P'-BB-AA-EE-HH-II-JJ	15.8	1,662	87	987	98	313	30	730	10	3,692	9	96
100	A-B'-H-J-U-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.4	1,767	99	591	57	563	96	765	14	3,686	100	95
8	A-B-C-D-E-I-P-O-R-P'-BB-AA-EE-EE'-MM-KK-II-JJ	15.7	1,678	90	934	95	344	34	742	12	3,697	8	97
10	A-B-C-D-E-I-P-O-R-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.4	1,678	90	879	94	344	34	829	22	3,729	10	98

TABLE 3-2
INITIAL ROUTE ALTERNATIVES SCORING RESULTS

			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
98	A-B'-H-J-U-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.4	1,767	99	579	53	563	96	826	21	3,735	98	99
101	A-B'-H-J-U-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.5	1,752	96	757	84	531	74	786	15	3,826	101	100
99	A-B'-H-J-U-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.5	1,752	96	746	80	531	74	814	20	3,842	99	101
11	A-B-C-D-E-I-P-O-R-P'-BB-DD-EE-HH-II-JJ	16.5	1,662	87	1,045	100	313	30	850	23	3,869	11	102
5	A-B-C-D-E-I-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.5	1,793	101	1,430	103	344	34	613	7	4,180	5	103
6	A-B-C-D-E-I-P-Q-AA-EE-EE'-MM-KK-II-JJ	15.5	2,044	105	1,456	104	344	34	475	6	4,318	6	104
7	A-B-C-D-E-I-P-Q-AA-EE-HH-II-JJ	15.6	2,028	104	1,622	105	313	30	463	5	4,425	7	105

TABLE 3-3
SUPPLEMENTAL AND UPDATED ROUTE ALTERNATIVES SCORING RESULTS

			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
138	A-H-H'-LL-J'-J-M-N-NN-OO-RR-R-P'-BB-DD-GG-HH-II'-JJ	16.7	55	3	265	12	281	5	1,513	49	2,114	138	1
139	A-H-H'-LL-J'-J-M-S-V-X-W-Z-BB-DD-GG-HH-II'-JJ	17.1	0	1	514	65	313	17	1,387	27	2,213	139	2
135	A-H-H'-J'-J-M-N-NN-OO-RR-R-W-Z-BB-DD-GG-HH-II'-JJ	16.6	188	12	306	17	281	5	1,461	39	2,237	135	3
133	A-H-H'-LL-J'-J-M-S-V-X-Y-FF-GG-HH-II'-JJ	17.0	0	1	492	59	313	17	1,440	34	2,244	133	4
129	A-B'-H-H'-LL-J'-J-M-N-NN-O-R-P'-BB-DD-GG-HH-II'-JJ	16.7	239	25	152	2	313	17	1,584	69	2,287	129	5
131	A-H-H'-LL-J'-J-M-N-NN-O-R-P'-BB-DD-GG-HH-II'-JJ	16.6	55	3	300	16	281	5	1,659	86	2,295	131	6
132	A-H-H'-LL-J'-J-M-N-NN-O-R-P'-BB-DD-EE-EE'-KK-II'-JJ	16.6	69	5	309	20	344	44	1,576	65	2,297	132	7
137	A-H-H'-J'-J-M-N-NN-OO-RR-R-P'-BB-DD-GG-HH-II'-JJ	16.5	198	15	256	10	281	5	1,599	72	2,334	137	8
44	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	38	247	9	344	44	1,422	31	2,396	44	9
39	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-FF-GG-HH-II-JJ	16.9	331	31	209	6	344	44	1,523	54	2,407	39	10
119	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	200	17	394	38	313	17	1,520	53	2,427	119	11
45	A-B'-H-H'-J'-J-M-S-V-X-Y-FF-GG-HH-II-JJ	16.9	326	30	336	24	344	44	1,451	37	2,457	45	12
105	A-H-H'-J'-J-M-S-R-W-Z-CC-FF-GG-HH-II-JJ	16.9	147	9	357	27	313	17	1,644	82	2,461	105	13
136	A-H-H'-J'-J-M-N-NN-OO-W-Z-BB-DD-GG-HH-II'-JJ	17.2	188	12	307	19	281	5	1,691	97	2,467	136	14
63	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-DD-GG-HH-II-JJ	16.7	429	56	216	7	313	17	1,515	50	2,473	63	15
120	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ	16.9	143	7	506	61	313	17	1,519	52	2,480	120	16
58	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-FF-GG-HH-II-JJ	16.5	376	34	179	5	313	17	1,616	75	2,484	58	17
68	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-GG-HH-II-JJ	16.5	381	35	144	1	313	17	1,647	83	2,485	68	18
103	A-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-GG-HH-II-JJ	16.4	198	15	291	14	281	5	1,722	102	2,492	103	19
115	A-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-DD-GG-HH-II-JJ	16.7	246	26	364	30	281	5	1,613	74	2,504	115	20
104	A-H-H'-J'-J-M-S-V-X-Y-FF-GG-HH-II-JJ	16.8	143	7	484	57	313	17	1,572	63	2,511	104	21
42	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	399	50	262	11	375	90	1,479	43	2,516	42	22
57	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	38	381	33	344	44	1,427	32	2,535	57	23
52	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-FF-GG-HH-II-JJ	16.9	331	31	343	25	344	44	1,528	55	2,546	52	24
122	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	216	21	410	44	344	44	1,577	66	2,547	122	25
130	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-EE-EE'-KK-II'-JJ	16.4	395	47	153	3	375	90	1,633	79	2,556	130	26
134	A-H-H'-LL-J'-J-M-N-NN-O-R-P'-BB-AA-EE-EE'-KK-II'-JJ	16.6	69	5	440	49	344	44	1,708	100	2,560	134	27
106	A-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-FF-GG-HH-II-JJ	16.5	193	14	327	23	281	5	1,760	105	2,561	106	28
114	A-H-H'-J'-J-M-S-V-X-W-Z-CC-FF-GG-HH-II-JJ	16.8	147	9	491	58	313	17	1,626	78	2,577	114	29
61	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	16.6	445	59	232	8	344	44	1,572	64	2,593	61	30
128	A-B'-H-H'-LL-J'-J-M-N-NN-O-R-P'-BB-AA-EE-EE'-KK-II'-JJ	16.6	252	27	292	15	375	90	1,679	93	2,598	128	31
66	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.4	397	48	159	4	344	44	1,705	98	2,604	66	32
117	A-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	16.6	261	28	380	32	313	17	1,670	92	2,624	117	33
113	A-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.4	213	19	307	18	313	17	1,803	108	2,635	113	34
55	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	399	50	397	39	375	90	1,484	44	2,655	55	35
43	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	38	428	45	344	44	1,504	47	2,660	43	36
123	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	216	21	544	74	344	44	1,582	68	2,686	123	37
46	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	16.9	331	31	352	26	344	44	1,664	88	2,690	46	38
51	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.1	384	38	389	35	344	44	1,585	70	2,702	51	39
116	A-H-H'-J'-J-M-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	16.8	147	9	500	60	313	17	1,762	106	2,721	116	40
40	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	399	50	393	36	375	90	1,565	60	2,732	40	41
121	A-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.1	200	17	537	71	313	17	1,684	94	2,733	121	42
62	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-DD-EE-HH-II-JJ	16.8	429	56	398	40	313	17	1,597	71	2,737	62	43
67	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-DD-EE-HH-II-JJ	16.5	381	35	325	21	313	17	1,730	103	2,749	67	44
124	A-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	216	21	541	72	344	44	1,663	87	2,763	124	45
56	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	38	563	77	344	44	1,509	48	2,799	56	46
107	A-H-H'-J'-J-M-N-NN-O-R-P'-BB-AA-EE-EE'-MM-KK-II-JJ	16.4	213	19	438	47	313	17	1,842	110	2,806	107	47
59	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	16.7	445	59	363	28	344	44	1,658	85	2,809	59	48
49	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.0	399	50	405	43	375	90	1,643	81	2,822	49	49
41	A-B'-H-H'-J'-J-M-S-R-W-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	38	559	76	344	44	1,544	57	2,830	41	50
118	A-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	16.6	261	28	511	64	313	17	1,756	104	2,840	118	51

TABLE 3-3
SUPPLEMENTAL AND UPDATED ROUTE ALTERNATIVES SCORING RESULTS

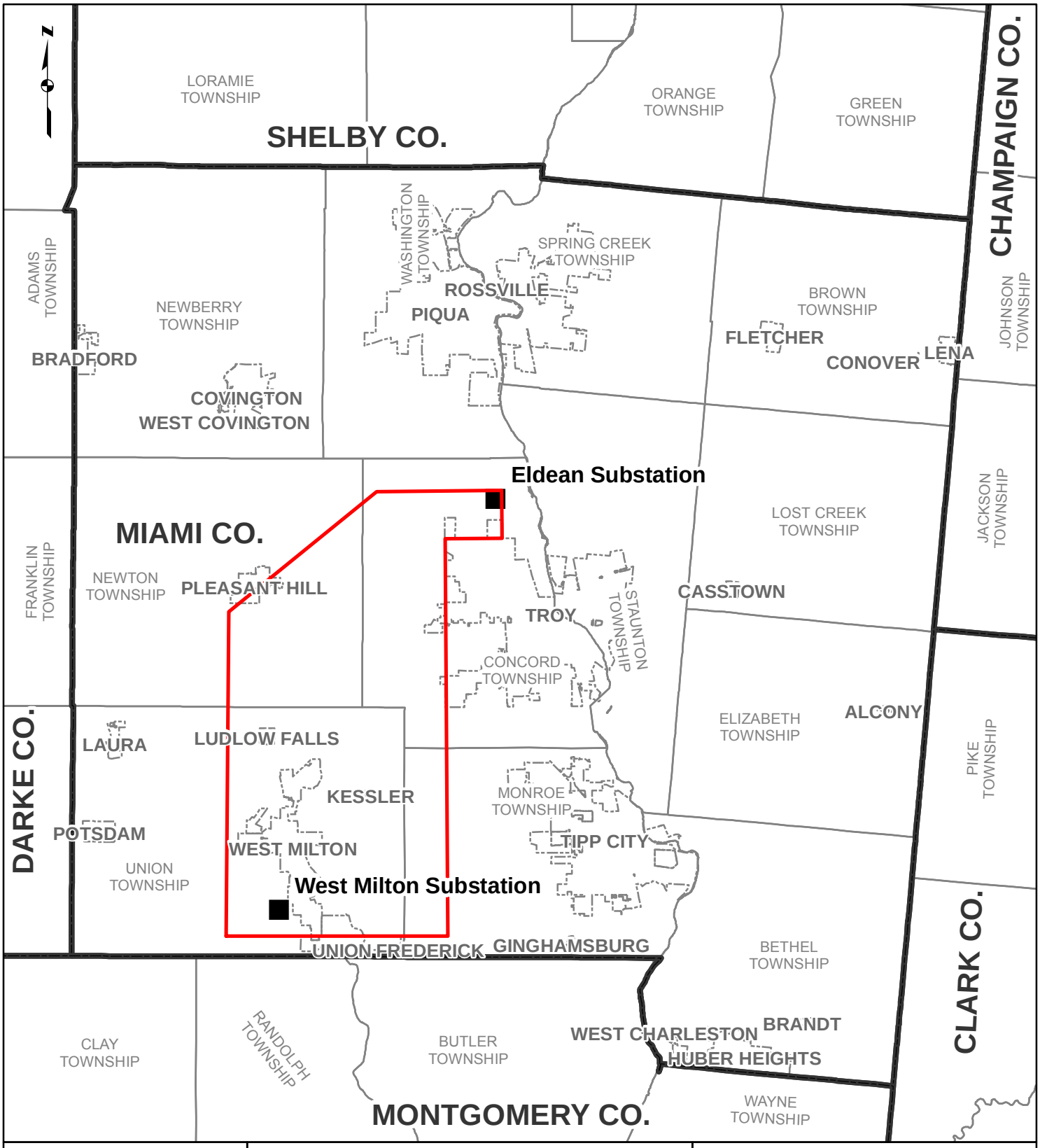
			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
64	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-AA-EE-EE'-MM-KK-II-JJ	16.4	397	48	290	13	344	44	1,813	109	2,844	64	52
53	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	399	50	527	67	375	90	1,570	62	2,872	53	53
125	A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	216	21	675	86	344	44	1,668	90	2,903	125	54
60	A-B'-H-H'-J'-J-M-N-NN-O-R-W-Z-CC-BB-AA-EE-HH-II-JJ	16.8	429	56	529	68	313	17	1,636	80	2,907	60	55
65	A-B'-H-H'-J'-J-M-N-NN-O-R-P'-BB-AA-EE-HH-II-JJ	16.5	381	35	456	55	313	17	1,792	107	2,942	65	56
50	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.1	384	38	571	78	344	44	1,668	89	2,966	50	57
54	A-B'-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	38	694	89	344	44	1,549	58	2,970	54	58
47	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.0	399	50	536	70	375	90	1,705	99	3,016	47	59
89	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-BB-DD-GG-HH-II-J	17.2	950	66	432	46	344	44	1,319	22	3,045	89	60
84	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-FF-GG-HH-II-JJ	17.0	897	64	394	37	344	44	1,421	30	3,055	84	61
126	A-H-H'-J'-J-U-T-V-X-W-Z-CC-FF-GG-HH-II-JJ	17.0	714	61	542	73	313	17	1,519	51	3,086	126	62
48	A-B'-H-H'-J'-J-M-S-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.2	384	38	702	90	344	44	1,684	95	3,114	48	63
76	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-BB-DD-GG-HH-II-JJ	17.3	1,058	80	363	29	344	44	1,357	25	3,122	76	64
71	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-FF-GG-HH-II-JJ	17.1	1,005	78	325	22	344	44	1,459	38	3,133	71	65
87	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	966	72	447	51	375	90	1,377	26	3,164	87	66
95	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-BB-DD-GG-HH-II-J	17.2	950	66	440	50	344	44	1,478	41	3,212	95	67
69	A-B'-H-H'-J'-J-M-N-NN-O-P-Q-AA-EE-EE'-MM-KK-II-JJ	16.1	762	63	838	98	344	44	1,274	19	3,218	69	68
90	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-FF-GG-HH-II-JJ	17.0	897	64	402	42	344	44	1,579	67	3,222	90	69
77	A-B'-H-H'-J'-J-U-T-S-V-X-Y-FF-GG-HH-II-JJ	17.0	1,000	77	453	52	344	44	1,433	33	3,229	77	70
74	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	1,073	86	379	31	375	90	1,415	29	3,242	74	71
88	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-BB-DD-EE-HH-II-JJ	17.3	950	66	613	82	344	44	1,402	28	3,309	88	72
70	A-B'-H-H'-J'-J-M-N-NN-O-P-Q-AA-EE-HH-II-JJ	16.2	747	62	1,005	101	313	17	1,253	17	3,316	70	73
93	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	966	72	456	54	375	90	1,535	56	3,332	93	74
85	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	966	72	578	79	375	90	1,462	40	3,381	85	75
75	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-BB-DD-EE-HH-II-JJ	17.3	1,058	80	545	75	344	44	1,440	35	3,386	75	76
72	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	1,073	86	510	63	375	90	1,501	45	3,458	72	77
83	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-BB-DD-GG-HH-II-JJ	17.3	1,058	80	506	62	344	44	1,567	61	3,475	83	78
94	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.3	950	66	622	84	344	44	1,560	59	3,476	94	79
86	A-B'-H-H'-J'-J-U-T-V-X-W-Z-CC-BB-AA-EE-HH-II-JJ	17.3	950	66	744	91	344	44	1,441	36	3,479	86	80
78	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-FF-GG-HH-II-JJ	17.1	1,005	78	468	56	344	44	1,669	91	3,486	78	81
96	A-B'-H-H'-J'-J-U-Y-FF-GG-HH-II-JJ	17.2	1,694	97	386	34	344	44	1,112	11	3,536	96	82
91	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	966	72	586	81	375	90	1,621	76	3,548	91	83
73	A-B'-H-H'-J'-J-U-T-S-R-W-Z-CC-BB-AA-EE-HH-II-JJ	17.3	1,058	80	676	87	344	44	1,479	42	3,557	73	84
127	A-H-H'-J'-J-U-Y-FF-GG-HH-II-JJ	17.2	1,511	91	534	69	313	17	1,210	15	3,567	127	85
81	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.2	1,073	86	522	66	375	90	1,625	77	3,595	81	86
109	A-D-E-F-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.9	1,183	90	1,057	103	375	90	1,012	9	3,626	109	87
3	A-B-C-D-E-F-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.7	1,871	108	945	99	156	4	655	4	3,627	3	88
92	A-B'-H-H'-J'-J-U-T-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.3	950	66	753	93	344	44	1,600	73	3,646	92	89
4	A-B-C-D-E-F-K-L-Q-AA-EE-HH-II-JJ	15.8	1,855	107	1,111	105	125	3	633	3	3,725	4	90
102	A-B'-H-H'-J'-J-U-Y-Z-CC-BB-DD-GG-HH-II-J	17.5	1,752	101	439	48	344	44	1,200	13	3,735	102	91
82	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.3	1,058	80	688	88	344	44	1,649	84	3,739	82	92
97	A-B'-H-H'-J'-J-U-Y-Z-CC-FF-GG-HH-II-JJ	17.3	1,699	98	402	41	344	44	1,302	21	3,746	97	93
110	A-D-E-I-P-O-R-P'-BB-DD-GG-HH-II-JJ	16.8	975	76	760	94	531	110	1,503	46	3,770	110	94
2	A-B-C-D-E-F-L-Q-AA-EE-HH-II-JJ	16.2	1,717	99	1,455	109	63	1	551	1	3,786	2	95
79	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.2	1,073	86	653	85	375	90	1,710	101	3,811	79	96
1	A-B-C-D-E-F-L-Q-AA-EE-EE'-MM-KK-II-JJ	16.0	1,733	100	1,432	107	94	2	572	2	3,831	1	97
100	A-B'-H-H'-J'-J-U-Y-Z-CC-BB-DD-EE-EE'-MM-KK-II-JJ	17.4	1,767	104	455	53	375	90	1,258	18	3,855	100	98
12	A-B-C-D-E-I-P-O-R-P'-BB-DD-GG-HH-II-JJ	16.5	1,663	92	791	95	281	5	1,147	12	3,882	12	99
80	A-B'-H-H'-J'-J-U-T-S-V-X-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.3	1,058	80	819	97	344	44	1,689	96	3,909	80	100
101	A-B'-H-H'-J'-J-U-Y-Z-CC-BB-DD-EE-HH-II-JJ	17.5	1,752	101	621	83	344	44	1,283	20	3,999	101	101

TABLE 3-3
SUPPLEMENTAL AND UPDATED ROUTE ALTERNATIVES SCORING RESULTS

			ECOLOGICAL		LAND USE		CULTURAL RESOURCES		ENGINEERING				
Route ID	Route Segment Description	Route Length	Normalized Ecological Score (30% weighting)	Ecological Rank	Normalized Land Use Score (30% weighting)	Land Use Rank	Normalized Cultural Resource Score (10% weighting)	Cultural Resource Rank	Normalized Engineering Score (30% weighting)	Engineering Rank	Total Route Score	Route ID	Overall Rank
10	A-B-C-D-E-I-P-O-R-P'-BB-DD-EE-EE'-MM-KK-II-JJ	16.5	1,679	95	806	96	313	17	1,204	14	4,002	10	102
9	A-B-C-D-E-I-P-O-R-P'-BB-AA-EE-HH-II-JJ	15.9	1,663	92	1,058	104	281	5	1,011	8	4,014	9	103
8	A-B-C-D-E-I-P-O-R-P'-BB-AA-EE-EE'-MM-KK-II-JJ	15.7	1,679	95	1,005	102	313	17	1,032	10	4,029	8	104
98	A-B'-H-H'-J'-J-U-Y-Z-CC-BB-AA-EE-EE'-MM-KK-II-JJ	17.4	1,767	104	586	80	375	90	1,343	24	4,072	98	105
11	A-B-C-D-E-I-P-O-R-P'-BB-DD-EE-HH-II-JJ	16.6	1,663	92	973	100	281	5	1,229	16	4,146	11	106
99	A-B'-H-H'-J'-J-U-Y-Z-CC-BB-AA-EE-HH-II-JJ	17.5	1,752	101	752	92	344	44	1,322	23	4,170	99	107
6	A-B-C-D-E-I-P-Q-AA-EE-EE'-MM-KK-II-JJ	15.5	2,044	110	1,455	108	313	17	677	6	4,489	6	108
5	A-B-C-D-E-I-K-L-Q-AA-EE-EE'-MM-KK-II-JJ	15.5	1,794	106	1,429	106	375	90	892	7	4,490	5	109
7	A-B-C-D-E-I-P-Q-AA-EE-HH-II-JJ	15.6	2,029	109	1,621	110	281	5	656	5	4,587	7	110

Preferred Route (March 2015)
Alternate Route
Optimized Preferred Route (October 2015)

FIGURES



PROJECT LOCATION

MIAMI COUNTY, OHIO

LEGEND

- STUDY AREA
- EXISTING SUBSTATION
- CITY LIMIT BOUNDARY
- TOWNSHIP BOUNDARY
- COUNTY BOUNDARY

0 1.5 3 6 Miles

FIGURE 3.1
PROJECT LOCATION MAP

WEST MILTON TO ELDEAN 138kV

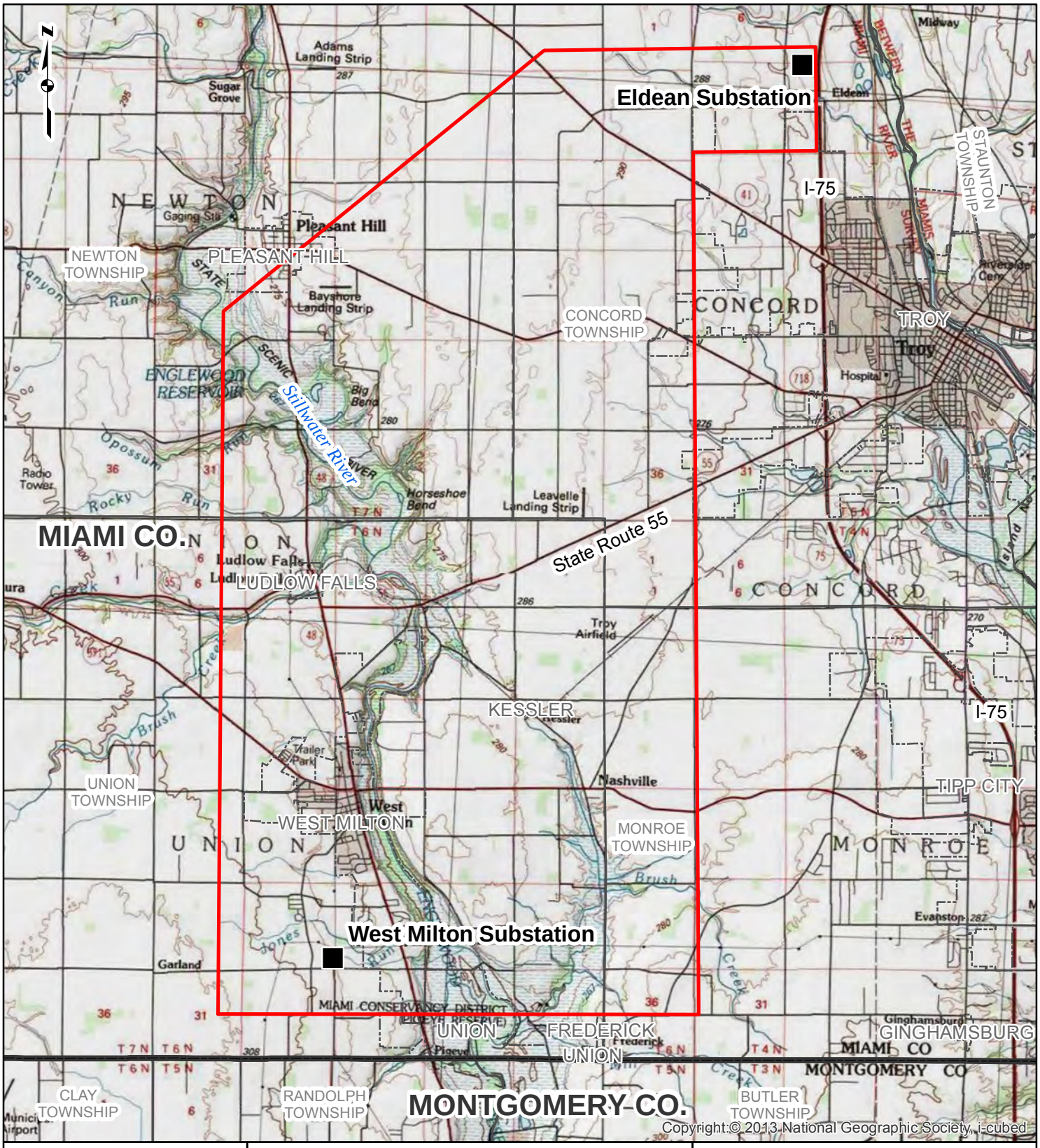
gai consultants

DAYTON POWER & LIGHT

DRAWN BY: TDB DATE: 2/5/2015
CHECKED: DRB APPROVED: MAF

REFERENCE: MIAMI CO. GIS, 2013; ODNR, 2014; GAI, 2015.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\PROJECT_LOCATION\PROJECT_LOCATION_MAP_2015_02_05.mxd



PROJECT LOCATION

MIAMI COUNTY, OHIO

LEGEND

- STUDY AREA
- EXISTING SUBSTATION
- CITY LIMIT BOUNDARY
- TOWNSHIP BOUNDARY
- COUNTY BOUNDARY

0 0.75 1.5 3 Miles

FIGURE 3.2
PROJECT STUDY AREA MAP

WEST MILTON TO ELDEAN 138kV

gai consultants

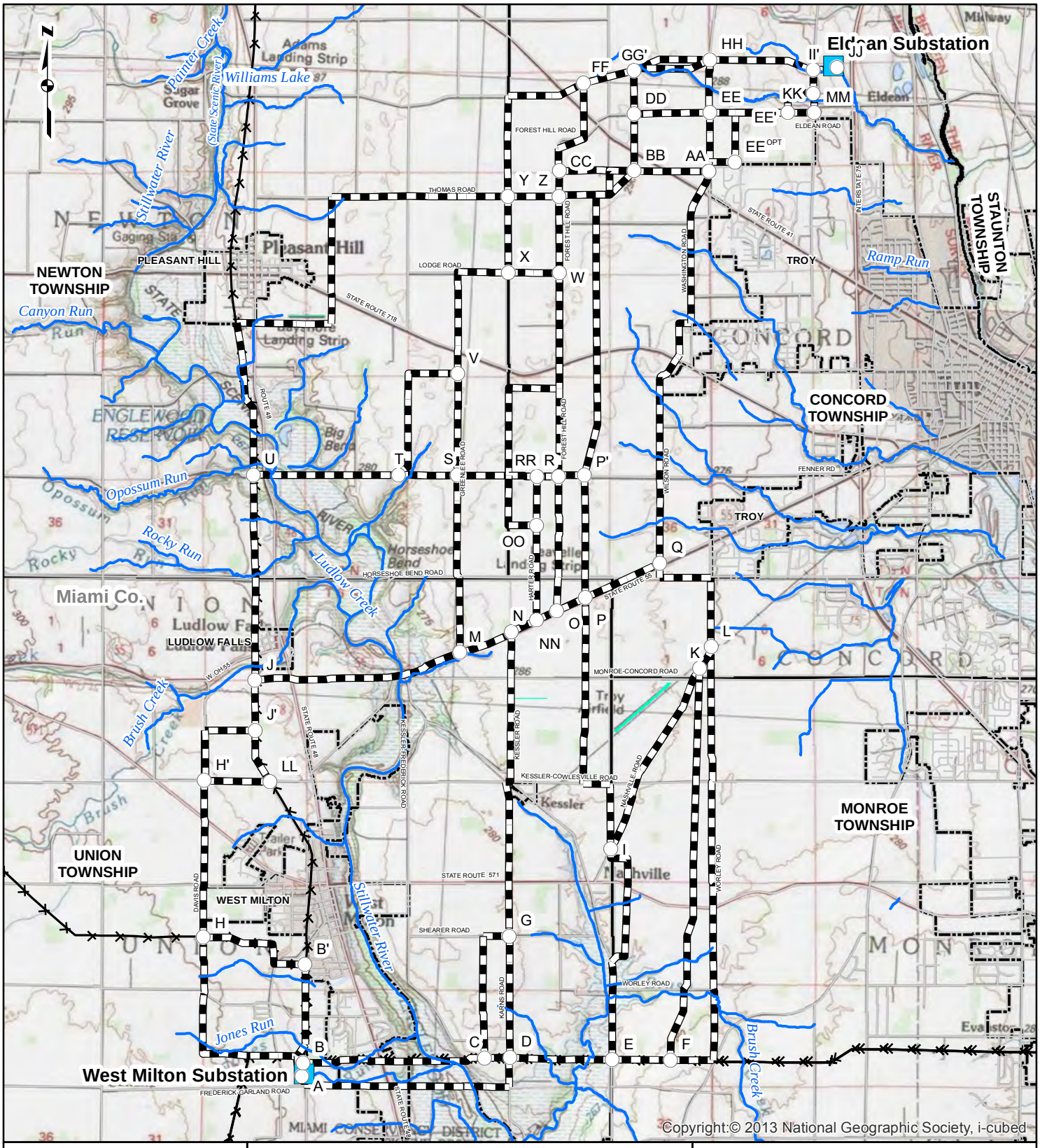
DAYTON POWER & LIGHT

DP&L

DRAWN BY: TDB DATE: 2/5/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: DAYTON (1986), PIQUA (1986), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 02/2015. MIAMI CO. GIS, 2013; ODNR, 2014; GAI, 2015.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\PROJECT_LOCATION\PROJECT_LOCATION_MAP_TOPO_2015_02_05.mxd



PROJECT LOCATION

MIAMI COUNTY, OHIO

Node
Substation
NHD Waterway
Proposed Route Alternative
Existing Transmission Line- Approximate
Road Centerline

Waterbody
Airport
City Limit
Township Boundary
County Boundary

0 3,500 7,000 14,000 Feet

FIGURE 3.3
ROUTE ALTERNATIVES

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

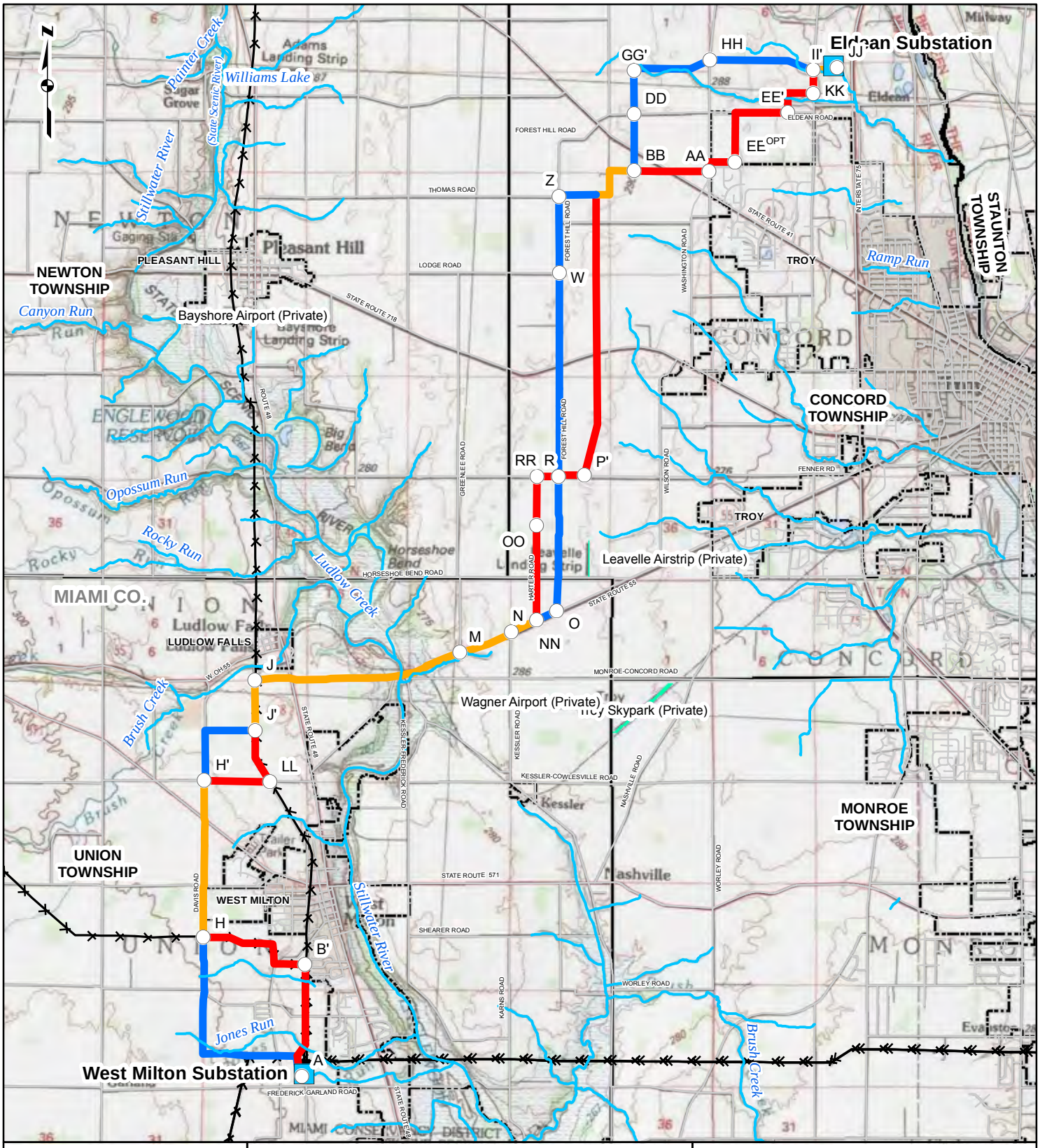
gai consultants

DP&L

DRAWN BY: TDB DATE: 1/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: PIQUA (1986,) DAYTON, OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 01/2015.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\3_1_DPL_WEST_MILTON_ELDEN_OVERVIEW_2015_01_21.mxd



PROJECT LOCATION

MIAMI COUNTY, OHIO

Node
Substation
NHD Waterway
Preferred Route
Common Route
Alternate Route
Existing Transmission Line- Approximate
Road Centerline
Waterbody
Airport
City Limit
Township Boundary
County Boundary

0 3,500 7,000 14,000 Feet

FIGURE 3.4
PREFERRED AND ALTERNATE ROUTES

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

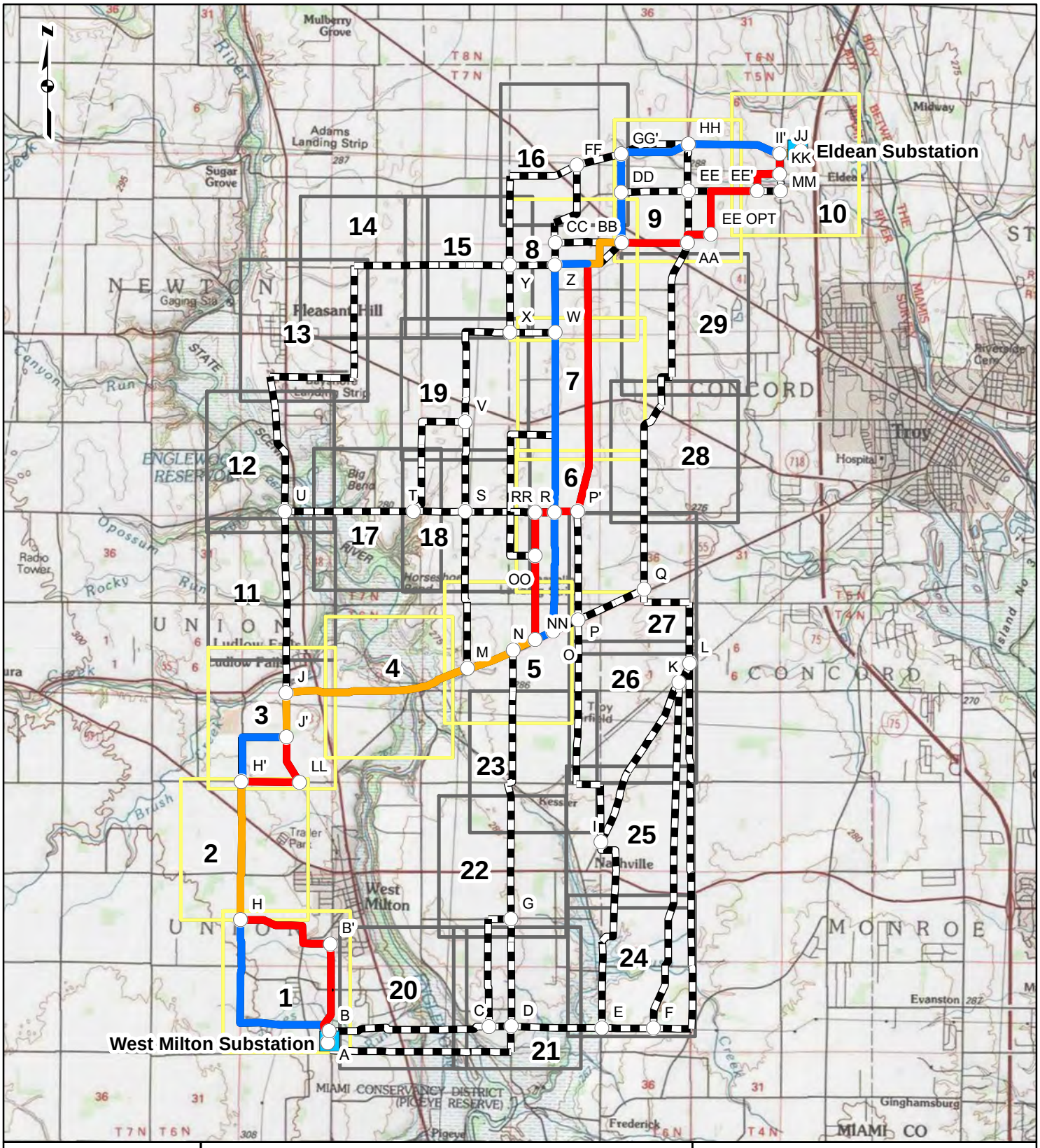
gai consultants

DP&L

DRAWN BY: TDB DATE: 10/22/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: PIQUA (1986,) DAYTON, OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. ODNR, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\3_4_DPL_WEST_MILTON_ELDEN_OVERVIEW_2015_10_22.mxd



PROJECT LOCATION

MIAMI COUNTY, OHIO

Node

Existing Substation

Preferred Route

Common Route

Alternate Route

Proposed Route Alternative

Sheet Boundary- Preferred and Alternate Route

Sheet Boundary

0 0.75 1.5 3 Miles

FIGURE 3.5
ROUTE ALTERNATIVES INDEX

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

gai consultants

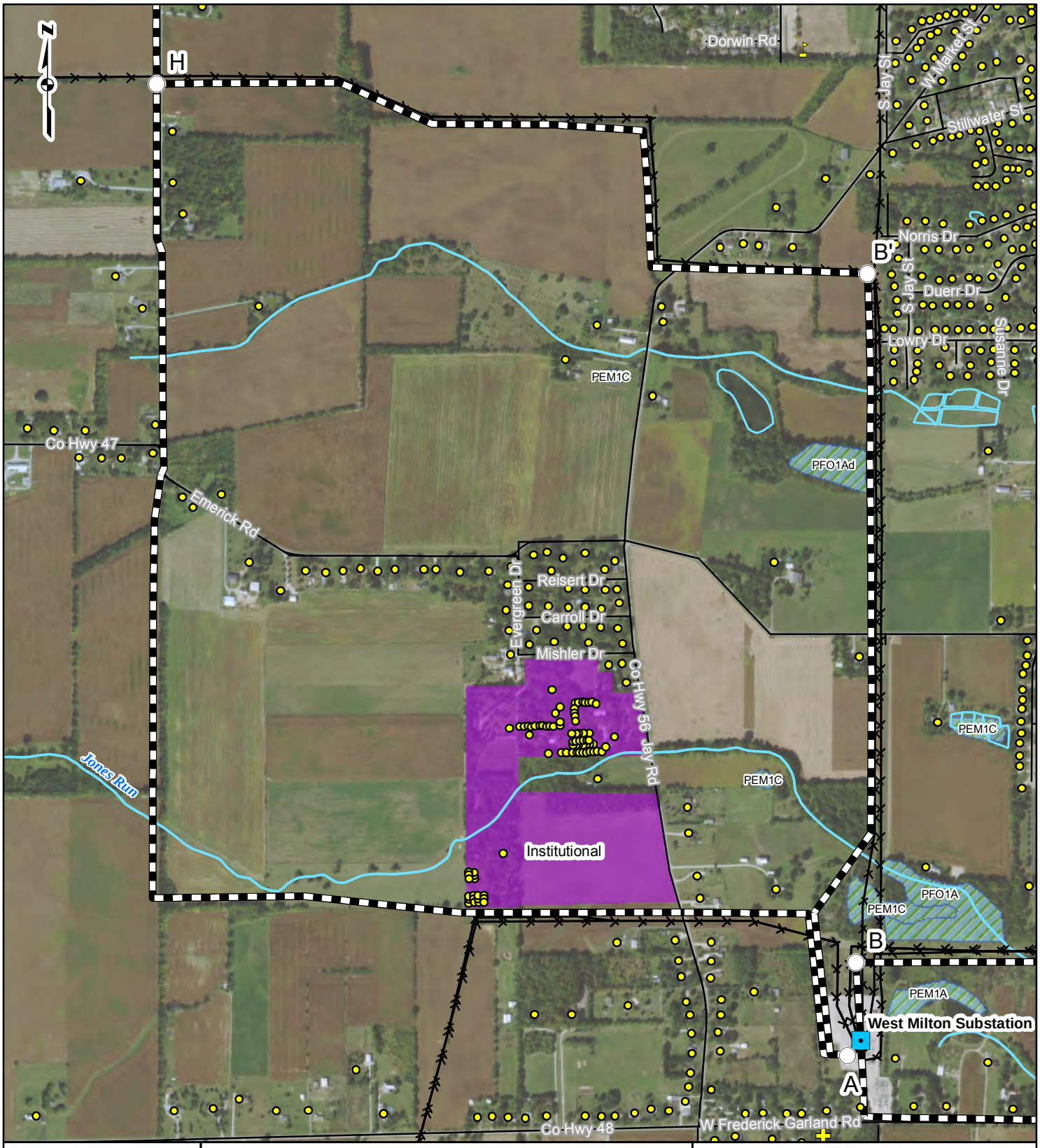
DP&L

DRAWN BY: TDB DATE: 11/16/2015

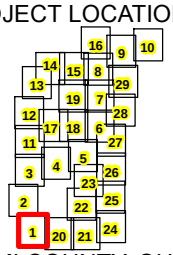
CHECKED: MAF APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: PIQUA (1986,) DAYTON, OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 11/2015.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_INDEX_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 1 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

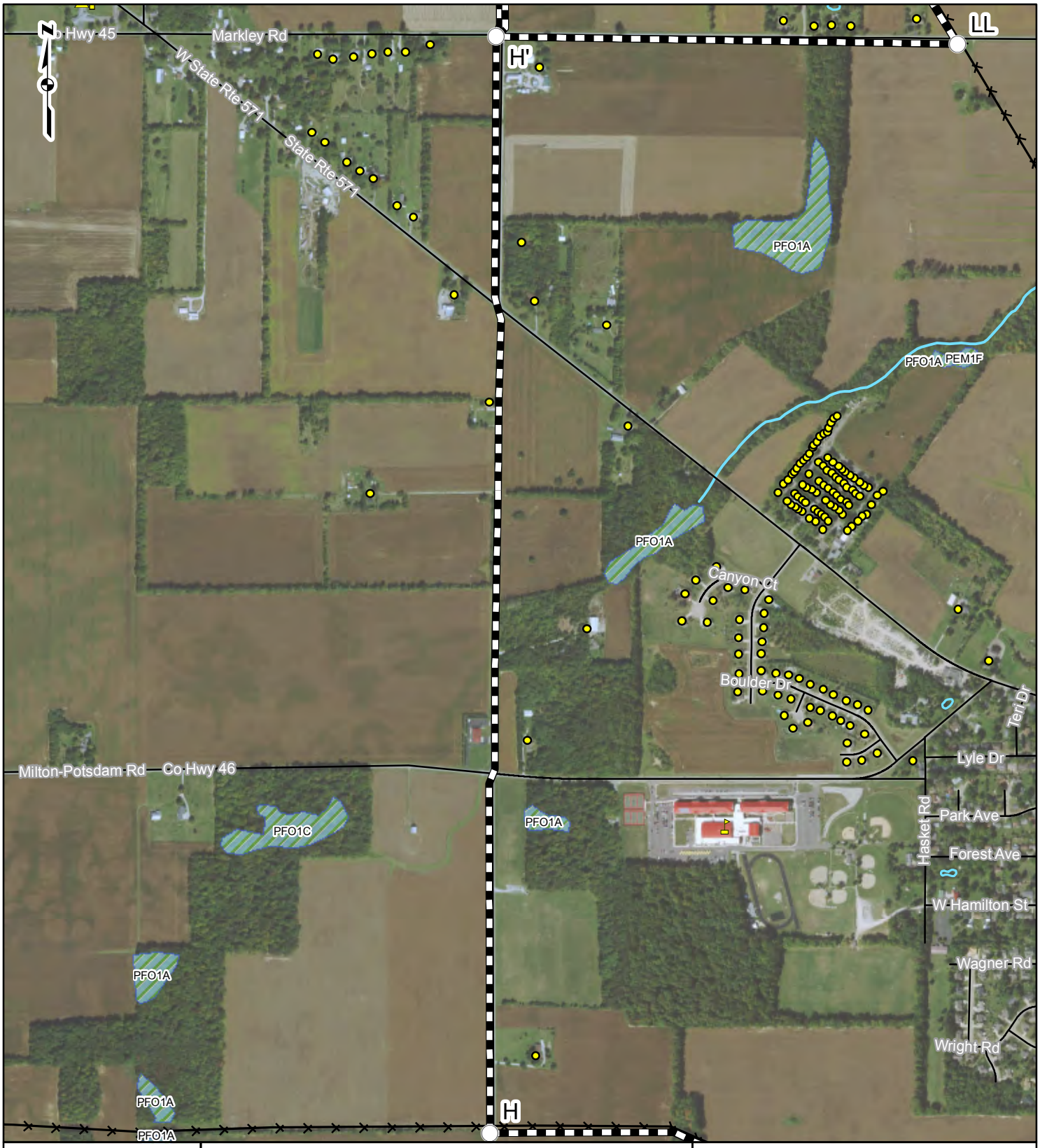
DAYTON POWER & LIGHT

DP&L

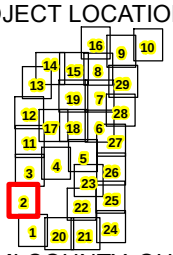
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 2 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

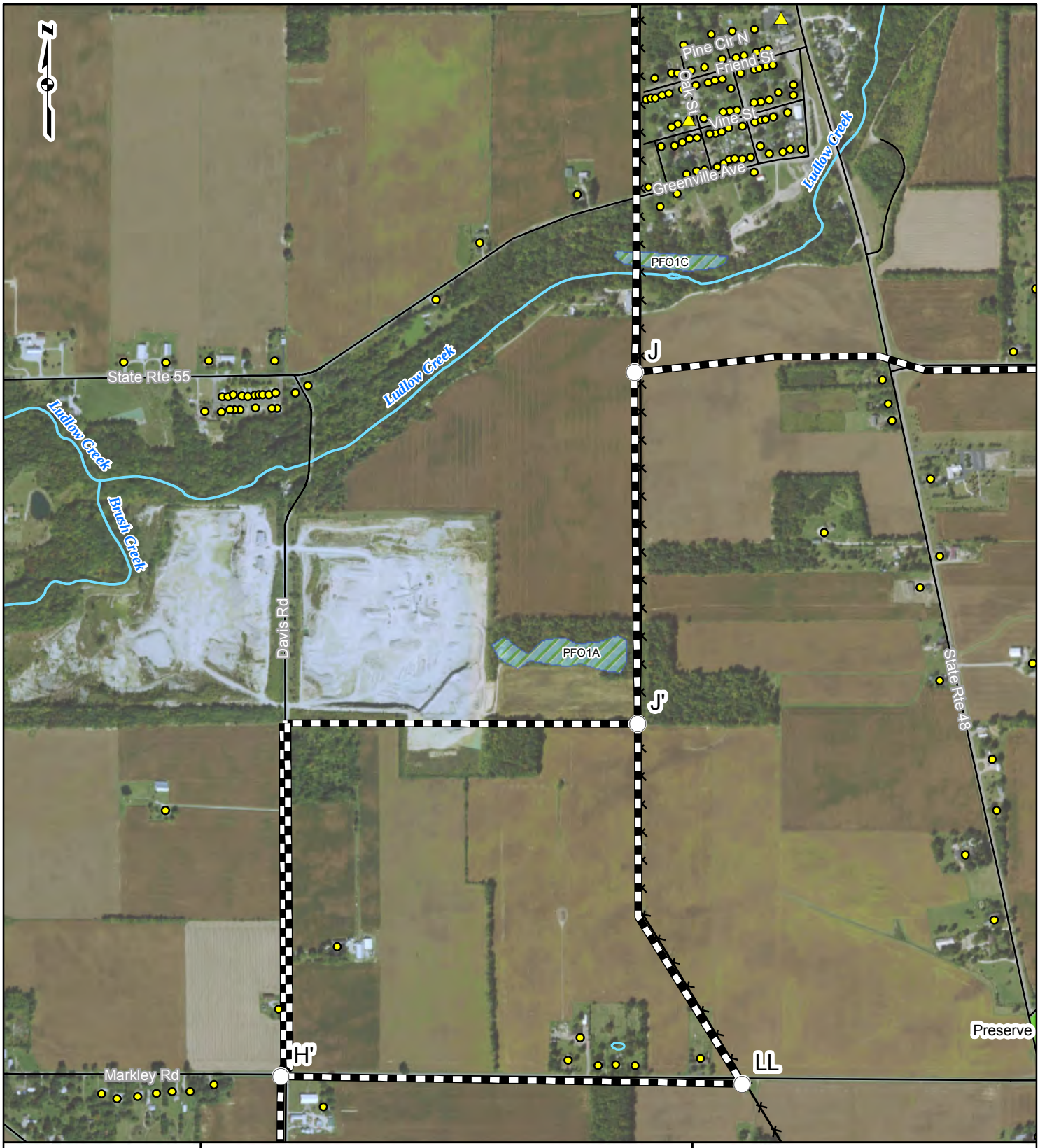
DAYTON POWER & LIGHT

DP&L

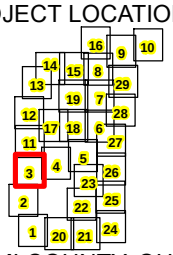
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 3 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

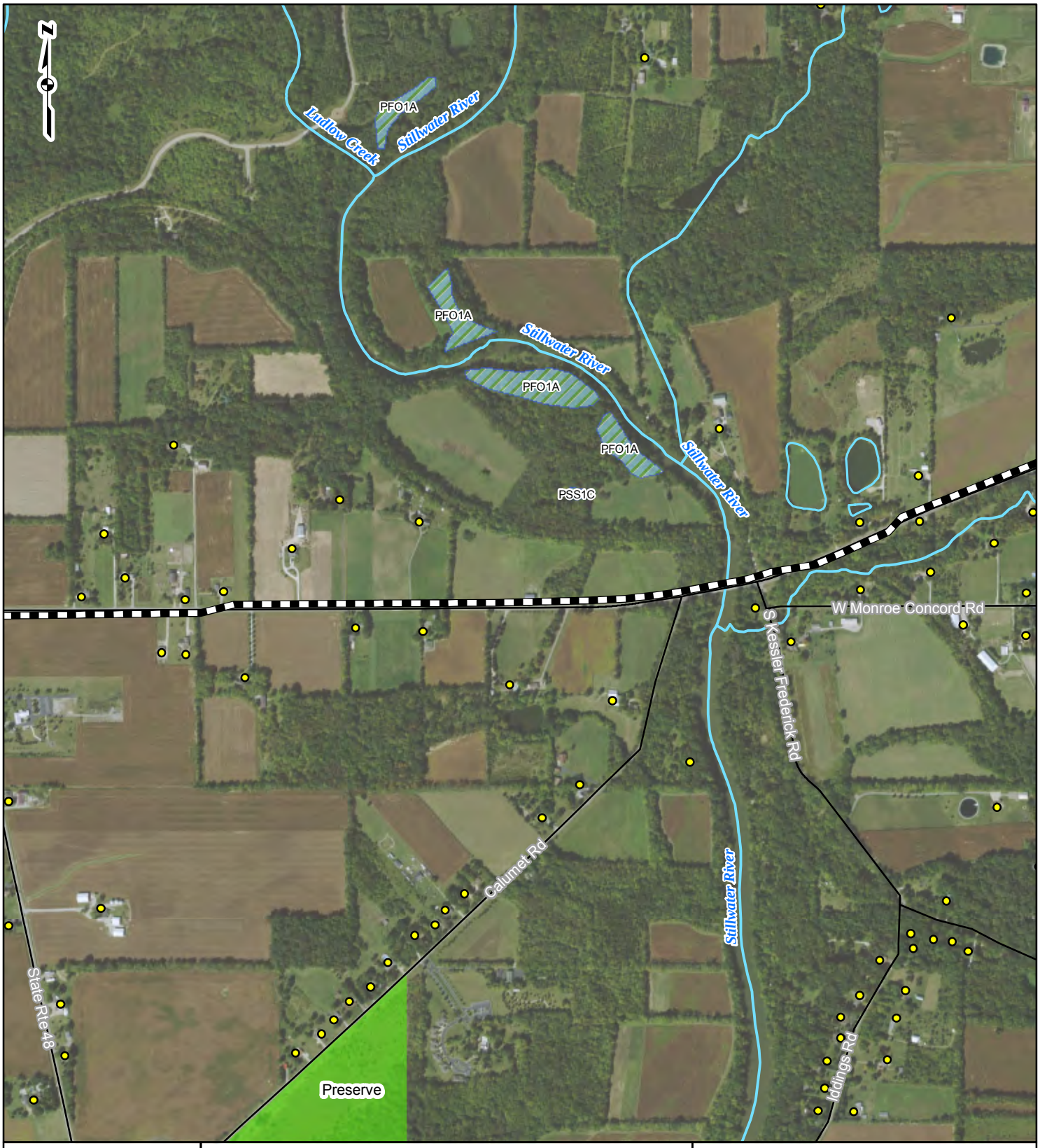
gai consultants

DP&L

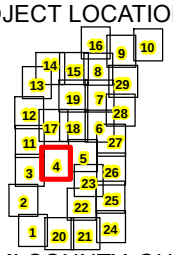
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 4 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

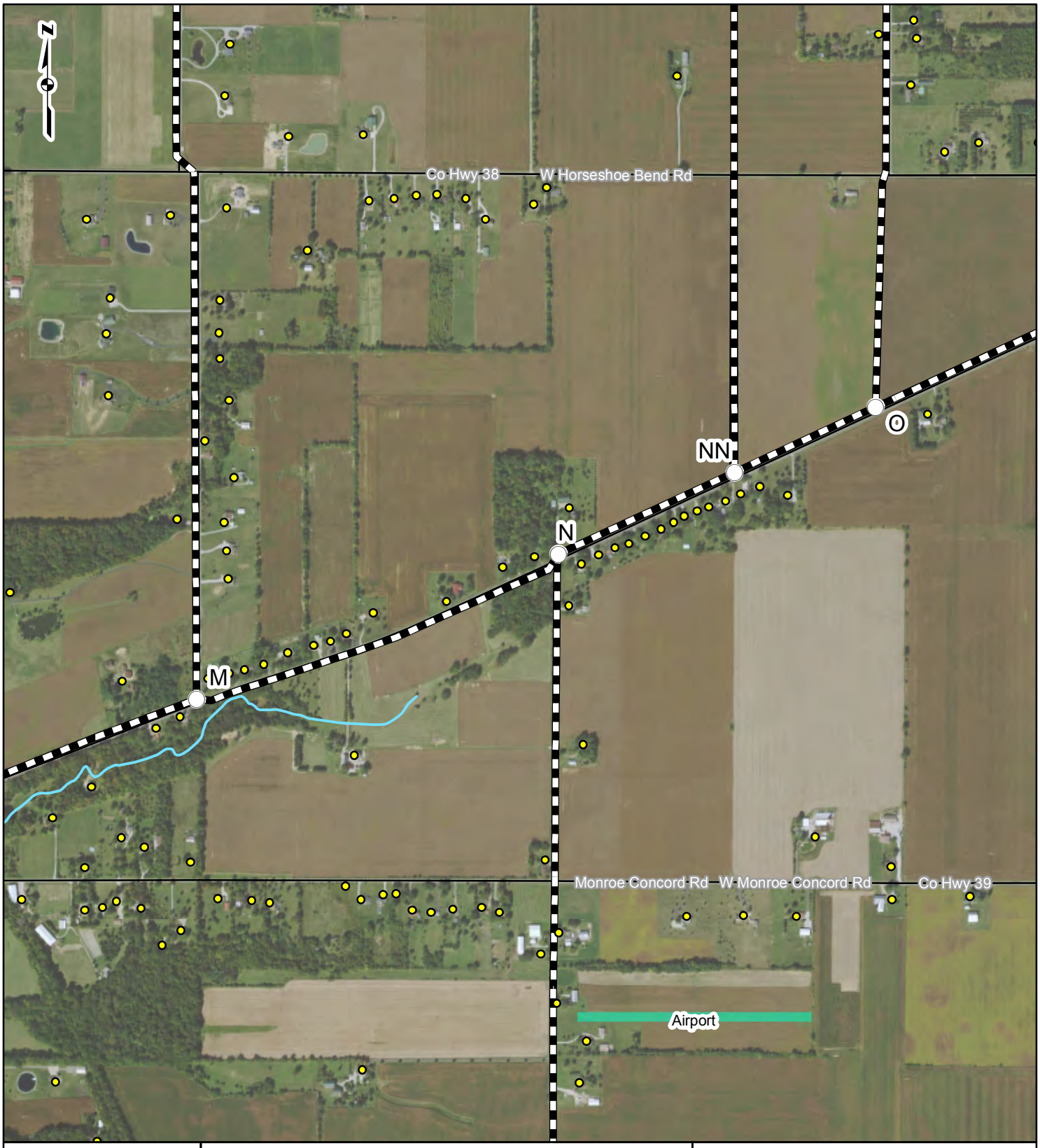
DAYTON POWER & LIGHT

DP&L

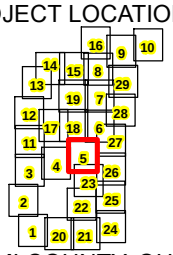
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 5 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

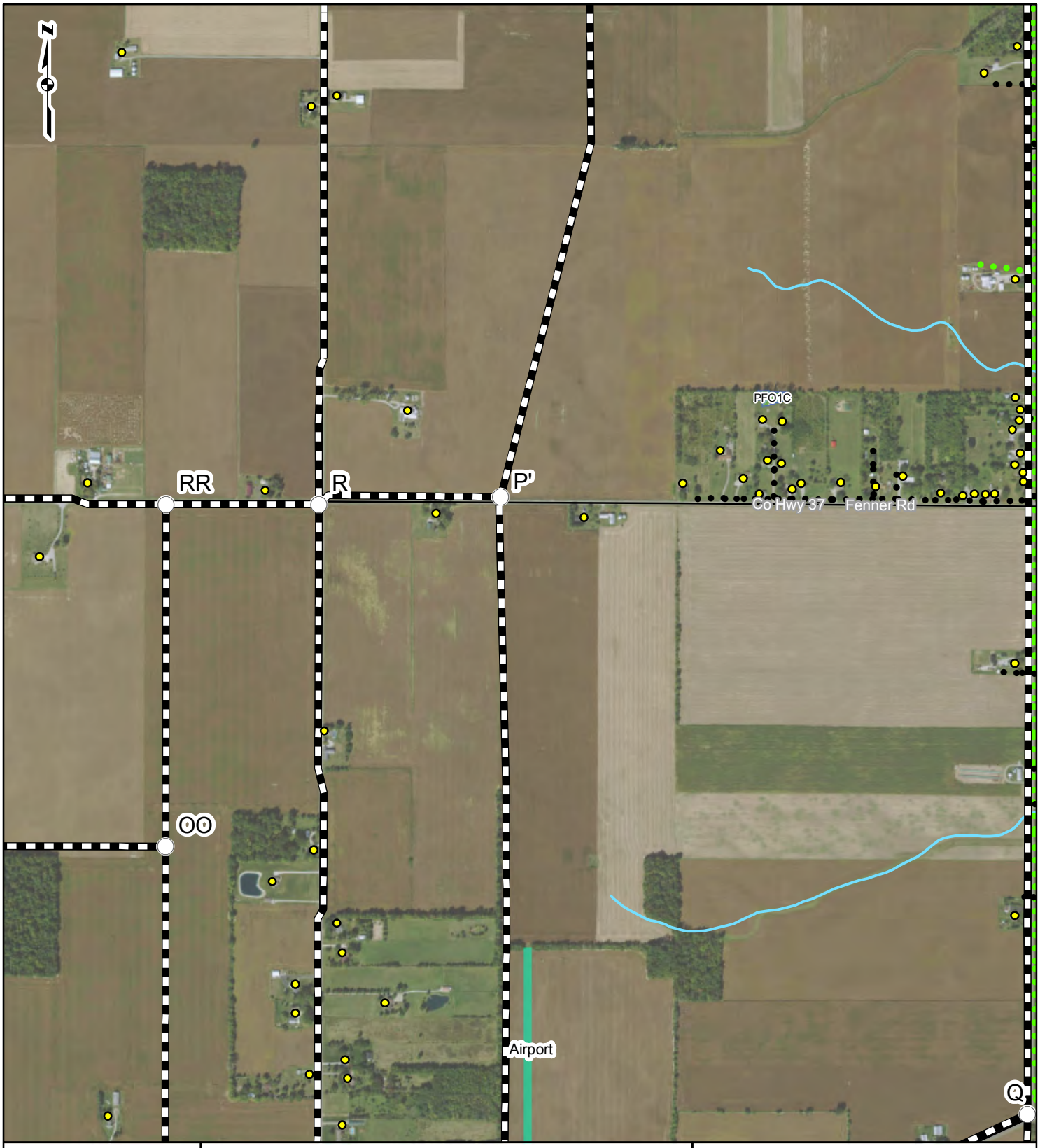
DAYTON POWER & LIGHT

DP&L

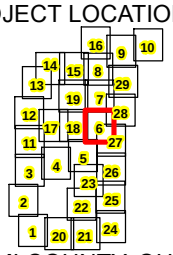
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 6 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

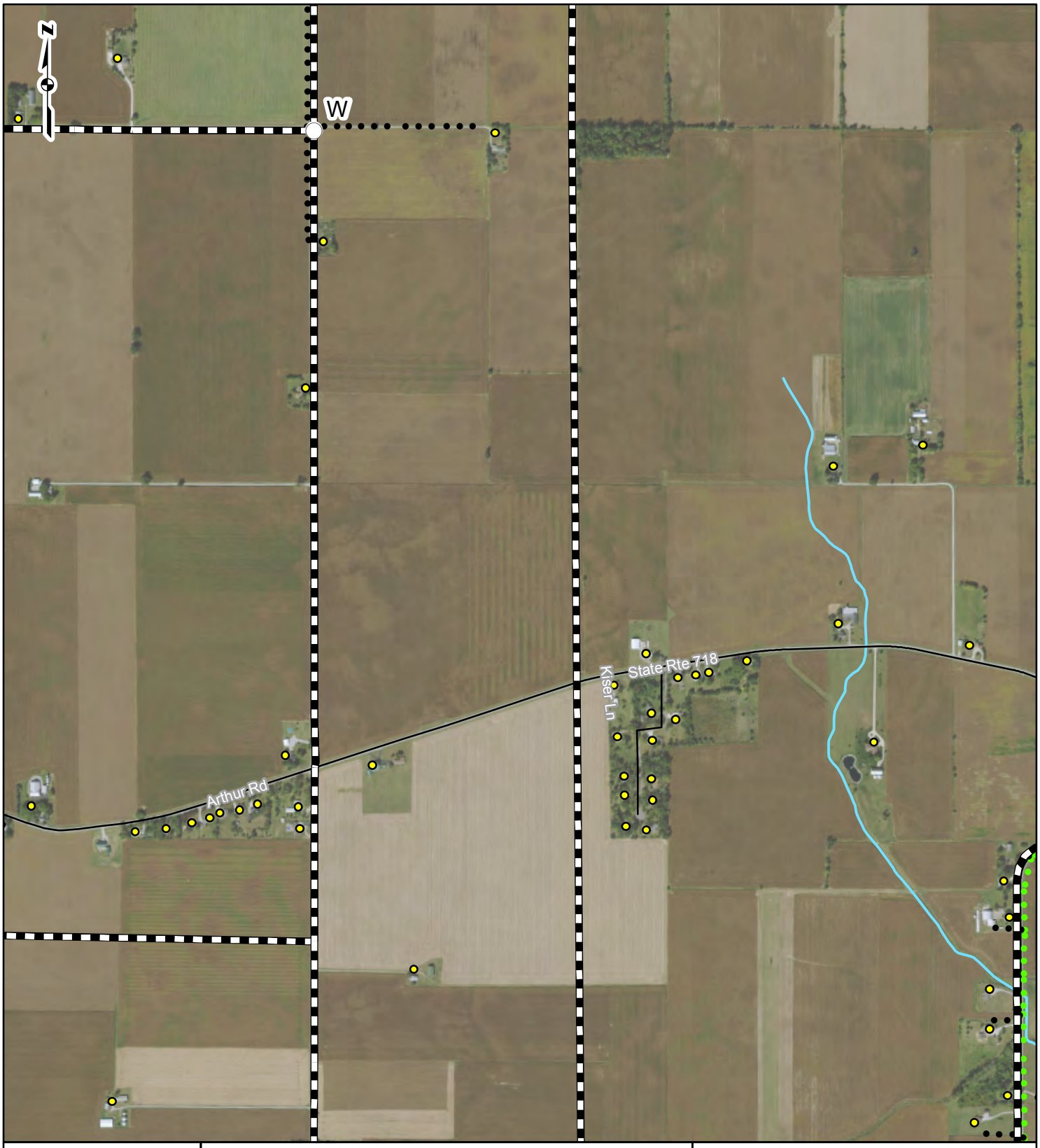
DAYTON POWER & LIGHT

DP&L

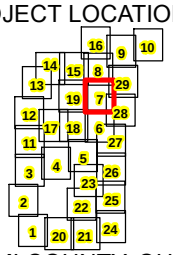
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 7 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

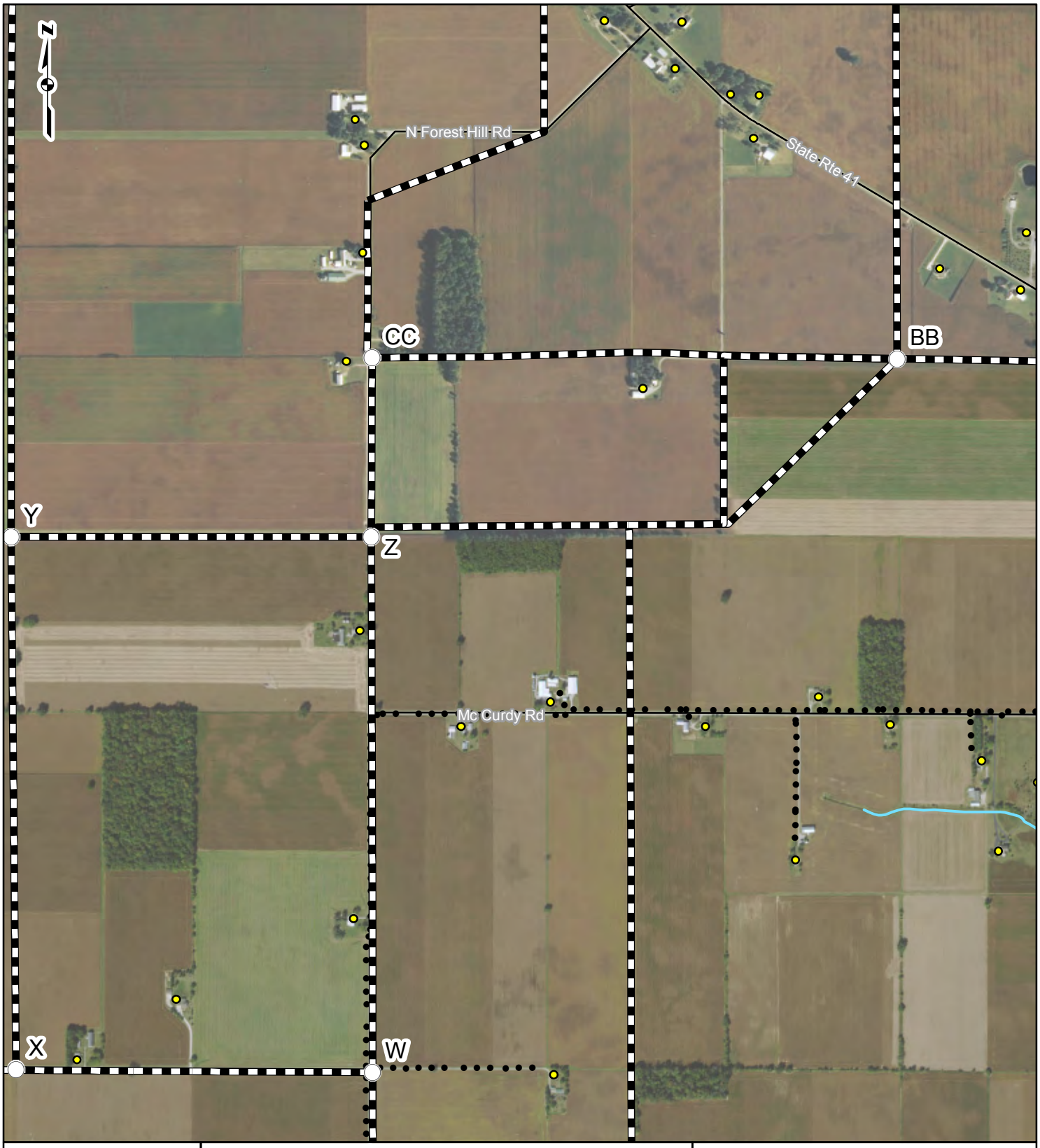
DAYTON POWER & LIGHT

DP&L

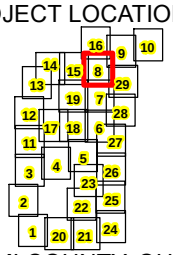
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 8 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

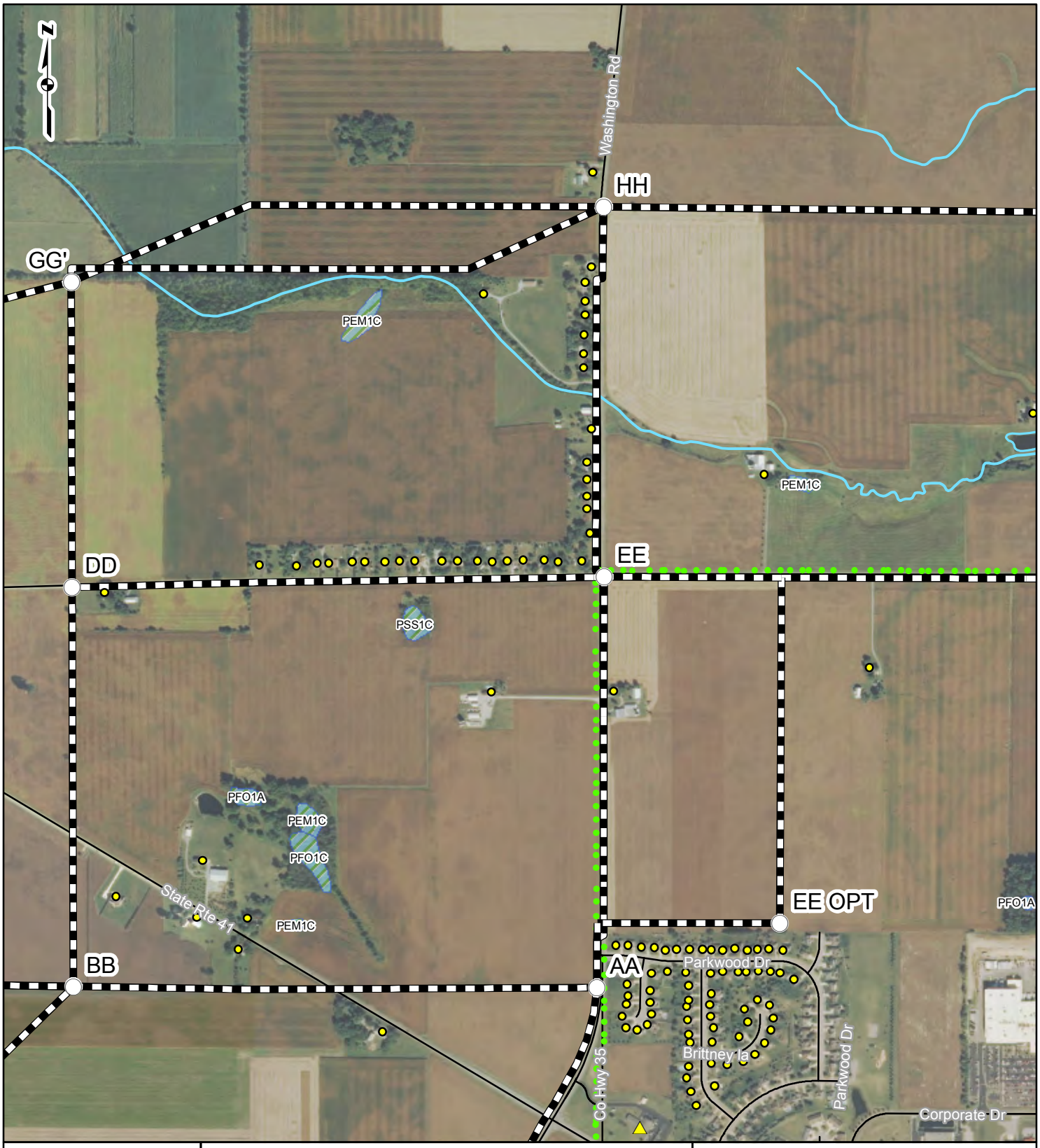
DAYTON POWER & LIGHT

DP&L

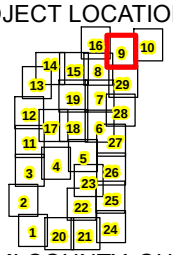
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 9 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

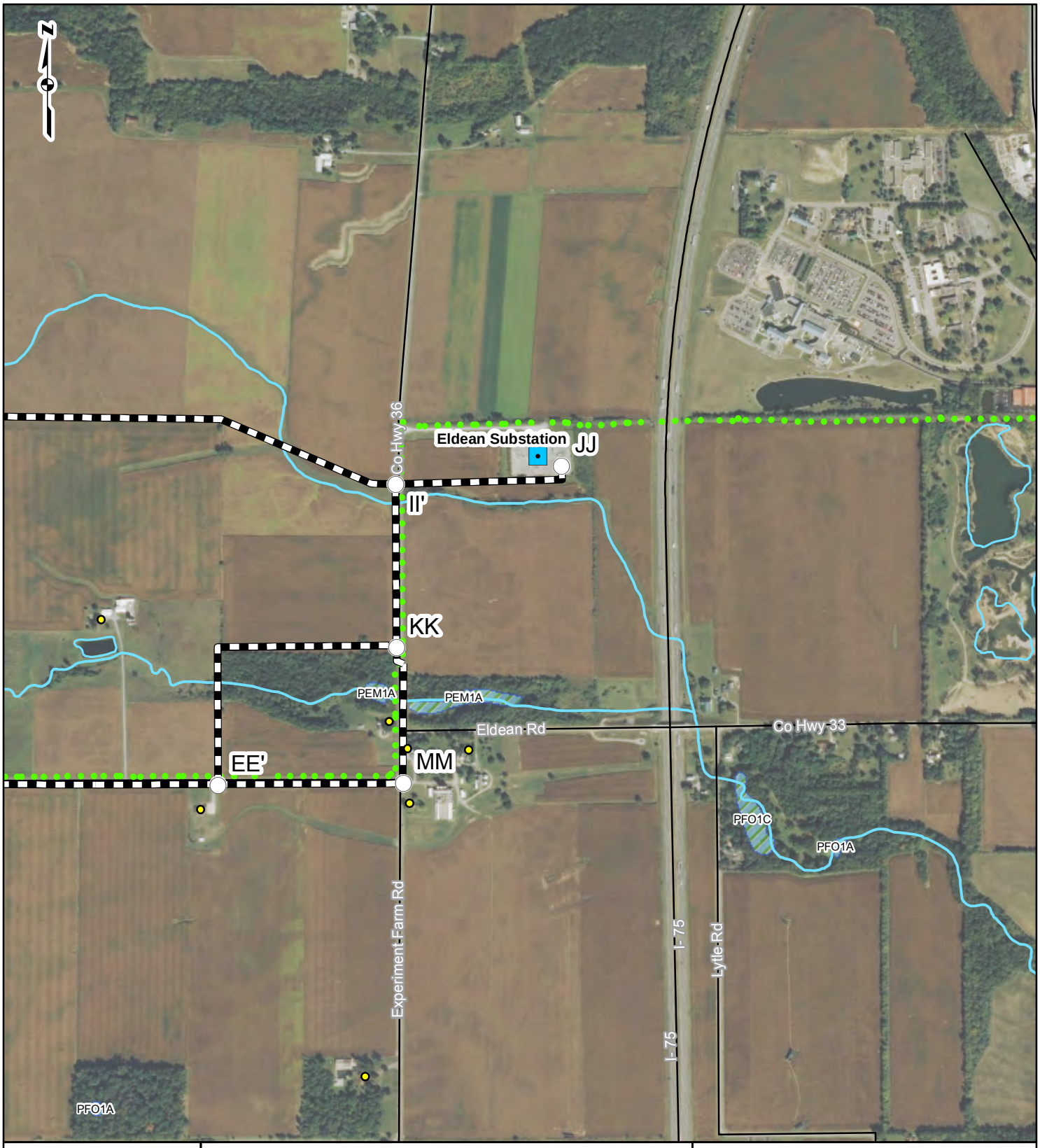
DAYTON POWER & LIGHT

DP&L

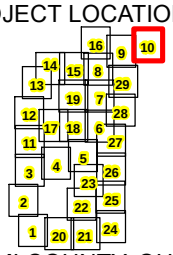
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 10 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

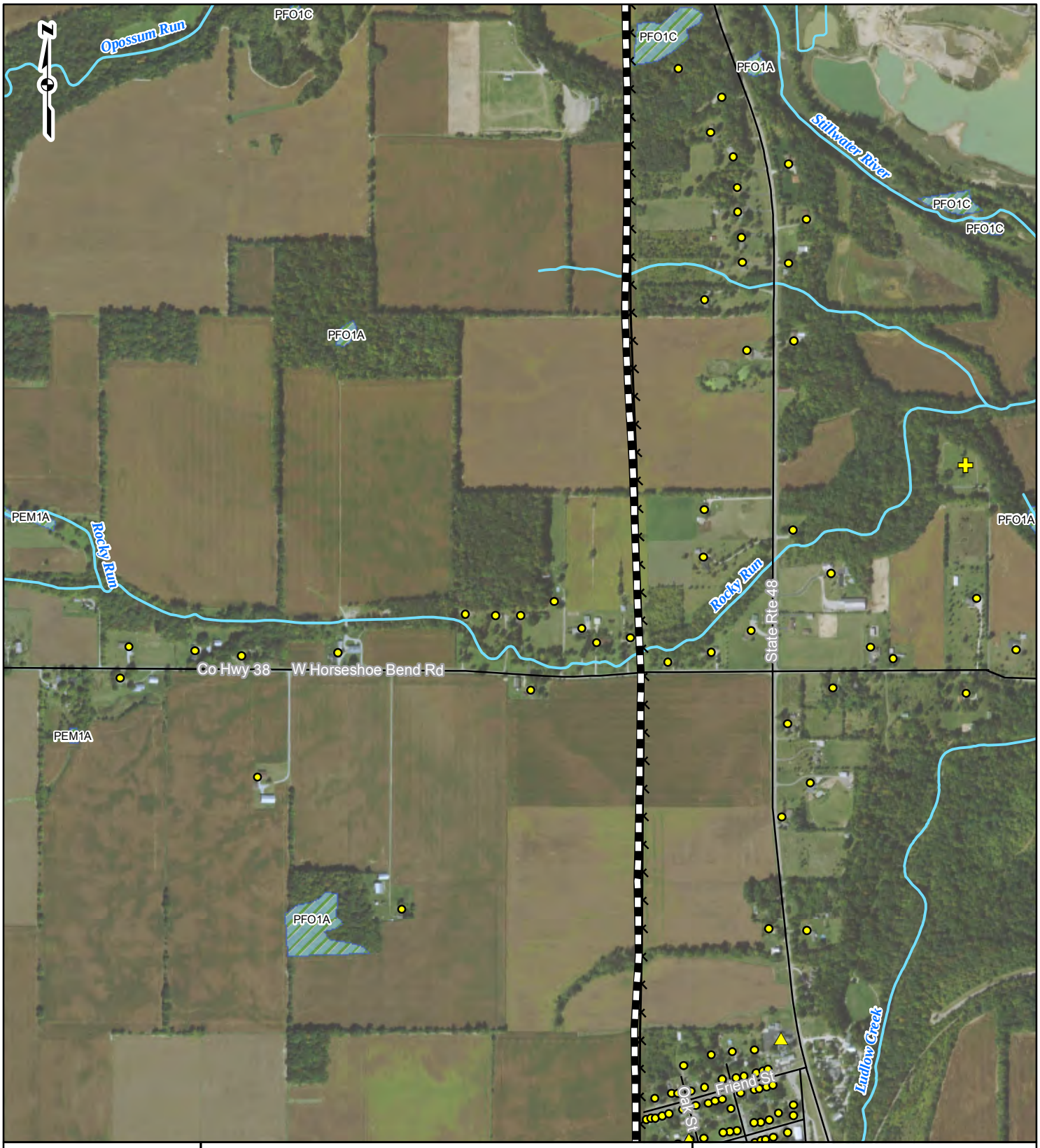
DAYTON POWER & LIGHT

DP&L

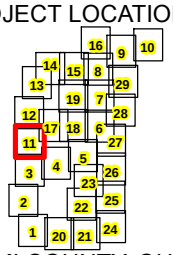
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 11 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

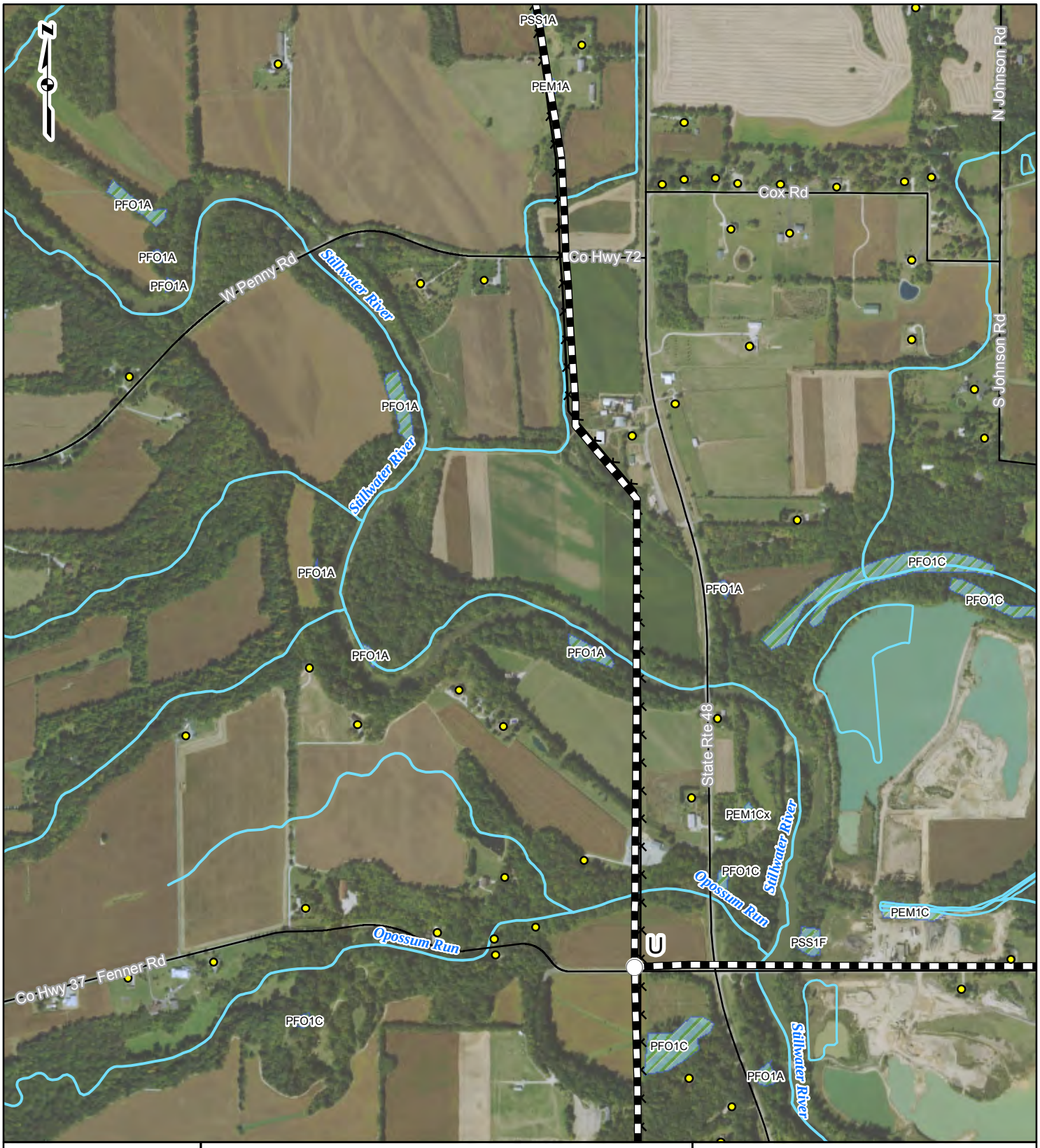
DAYTON POWER & LIGHT

DP&L

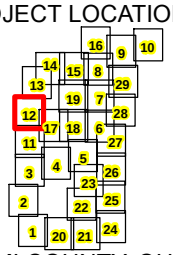
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 12 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

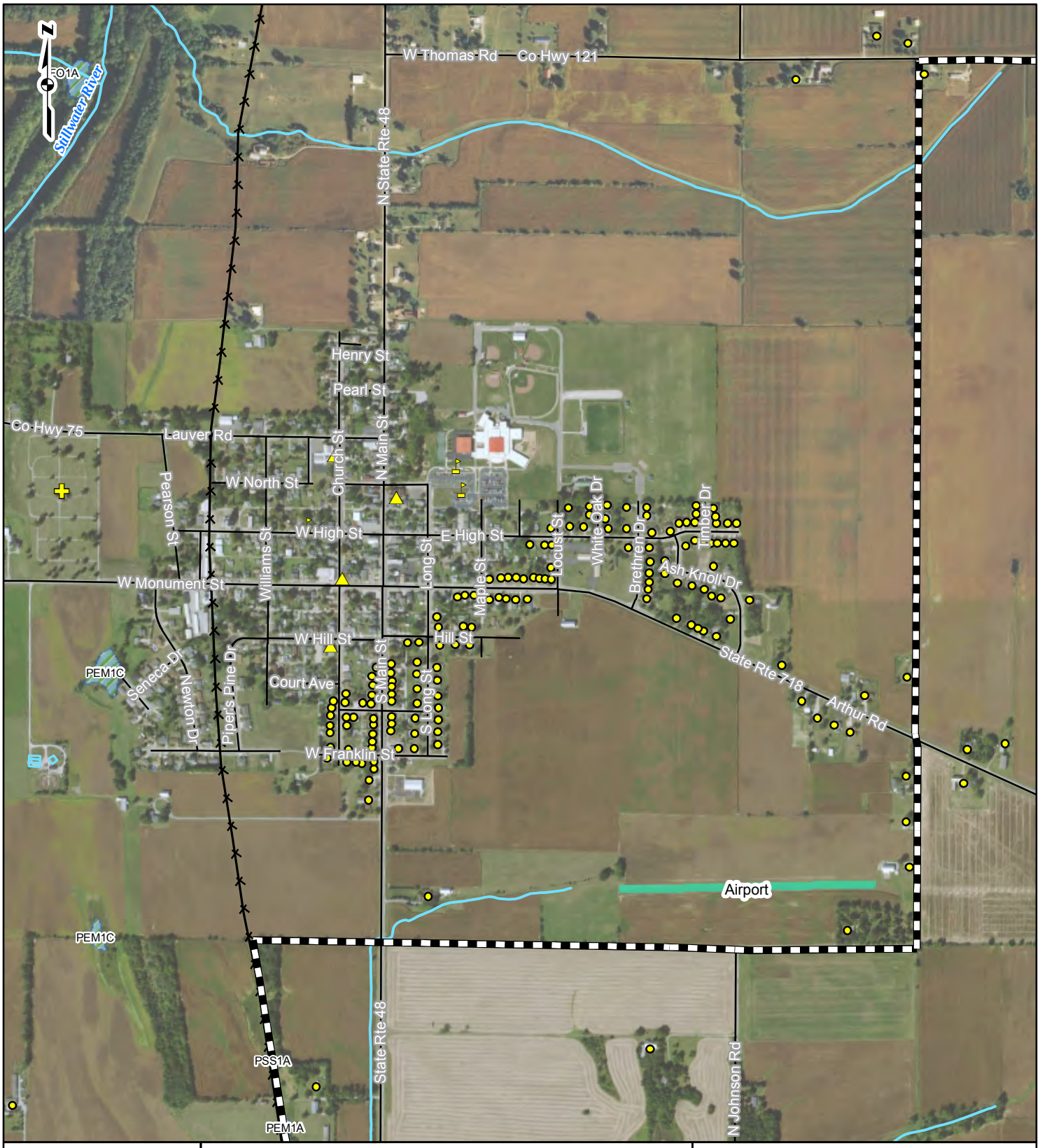
DAYTON POWER & LIGHT

DP&L

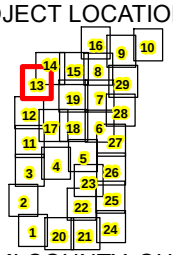
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 13 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

DAYTON POWER & LIGHT

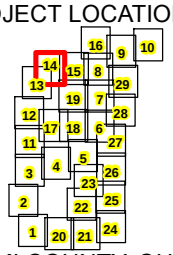
DP&L

DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd

PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 14 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

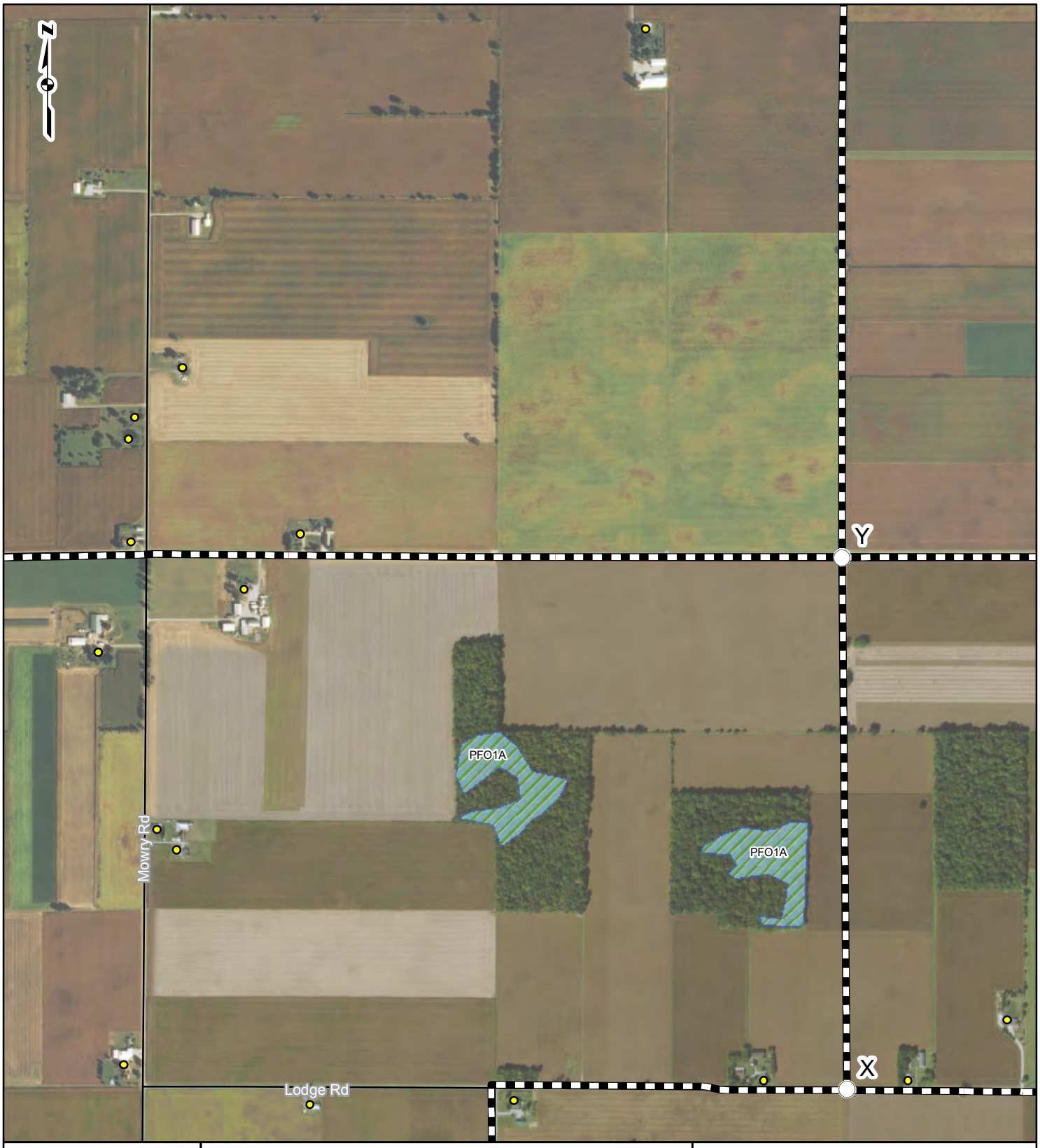
gai consultants

DP&L

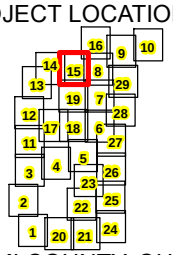
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 15 OF 29

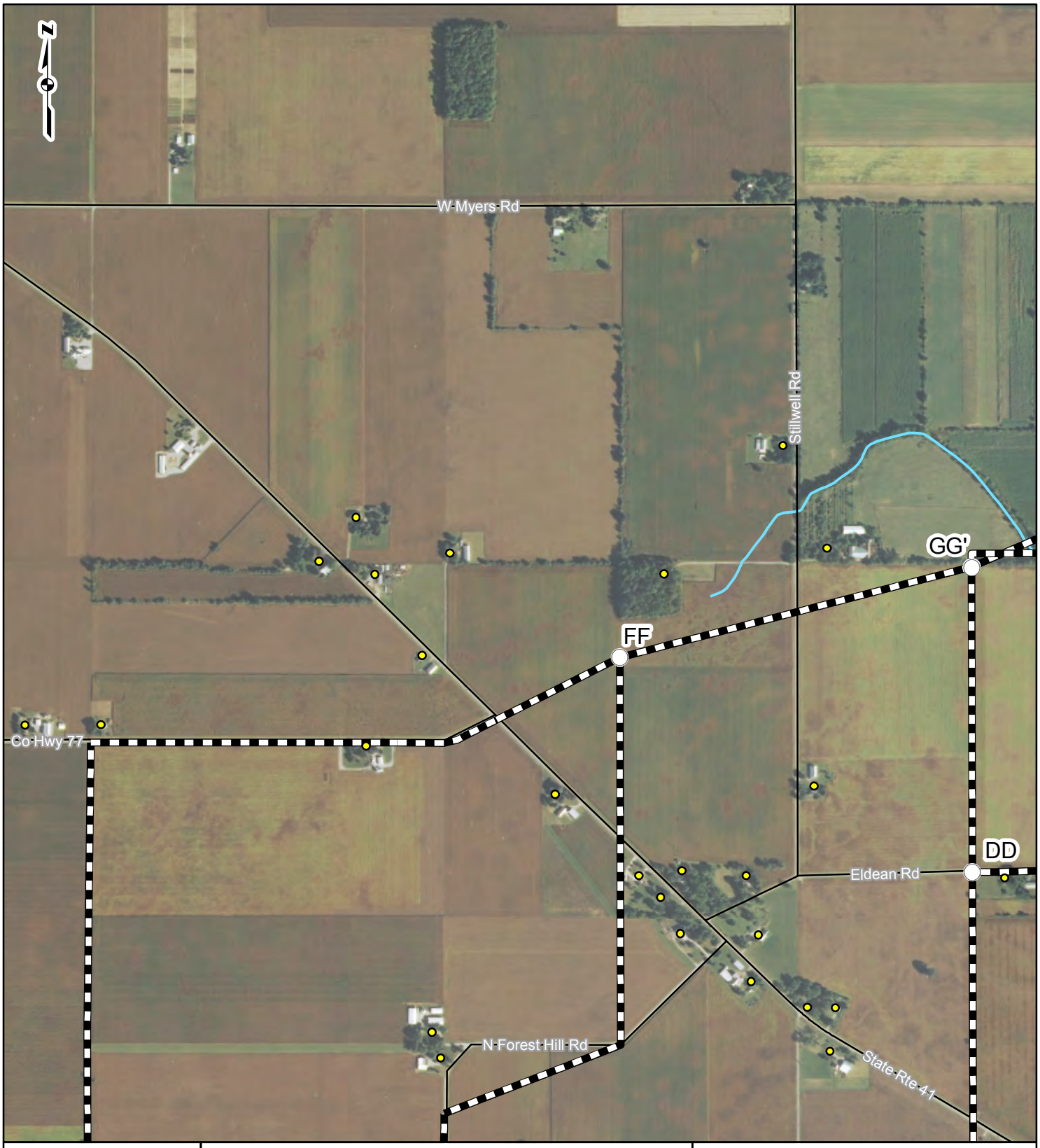
WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

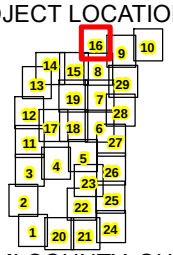
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 16 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

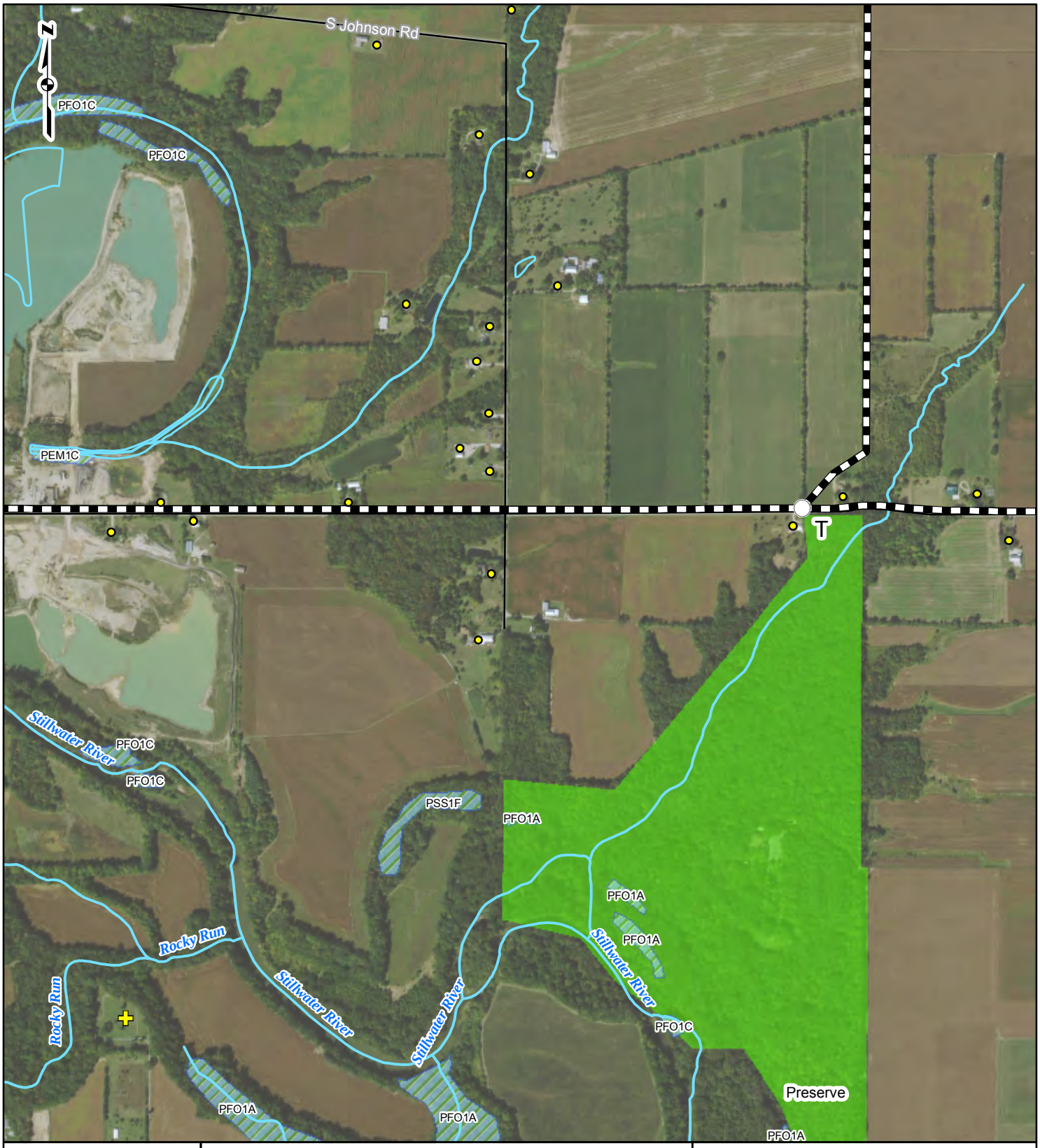
DAYTON POWER & LIGHT

DP&L

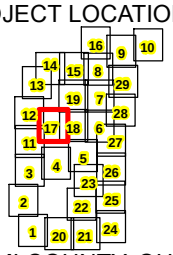
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 17 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

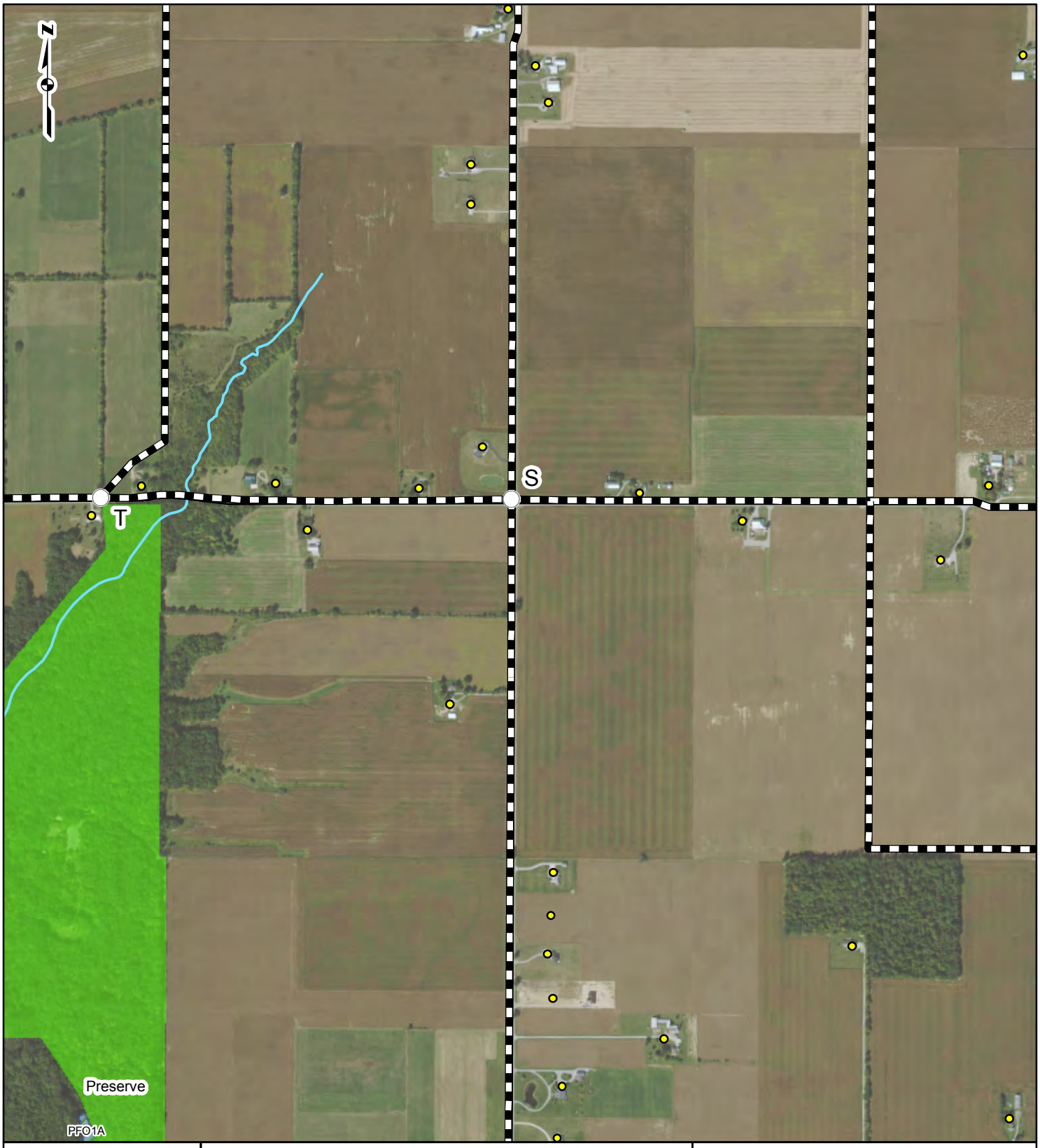
gai consultants

DP&L

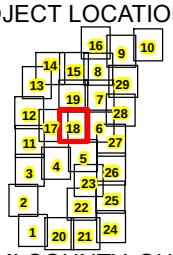
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 18 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

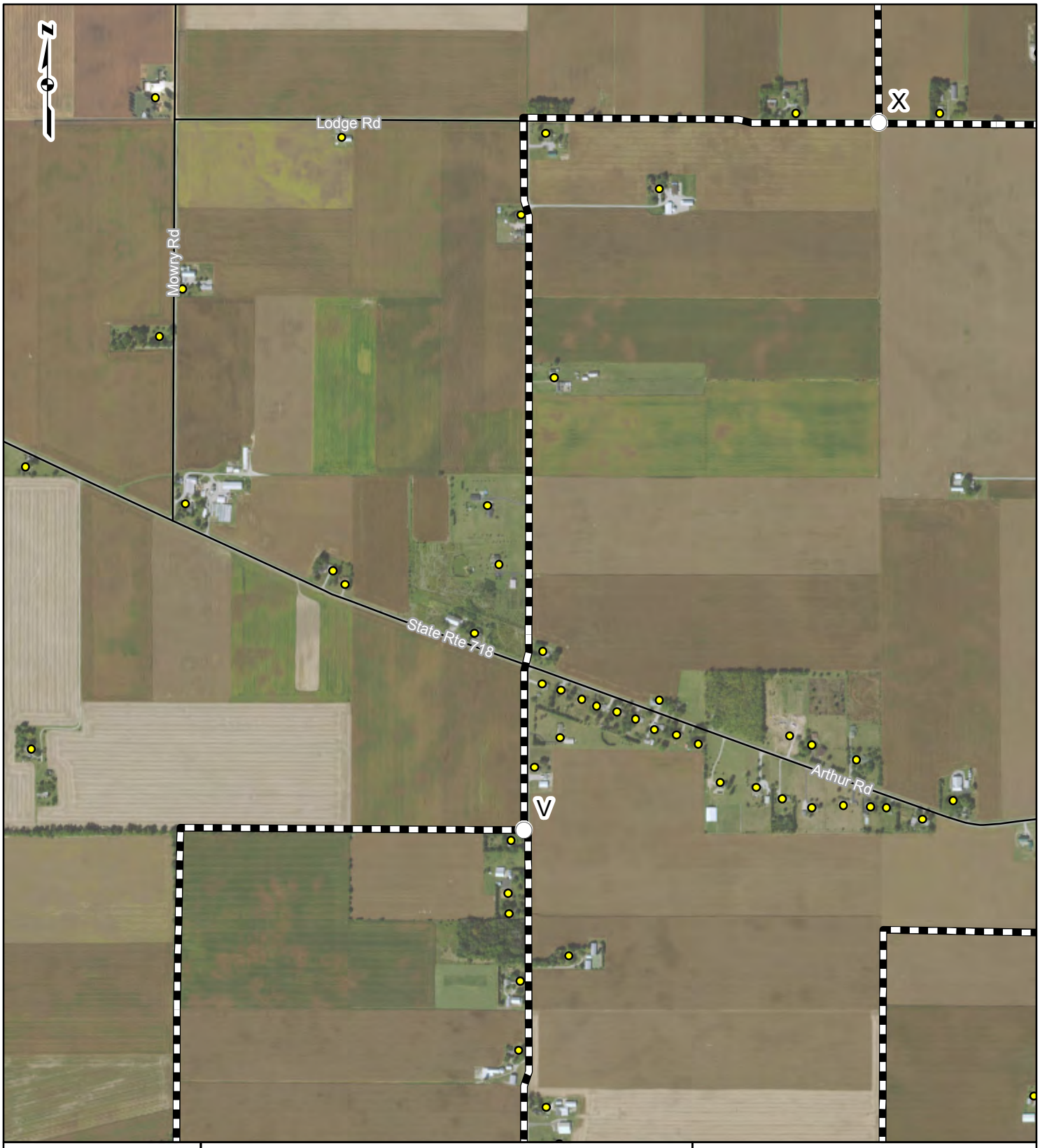
gai consultants

DP&L

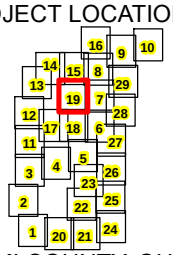
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 19 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

DAYTON POWER & LIGHT

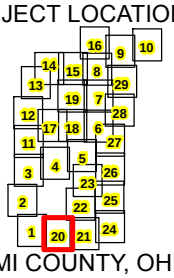
DP&L

DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd

PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 20 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

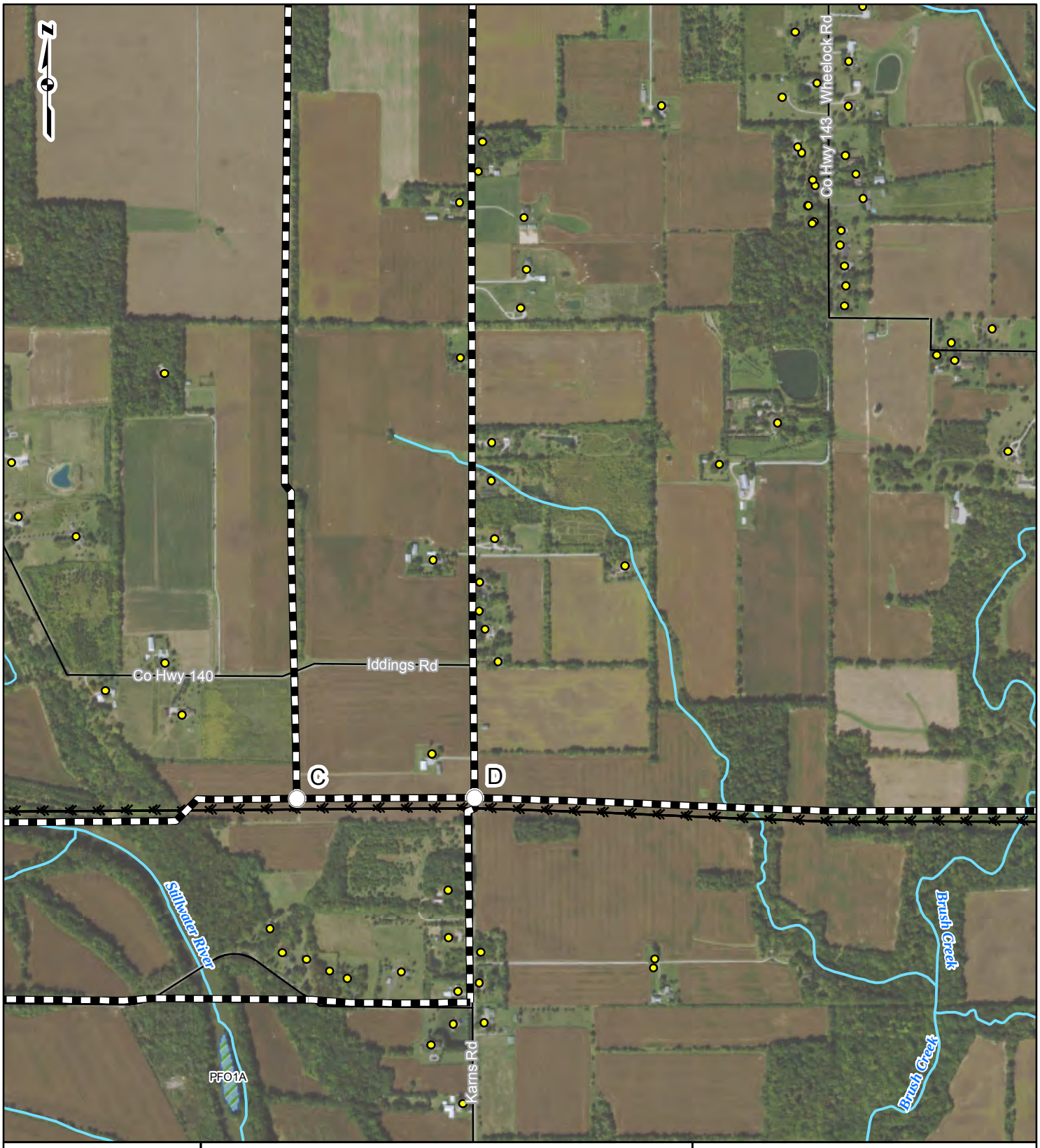
DAYTON POWER & LIGHT

DP&L

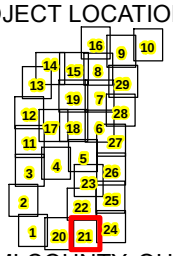
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 21 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

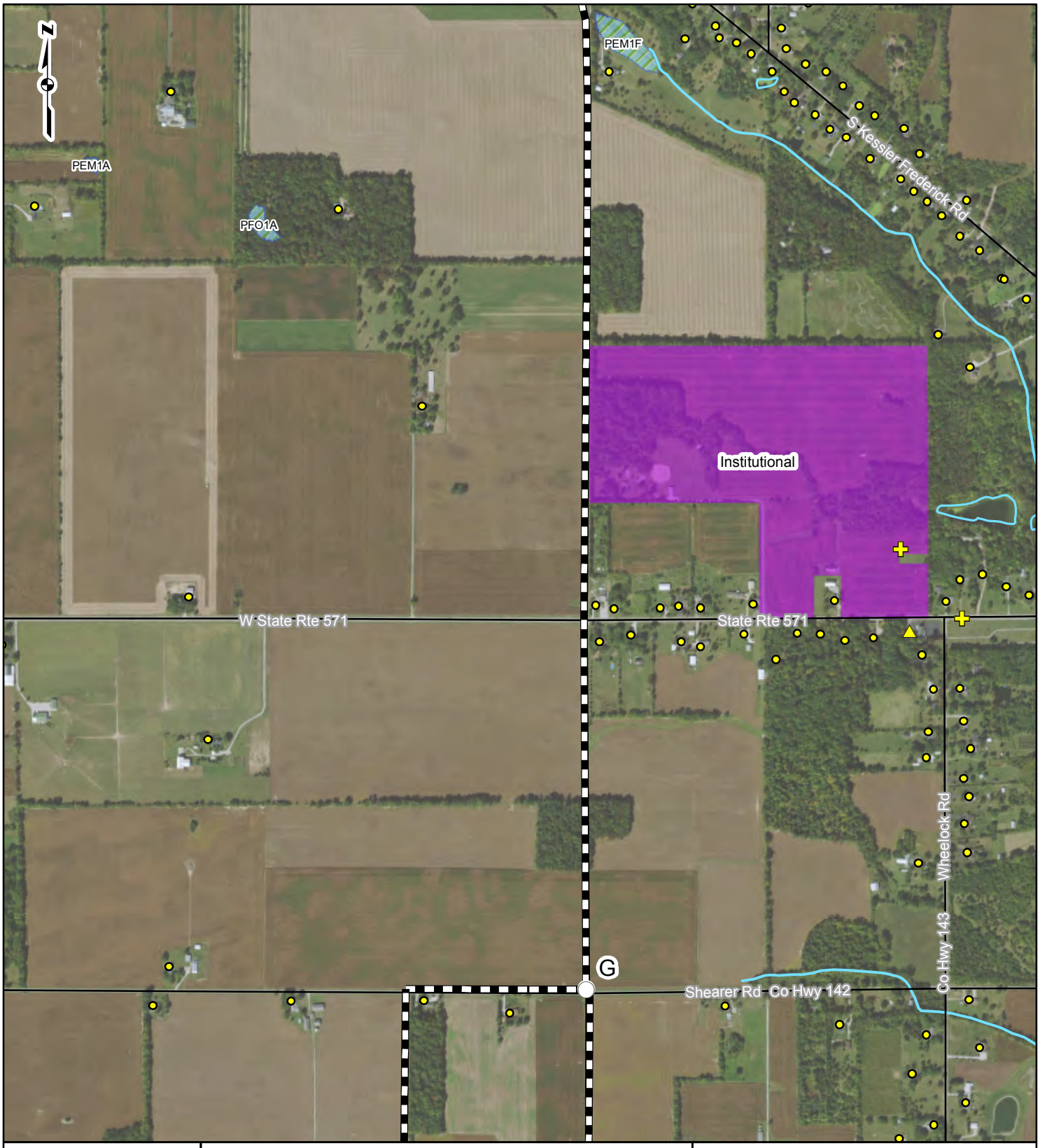
gai consultants

DP&L

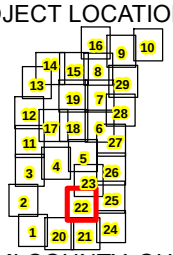
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 22 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

DAYTON POWER & LIGHT

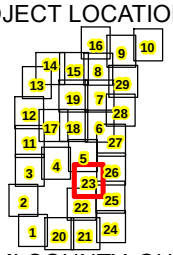
DP&L

DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd

PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 23 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

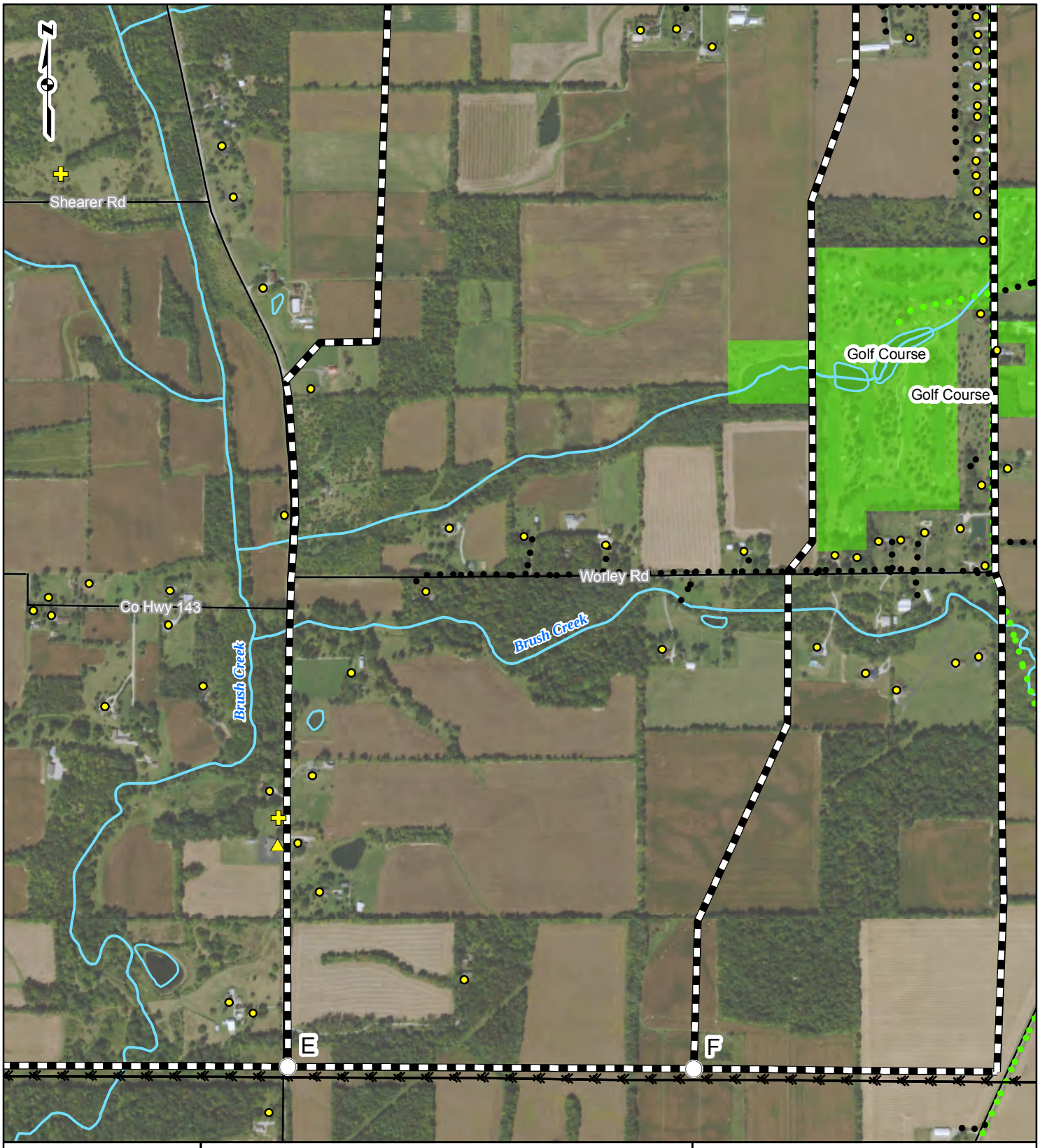
DAYTON POWER & LIGHT

DP&L

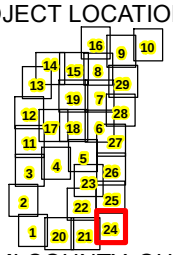
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 24 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

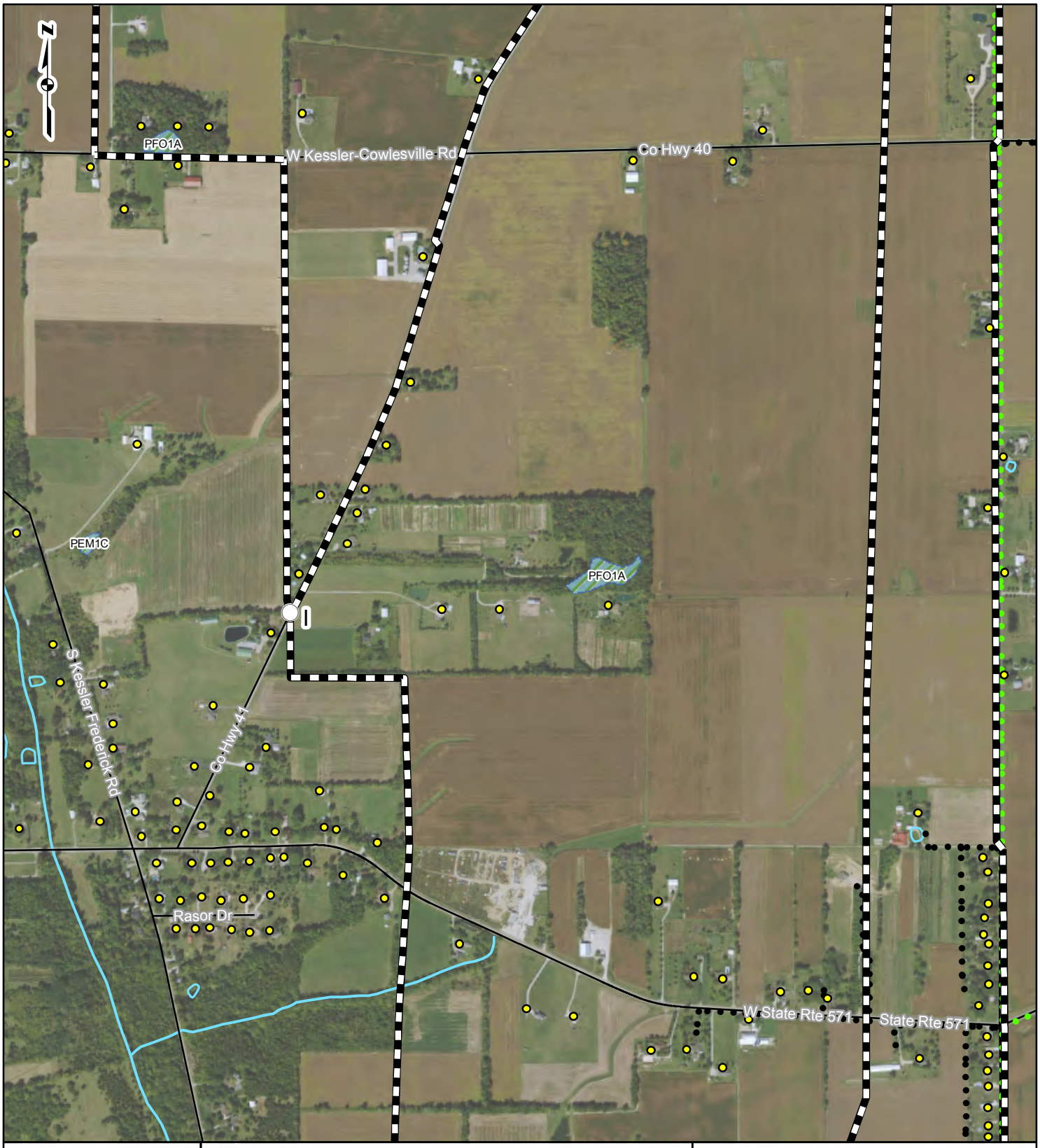
gai consultants

DP&L

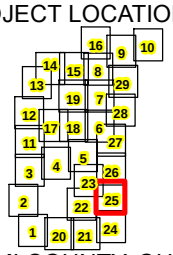
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 25 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

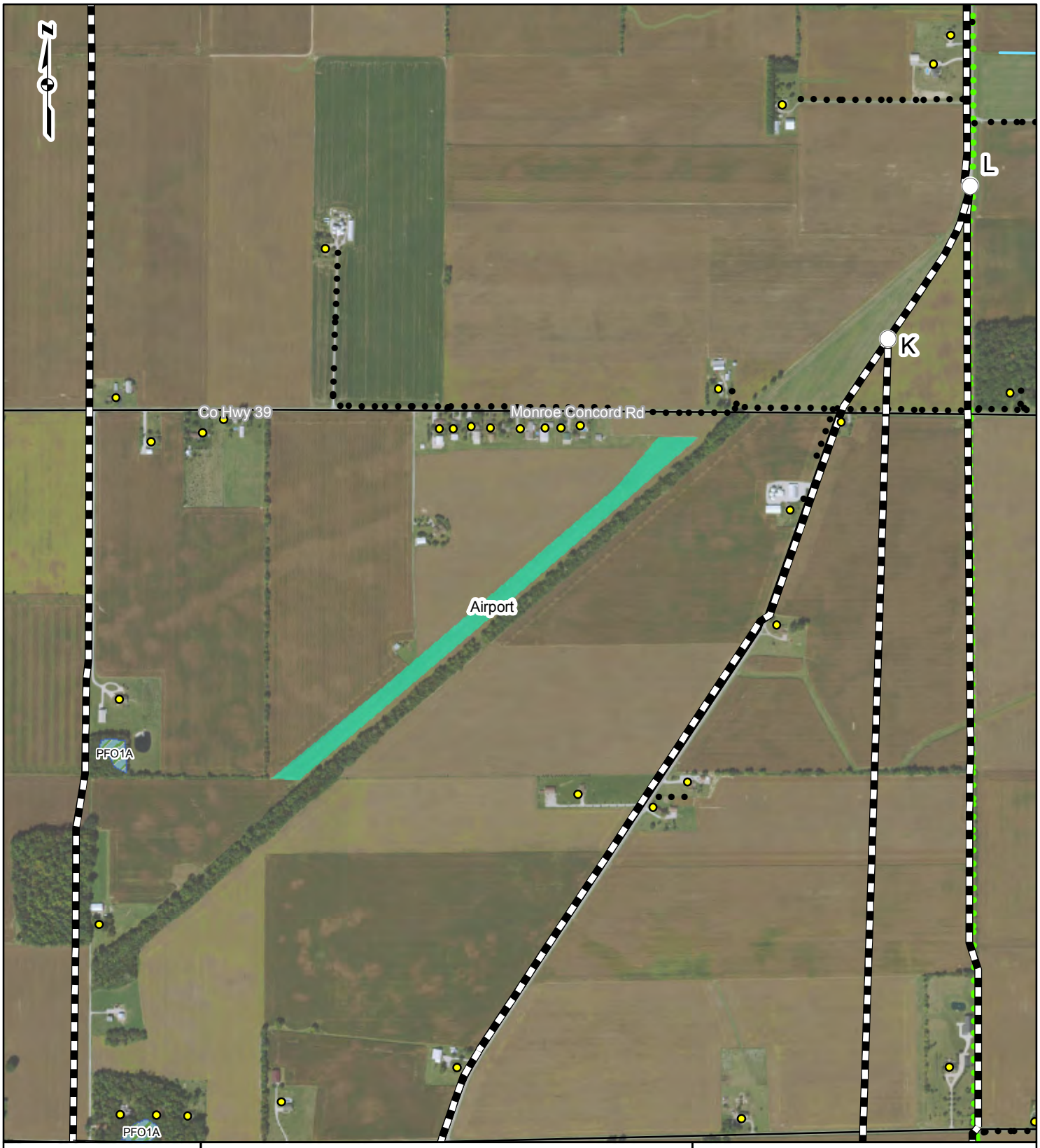
gai consultants

DP&L

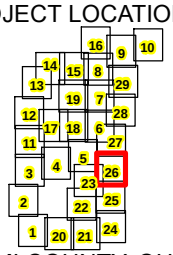
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 26 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

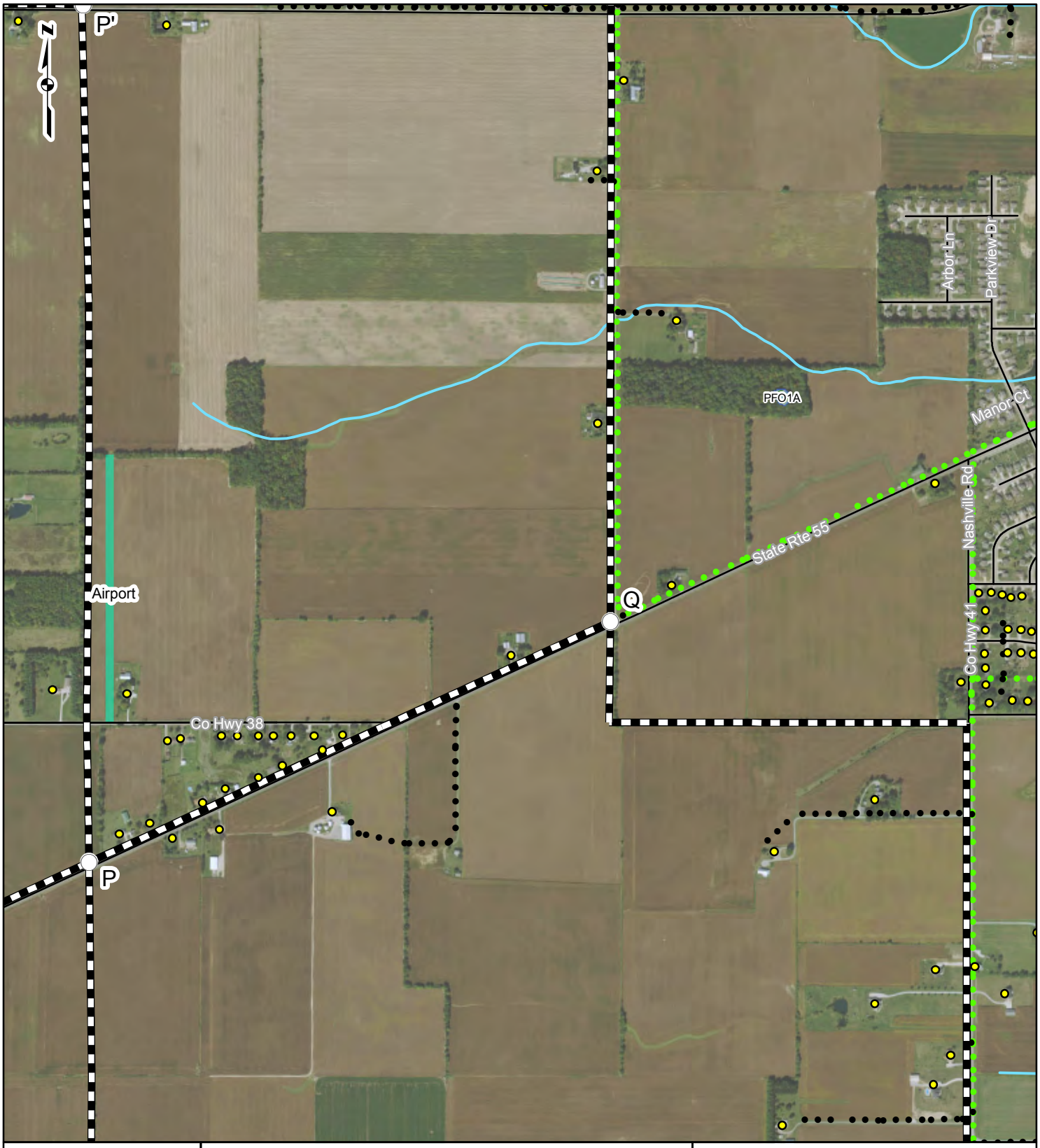
gai consultants

DP&L

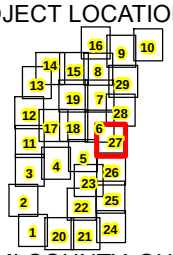
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 27 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

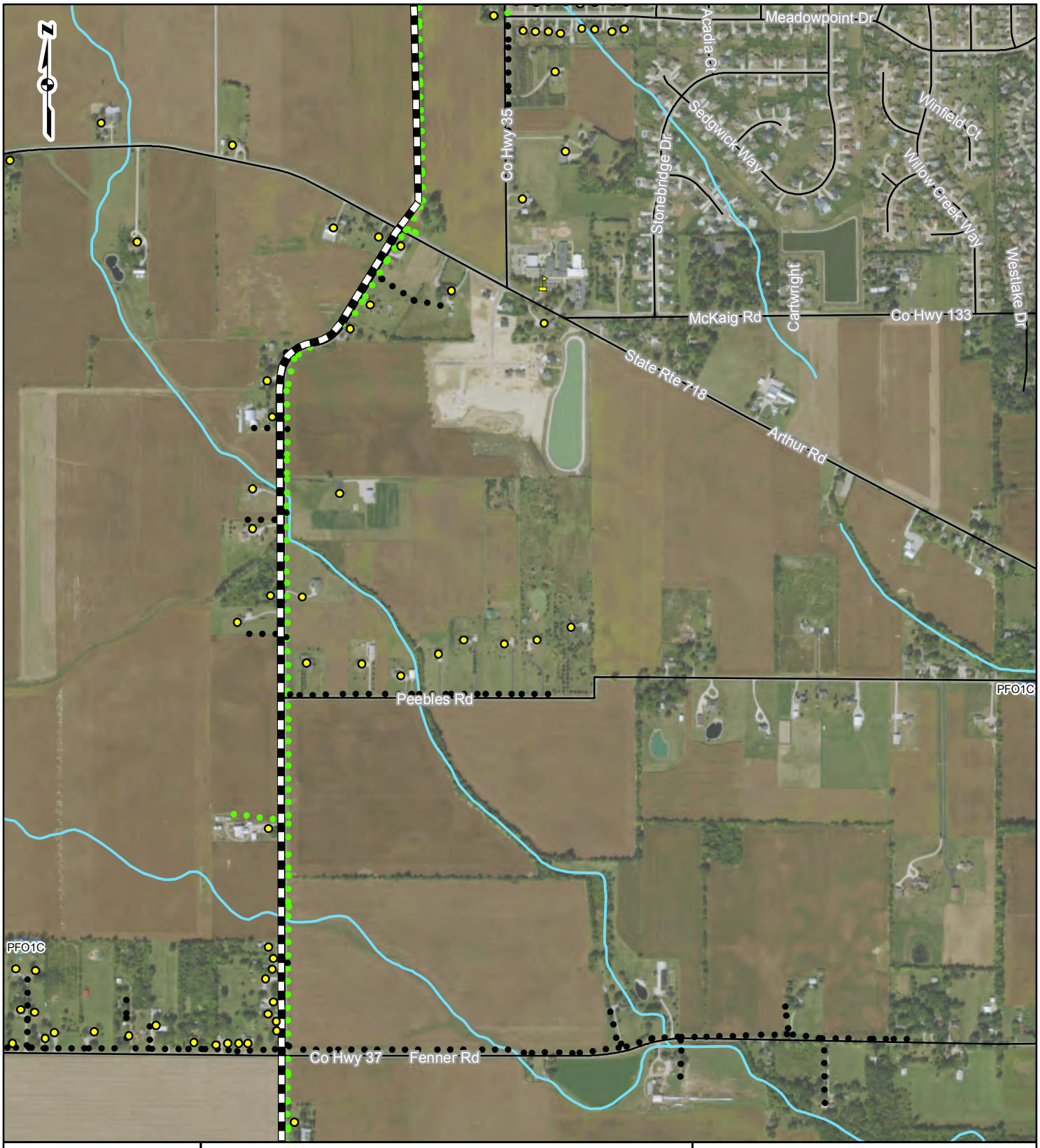
gai consultants

DP&L

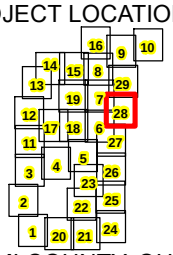
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 28 OF 29

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

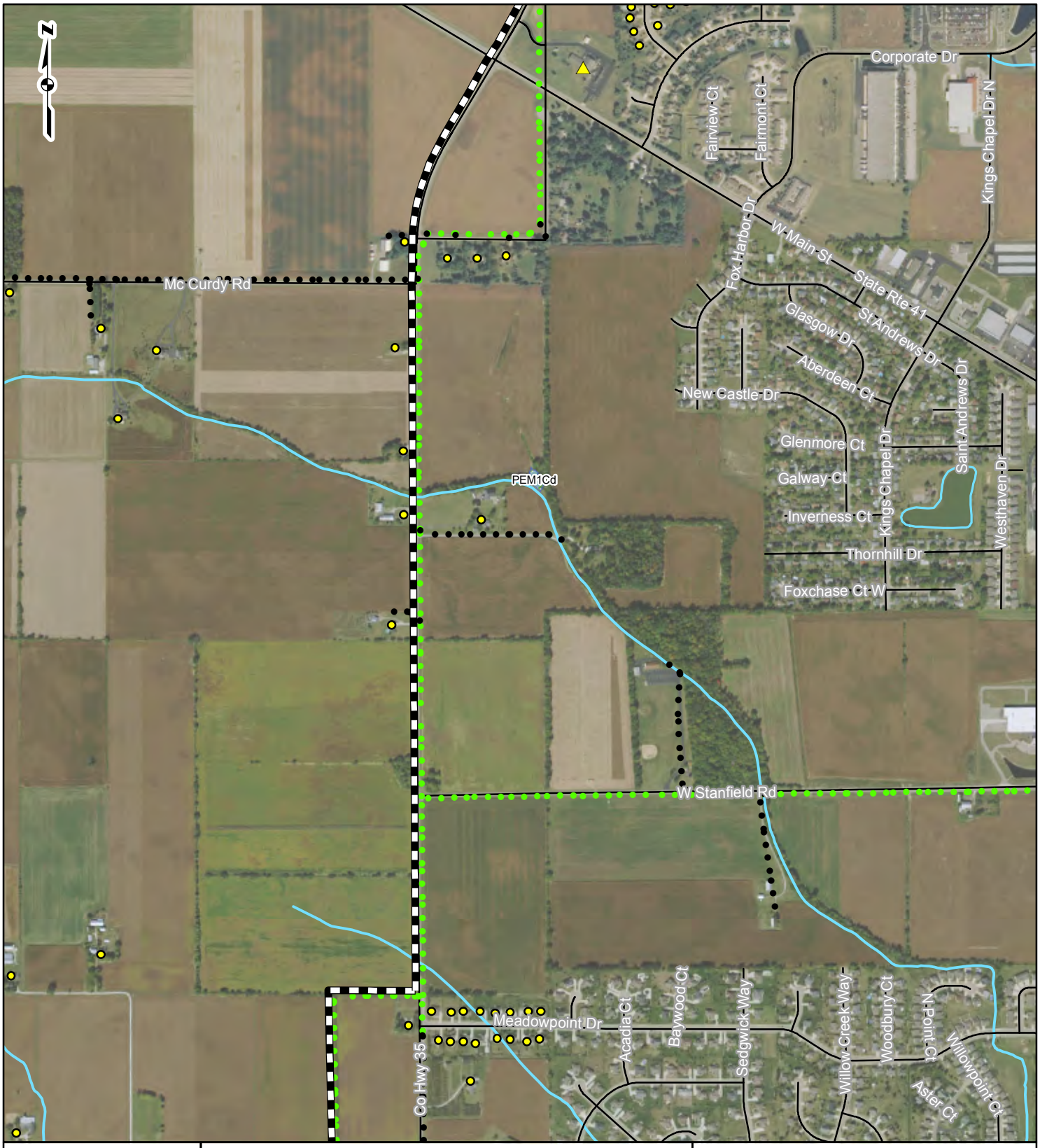
gai consultants

DP&L

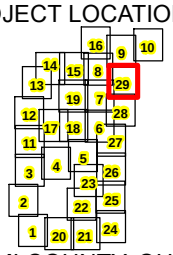
DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Existing Substation
Cemetery
Church
School
Residence
Proposed Route Alternative
Existing Transmission Line-Approximate
Existing 1-2 Phase (Pioneer Only)
Existing 3-Phase (Pioneer Only)
Road Centerline
NHD Waterway
NHD Waterbody
NWI Wetland
Airport (Private)
Institutional
Recreational

0 500 1,000 2,000 Feet

FIGURE 3.5
ROUTE ALTERNATIVES
SHEET 29 OF 29

WEST MILTON TO ELDEAN 138kV

gai consultants

DAYTON POWER & LIGHT

DP&L

DRAWN BY: TDB DATE: 11/16/2015
CHECKED: MAF APPROVED: MAF

REFERENCE: ESRI WORLD IMAGERY, 2012, ACCESSED 11/2015; UGSG NHD, 2012; MIAMI CO., 2013; USFWS, 2010; PIONEER, 2013; DP&L, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\ROUTE_SELECTION\3_5_DPL_WEST_MILTON_ELDEN_138KV_ROUTES_2015_11_16.mxd

4906-15-04 TECHNICAL DATA

(A) ROUTE ALTERNATIVES DATA

This section of the Application provides technical data for the West Milton-Eldean 138 kV Transmission Line Project ("Project"). Information is provided on the location and features surrounding the Preferred and Alternate Routes for the transmission line including highways, existing utility corridors, airports, streams, topography, soil types and slopes, design features, construction methods, and environmental compliance measures.

(1) Geography and Topography

Map figures having a 1:24,000 scale illustrate the Preferred and Alternate Route including the area 1,000 feet on either side of the proposed alignments and are presented in Figure 4-1 (sheets 1 through 5). These maps were developed from the following U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps: Dayton and Piqua, Ohio (1986). Some features on the map figures are based on field reviews to identify wetlands, streams and waterbodies within or near the proposed alignment and a review of aerial imagery and property data. The field review for wetlands, streams and water bodies was conducted during October 2014.

(a) Transmission Line Alignments, Including Proposed Turning Points: The Project proposes a Preferred Route and an Alternate Route, both of which are 16.6 miles in length and traverse mostly agricultural fields either adjacent to rural county roads or across fields (following property lines where feasible). The proposed alignments and turning points are illustrated on Figure 4-1 (sheet 1 through 5) along with major roads and land use categories identified. Each route is briefly described below, originating from the West Milton Substation and ending at the Eldean Substation.

<u>Preferred Route</u>

The Preferred Route parallels 11.2 miles of either existing transmission line right-of-way ("ROW") (1.2 miles) or public road ROW (10.0 miles). The remainder of the route (5.4 miles) primarily consists of open agricultural fields. The roads paralleled by the Preferred Route, from south to north, include Davis Road (northerly) located west of the village of West Milton up to the rock quarry owned by Barrett Paving Materials, Ohio SR 55, and Forest Hill Road (northerly).

Alternate Route

The Alternate Route parallels 8.9 miles of either existing transmission line ROW (3.3 miles) or public road ROW (5.6 miles). The remainder of the route (7.7 miles) primarily consists of open agricultural fields. The roads paralleled by the Alternate Route, from south to north, include Davis Road (northerly) located west of the village of West Milton, Markley Road (easterly) located northwest of West Milton, Ohio SR 55, Forest Hill Road (northerly), Washington Road (northerly), Eldean Road (easterly), and Experiment Farm Road (northerly).

(b) Proposed Substation Site Locations: There are no new substations proposed as part of the Project. The transmission line will terminate at the existing West Milton Substation and the Eldean Substation owned and operated by The Dayton Power and Light Company ("DP&L"). These substations are shown on Figure 4-1 (sheets 1 through 5). The existing West Milton Substation will be expanded in 2017 which will be addressed under a separate application or notification to the Ohio Power Siting Board ("Board"), dependent on the final planned extent of the expansion. In addition, new breaker and relay equipment will be installed within the existing footprint of the Eldean Substation as part of the transmission line construction.

(c) Major Highway and Railroad Routes: The majority of road crossings of the Preferred and Alternate transmission line routes are state and county roads. A major highway within 1,000 feet of both the Preferred and Alternate routes is Interstate I-75 located east of the Eldean Substation.

(d) Air Transportation Facilities: No existing or proposed air transportation facilities are within 1,000 feet of the proposed locations for the Preferred or Alternate route. There are four privately owned, turf-covered air strips or airports, one of which is within 1,300 feet of the Alternate Route (with the Leavelle airstrip runway oriented parallel to the Alternate Route), and the remainder being 2,900 feet or greater in distance. Only the Troy Airpark is open to the public and is located 1.26 miles from the Alternate Route with its runway oriented parallel to the route.

(e) Utility Corridors: Two primary transmission line corridors exist within the study area, both of which are owned and operated by DP&L. Circuit 34590 connects with the existing West Milton Substation and extends to the east to the Miami Substation on structures shared with circuit 13807. Circuit 34591 runs to the south out of the West Milton Substation. Circuits 6680 & 6640 (West Milton to Covington) exit the West Milton Substation and extend to the north directly through the City of West Milton and Pleasant Hill, Ohio. Circuit 13834 (West Milton to Greenville) extends west along the initial portion of the Alternate Route northwest of the substation. A portion

of the Alternate Route, and the Preferred Route to a lesser extent, parallels Circuits 6680 &6640. There are no gas transmission lines within 1,000 feet of either route.

(f) Proposed Permanent Access Roads: No permanent access roads are anticipated to be constructed for the transmission line's construction, operation or maintenance.

(g) Lakes, Ponds, Reservoirs, etc.: A full description of the ponds, streams, and wetlands located within 1,000 feet of the Preferred and Alternate Routes is provided in Section 4906-15-07(B)(3) of this application. Three ephemeral streams, three intermittent streams, one perennial waterbody (Stillwater River), two wetlands and one pond were delineated within the 200-foot study corridor of the Preferred Route. The Alternate Route crosses a total of ten streams including three ephemeral, four intermittent, and three perennial flow streams. The centerlines of the route alternatives do not cross any wetlands based on field reviews of the Preferred Route and portions of the Alternate Route that have common segments with the Preferred Route. One pond is located within the 200-foot study corridor of the Preferred and Alternate Routes; however, it is located on the opposite side of the highway from the proposed transmission line centerlines.

(h) Topographic Contours: Using USGS topographic source data, maps of existing surface contour intervals (10 feet) of the study area were prepared and are illustrated as Figure 4-1 (sheets 1 through 5). The topographic gradient along the 16.6-mile proposed overhead transmission line alignments is slight with a total elevation change of approximately 130 feet above mean sea level over the entire route length. The steepest gradient is in the vicinity of the Stillwater River crossing at State Route 55 which ranges from approximately 840 feet elevation at the bridge to 900 feet elevation feet further east (3,300 feet east of the bridge) on State Route 55.

(i) *Soil Associations or Series:* Four soil associations will be crossed by the Preferred Route and the Alternate Route. Soil associations within the proposed overhead transmission line alignments are shown on Figure 7-1. These soil associations in Miami County include Miamian-Crosby-Brookston, Miamian-Losantiville-Crosby-Celina, Sleeth-Ockley-Eldean, and the Randolph-Milton-Millsdale-Miamian (U.S. Department of Agriculture, 1984).

(j) Population centers and Legal Boundaries of Cities, Villages, Townships, and Counties: Population centers and legal boundaries in the project area are depicted in Figure 4-1 (sheets 1 through 5). Both the Preferred and Alternate Routes are located within unincorporated portions of Union Township and Concord Township in Miami County, Ohio. The Alternate Route is

positioned along a small portion of the boundary for the Village of West Milton, and a common segment (< 0.3-mile) of both routes runs immediately adjacent to the village boundary. The Alternate Route also lies just within the northwest area of Troy's municipal boundary located along road ROW (a section of Eldean Road and Washington Road).

(2) Slope and Soil Mechanics

(a) Slopes: Very few areas along the Preferred Route and Alternate Route contain soil that has a slope greater than or equal to 12%. In fact soil types with these slope ranges make up 1% of the total acreage within the planned ROW for the two routes, and the soils are primarily limited to the Stillwater River vicinity. The Preferred Route contains the following soil series greater than or equal to 12% slopes; Miamian silt loam (MhC2) 6 to 12%, Miamian silt loam (MhD2) 12 to 18%, Eldean-Casco gravelly loams (EoD2) 12 to 18%, Miamian and Hennepin silt loams (MmF) 25 to 50%, Miamian and Hennepin silt loams (MmE) 18 to 25%, Eldean-Casco gravelly loams (EoC2) 6 to 12%, Milton silt loam (MpC2) 6 to 12% slopes. The Alternate route contains the following soils series greater than or equal to 12% slopes; Miamian silt loam (MhC2) 6 to 12%, Miamian silt loam (MhD2) 12 to 18%, Eldean-Casco gravelly loams (EoD2) 12 to 18%, Miamian and Hennepin silt loams (MmF) 25 to 50%, Miamian and Hennepin silt loams (MmE) 18 to 25%, Eldean-Casco gravelly loams (EoC2) 6 to 12%, Milton silt loam (MpC2) 6 to 12% slopes. A description of these soil types are found below:

i. Miamian silt loam, 6 to 12% slopes (MhC2) and Miamian silt loam, 12 to 18% (MhD2): This soil consists of well drained, level to very steep soils. The native vegetation was mixed hardwoods, but most wooded areas have been cleared. Common trees found here are northern red oaks. These soils are used mainly for field crops. Urban development is currently taking place in some areas. This soil has moderate permeability and the potential for surface runoff ranges from slight to moderate.

ii. Eldean-Casco gravelly loams, 12 to 18% slopes, (EoD2) and Eldean-Casco gravelly loams (EoC2) 6 to 12%: This series consists of well drained nearly level to moderately steep soils. The native vegetation was mixed hardwoods, but most wooded areas have been cleared. Common trees are black oak, northern red oak and white oak. These soils are used mainly for field crops. Some areas, especially the sloping areas, are used for pasture or left wooded. The potential for surface runoff is slight to moderate depending on slope gradient. Permeability is moderately rapid.

iii. Hennepin silt loam 25 to 50% (MmF) and Miamian and Hennepin silt loam, 18 to 25% (MmE): The Hennepin series consists of well drained, steep to very steep soils. The native vegetation was mixed stands of deciduous hardwoods. Common trees are northern red oaks. These soils are used for pasture and woodland. They are too steep to be cultivated. Permeability of this soil is moderate and the potential for surface runoff is moderate to low.

iv. Milton silt loam, 6 to 12% (MpC2)

This series consists of well drained, level to moderately steep soils. The native vegetation was mixed hardwoods, but most wooded areas have been cleared. Common trees found here are northern red oaks and tulip trees. These soils are used mainly for field crops. This soil has moderate permeability and the potential for surface runoff ranges from slight to low.

(b) Soil Suitability: No slope or soil conditions or soil conditions were found that could potentially limit construction feasibility of the proposed Project. Many segments of the Preferred and Alternate Route follow existing transmission ROW and road ROW. It is not anticipated that the steeper slopes would impact the Project. New poles would typically be placed on more gently sloped locations to ease placement and reduce the potential for erosion. Slope mechanics are not expected to cause problems for construction, operation or maintenance of the proposed transmission line due to the relatively flat agricultural setting.

(B) LAYOUT AND CONSTRUCTION

(1) Site Activities

The following paragraphs provide data on the layout, engineering design process, and construction of the Project. Additionally, Section 4906-15-07 (E) provides data relating to the vegetation removal during construction of the proposed transmission line.

(a) Surveying and Soil Testing: The transmission line will be surveyed to establish the centerline location. The topographic surveying will be completed using conventional and/or aerial methods (e.g., LIDAR). The location of significant topographic features and man-made structures along or near the centerline of the transmission line that may affect the design of the transmission line will be identified during the survey. Offsets will be used to survey around large trees and other large obstructions. Structure locations will be staked prior for construction planning.

Soil testing will only be performed for the transmission line and angle structure locations requiring foundations for the new steel pole structures. Wood pole structures are planned for the vast

majority of the route. Where necessary, soil tests will be performed using a drop hammer to drive a sampler tube for laboratory analysis of the soil. Soil capacity is determined by the number of blows required to drive the tube 12 inches into the ground. Soil samples taken with a split-spoon will be used to determine soil type. Typically, the testing will be performed to a depth of 20-40 feet. If rock is encountered, a carbide-tipped bit will be drilled 5-10 feet into the rock.

(b) Grading and Excavation: No significant grading is anticipated to construct the transmission line on either route. The existing terrain within the Preferred and Alternate Routes is fairly level, and much of the route distance is adjacent to road ROW (8.5 miles and 7.8 miles of the Preferred and Alternate Route, respectively) which is anticpated to provide a mostly suitable surface for some construction vehicle operations (e.g., from roadway and road shoulder).

Each wood pole installation requires a machine-excavated hole for placement of the structure. The excavation for these poles will average three feet in diameter and nine to 12 feet deep. A portion of the excavated soil will be used for backfill. The excess material will be placed around the structure or hauled off-site.

(c) Access Road Construction: No permanent access roads are anticipated for transmission line construction or maintenance purposes. Temporary access to the construction areas of the Preferred and Alternate Route will occur from existing township, county or state roads adjacent to or crossed by the transmission line ROW. Where possible, existing access routes along the existing ROW used by crews during routine transmission line maintenance of the existing transmission lines will be utilized to construct the proposed line along the Preferred or Alternate Route.

(d) Stringing of Cable: Conductor installation for the proposed line will be accomplished using the tension stringing method. Lightweight guy cables or ropes will be fed through the stringing sheaves of the sections of line that require stringing. Conductors will then be pulled through under sufficient tension to keep the conductor “in the air”. This protects the conductor from surface damage.

Temporary guard or clearance poles will be used as a safety precaution at locations where the conductors could create a hazard to either crew members or the general public. The locations and heights of clearance poles will be such that the conductors are held clear of power and communication circuits, vehicular traffic, and other structures. The stringing operation will be

under the observation of crew members at all times. The observers will be in radio and/or visual contact with the operator of the stringing equipment.

(e) Post Construction Reclamation: After construction, drainage, fencing and erosion control aspects of the transmission line ROW will be restored to conditions as good as or better than those that existed prior to construction. This includes the restoration of drainage ditches, fencing, field drainage tiles, fertilizing, seeding, and mulching of disturbed non-cultivated areas, and the removal of temporary soil erosion and sedimentation control measures after vegetative cover has been established per the project-specific Stormwater Pollution Prevention Plan (SWPPP). Disturbed areas adjacent to streams and wetlands will be revegetated using methods to minimize soil erosion and degradation of water quality.

(2) Layout for Associated Facilities

(a) Site Map (1:24,000 Scale): Figure 4-1 (sheet 1) shows the Preferred and Alternate Routes relative to the existing West Milton Substation and the Figure 4-1 (sheet 5) shows the routes relative to the existing Eldean Substation.

(i) Final grades after construction, including access roads: Construction will not significantly alter the existing grades along the proposed transmission line routes.

(ii) Proposed location of major structures and buildings: There are no major structures and/or buildings planned along the proposed transmission line routes.

(iii) Fenced-in or secured areas: There will be no fenced-in or secured areas for the proposed transmission line.

(iv) Estimated Overall Dimensions: Neither existing substation will involve expanding the existing fence line.

(b) Reasons for Proposed Layout and Unusual Features: There are no unusual features associated with construction of this project.

(c) Future Modification Plans: DP&L's planning engineers generally forecast future transmission projects in a multi-year planning window. Currently, there are plans to expand the West Milton Substation in 2017. There are no other plans for future modifications to any substation or transmission facilities within the next five years for the facilities discussed in this application.

(C) TRANSMISSION EQUIPMENT

(1) Transmission Line Design Data

The majority of the Project will be installed on single wood pole construction. A few free standing steel pole structures may be required for longer span cross country construction. The exact number and location of these structures along the centerline of the proposed routes will be determined further along during detailed engineering design. A rough approximation of the number of structures is 350 to 370, based solely on an average estimated distance of 250 feet between structures based on the Preferred and Alternate Route both being 16.6 miles.

(a) *Design Voltage:* The transmission line will be designed and constructed to operate at 138 kV with 12.5 kV underbuild for some portions of the line.

(b) Transmission Pole Structures, Conductor Data, and Insulator Configuration: The proposed new transmission line will be supported on multiple structure types. The general features of these structures are described in the following sections. Where new structures are installed, they will be designed to support one 138 kV transmission line. Some portions of the line will also support 12.5 kV underbuild. Where the route of the transmission line is located along road ROW, the transmission line poles may be designed to support distribution circuits, either on cross arms or on horizontal post insulators, depending on the voltage of the distribution circuit. Additionally, DP&L will coordinate with communication utility companies having existing communication cables on or near the planned transmission route for transfer of such cables to the new transmission line pole structures.

1. For tangent configurations, single wood pole tangent structures, shown conceptually in Figure 4-2, will be utilized. These typical tangent structures will consist of a single wood pole with three horizontal post insulators to support the transmission conductors on each side of the pole.

2. For structures with a light angle configuration, shown conceptually in Figure 4-3, a single wood pole with horizontal line posts on one side of the structure will be utilized. This structure will most likely be guyed.

3. For structures with a major angle configuration, shown conceptually in Figure 4-4, a single wood pole structure, with three strain/suspension insulators, installed in a pull-off configuration, will be utilized. This structure will be guyed.

4. For tangent configurations with long span construction, a single pre-engineered steel pole will be utilized. This structure is shown conceptually in Figure 4-5. These typical tangent structures will consist of three horizontal post insulators to support the transmission conductors in a delta configuration on either side of the pole.

5. Figure 4-6 shows the typical structure details for locations where a self-supported steel structure with a concrete foundation are needed.

Although it is not anticipated, the design or ROW conditions may dictate that other types of structures need to be utilized. If these unanticipated conditions arise, they will be addressed on a case-by-case basis.

The conductor used for the Preferred Route will be designed and constructed for 138 kV operation and will be single 1351.5 kcmil AAC per phase. This conductor has a maximum strength of approximately 23,400 pounds. The overhead ground wire to be installed on the Preferred Route will be 3/8" EHS steel. The conductor used for the 12.5 kV construction will be 477 kcmil ACSR per phase. This conductor has a maximum strength of approximately 11,800 pounds. The neutral wire to be installed on the Preferred Route will be 4/0 AWG ASCR with a maximum strength of approximately 8,350 pounds. The phase conductors for both the 138 kV and 12.5 kV as well as the overhead ground wires and neutral will be installed in accordance with the latest version of the National Electrical Safety Code. The conductors will be supported by aluminum clamps attached to the polymer horizontal post and polymer strain/suspension insulators. Steel clamps will support the overhead ground wire. At deadends, bolted-type dead-end clamps will be used on the conductor and on the ground wire.

(c) Base and Foundation Design: Each wood pole and pre-engineered steel pole will be set in an approximately three-foot diameter hole, nine to 12 feet deep. Crushed rock backfill will be used as backfill for all direct-embed structures. Custom steel poles, if installed, will be supported on reinforced concrete foundations designed for the specific loading conditions of the structure.

(d) *Underground Cable Design:* There are no underground cables associated with the proposed transmission line; therefore, this section does not apply.

(e) *Other Major Equipment or Special Structures:* No other major equipment or special structures are anticipated. Any potential variances will be assessed on a case-by-case basis, and discussed with the Board staff prior to construction.

(2) Electrical Substation Design Data

This Application does not involve the construction of an electrical transmission substation.

(3) Not Applicable (Gas Transmission Lines)

Not Applicable.

(D) ENVIRONMENTAL AND AVIATION COMPLIANCE INFORMATION

(1) List and Discussion of Permits Required

The Applicant anticipates submitting a Notice of Intent for coverage under Ohio Environmental Protection Agency ("OEPA") General National Pollutant Discharge Elimination System ("NPDES") Permit for construction stormwater. At most, coverage under U.S. Army Corps of Engineers Nationwide Permit 12 (utility lines) for wetland and stream impacts associated with construction only would apply to this Project. No permanent fill in streams or wetlands should be necessary. Other agency coordination required as part of the Nationwide Permit coverage will be conducted as necessary (e.g., authorizations from the U.S. Fish & Wildlife Service and/or the Ohio Historic Preservation Office).

(2) Description, Quantification, and Disposal of Construction Debris

As construction work proceeds, the ROW will be kept clean of all rubbish and debris resulting from the work. Debris associated with construction of the proposed transmission line is expected to consist of conductor scrap, construction material packaging including cartons, insulator crates, conductor reels and wrapping, and used storm water erosion control materials. Clearance poles, conductor reels and other materials with salvage value will be removed from the construction area for reuse or salvage. It is estimated that approximately 300 cubic yards of construction debris could be generated from the project. Construction debris will be disposed of in accordance with state and federal requirements for such disposal. Where trees must be cleared from the ROW, which is expected to be minimal, the resulting brush will be either mechanically chipped

and hauled off-site, wind-rowed along the edge of the ROW, prepared for fire wood use by the landowner, or handled as the landowner prefers. Grubbing of stumps and roots is not currently planned in these areas.

(3) Storm Water and Erosion Control

A SWPPP document will be prepared and incorporated into the Construction Plans and Specifications, and shall be made available onsite during construction of the Project. The SWPPP will include the following general conditions at a minimum.

Erosion and Sedimentation Controls

Implementation of erosion and sedimentation control practices shall conform to the Ohio Department of Natural Resources Rainwater and Land Development Manual (2006); the OEPA NPDES Permit Program for the discharge of stormwater from construction sites, and any erosion and sediment control practices and standards required by the Miami County Soil and Water Conservation District Office.

Wetlands, streams and other environmentally sensitive areas shall be clearly flagged before commencement of clearing or construction. No construction or access will be permitted in these areas unless clearly specified in the Construction Plans and Specifications. Streams are not expected to be impacted; however if a stream channel (bed or bank) is disturbed during construction, the area will be stabilized immediately upon completion of the construction task. Grubbing activities are not expected to be required. Where applicable (e.g., steep slopes), perimeter sediment controls shall be implemented for grubbing activities and shall continue to function until disturbed areas are permanently stabilized.

Specific Silt Fence or Filter Sock Inspection Requirements

Silt fencing and/or other appropriate best management practices for erosion control shall be constructed before upslope land disturbance begins. All silt fences, filter socks, etc. shall 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 which may carry concentrated flows to the silt fence are dissipated along its length. Where possible, vegetation shall be preserved for five feet upslope from the silt fence.

Silt fence shall be placed so that eight inches of cloth are below the ground surface. Excess material shall lay at the bottom of the six-inch deep trench and the trench shall be backfilled and

compacted. Silt fence shall allow runoff to pass only as diffuse flow through the geotextile fabric. If runoff overtops the silt fence, flows under or around the ends, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

Soil Stabilization

As specified in the SWPPP document, disturbed areas that remain un-worked for more than 14 days the area will be stabilized with mulch or other acceptable means no later than seven days after the last construction in that area. For disturbed areas within 50 feet of a surface water of the state, and not at final grade, stabilize the area within two days. Permanent soil stabilization methods and timeframes are similar and will include seeding and mulching of disturbed areas.

Maintenance / Inspection

All erosion and sediment control practices shall be inspected at least once every seven days and within 24 hours after any storm event greater than 0.5-inch of rain per 24-hour period.

All erosion and sedimentation control structures will be maintained in good working order. Straw wattles, straw bales, and silt fence will be inspected for excess sediment accumulation, tears in fabric and to ensure proper staking. Inspections will continue until the site is at least 70% stabilized with newly sown grasses or gravel as appropriate. If a repair is necessary, it will be initiated within 48 hours of the report. Records of the maintenance and inspection must be maintained throughout the construction period. Records shall include, at a minimum, the name of the inspector, major observations, date of inspection, certification of compliance, and corrective measures taken.

Materials Management

All materials stored onsite shall be kept in an orderly manner in their appropriate containers and, if possible, under a roof or other enclosure. Products shall 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 will be retained and available on-site at all times during construction.

(4) Contaminated Soil and Hazardous Materials

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

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 shall be provided for all onsite fuel storage tanks.

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 on-site.

Spills will be reported to the appropriate government agency as required. Any suspected hazardous materials encountered during construction shall be reported to the DP&L Environmental Department.

(5) Height of Tallest Anticipated Above Ground Structures

The tallest structures associated with the Project will be the transmission line poles, which would be designed with an anticipated maximum height of approximately 90 feet. The typical height of transmission structures will be approximately 70 feet in height. There are four privately owned, turf-covered air strips or airports in the Project vicinity and are not open to the public for aircraft landing with the exception of one air strip. The private Leavelle Air Strip is within 1,300 feet of the Alternate Route (the single grass runway is oriented parallel to the Alternate Route), and the remainder of airports are 2,900 feet or greater in distance from the Preferred or Alternate Route. Only the Troy Airpark, a privately-owned facility, is listed as "open to public" use based on the website www.airnav.com, accessed on December 2, 2014. This airfield is located 1.26 miles from the Alternate Route with its single runway oriented approximately parallel to the route.

The height of construction equipment associated with the Project is expected to be less than that of the transmission line poles except for the use of a crane where steel poles are required. The exact structure locations have not been determined, however all transmission structure locations will be input to the Federal Aviation Association's ("FAA") Notice Criteria Tool website. Additional coordination with the FAA and Ohio Department of Transportation, Office of Aviation may be required, in particular, for the private Troy Airpark facility.

(6) Construction Plans in Poor Soil Conditions:

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 which will prevent tracking or flowing of sediment onto public roads. Sediment tracked onto public road ROWs shall be removed as soon as practical and daily at a minimum.

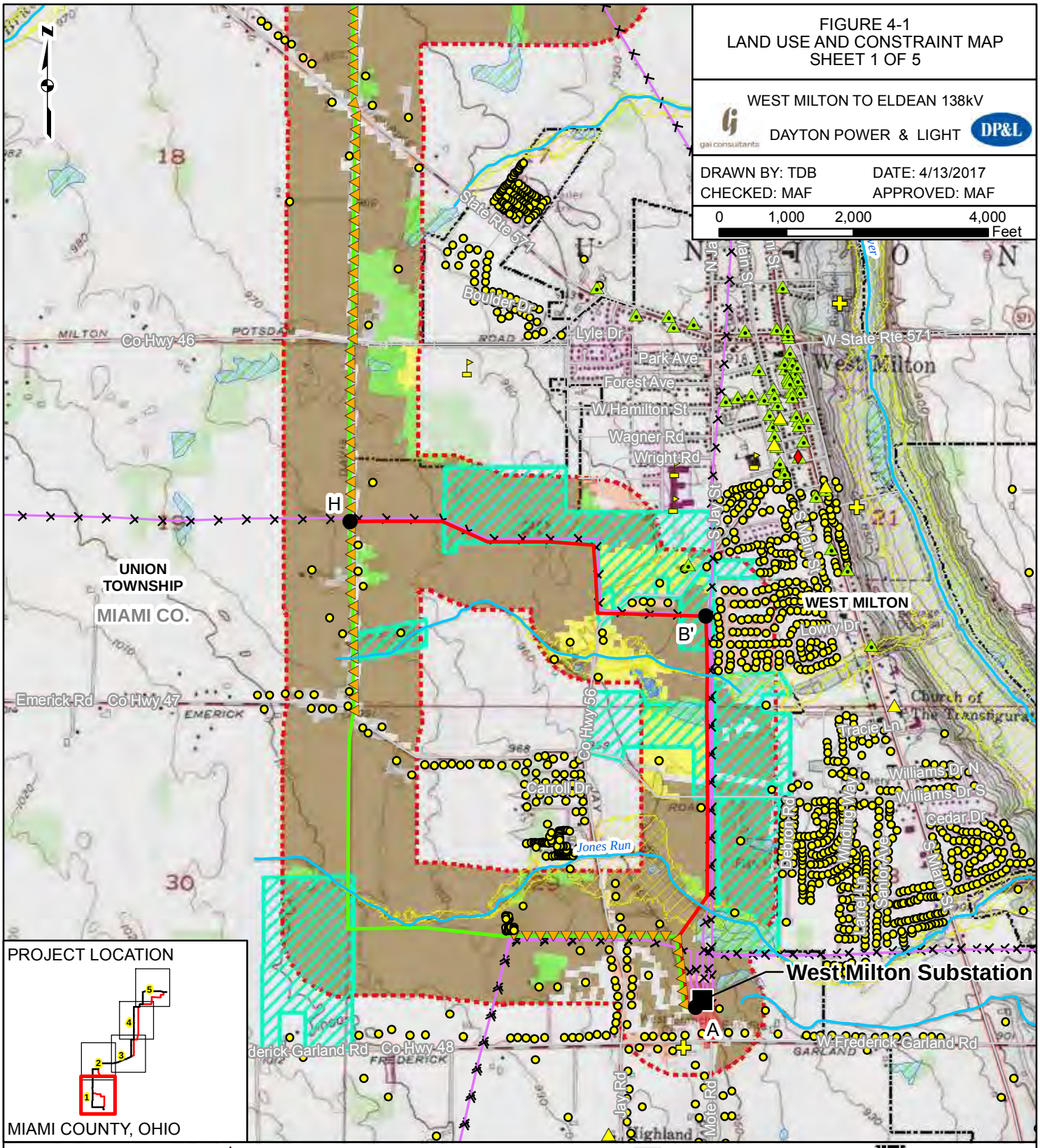
FIGURE 4-1
LAND USE AND CONSTRAINT MAP
SHEET 1 OF 5

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

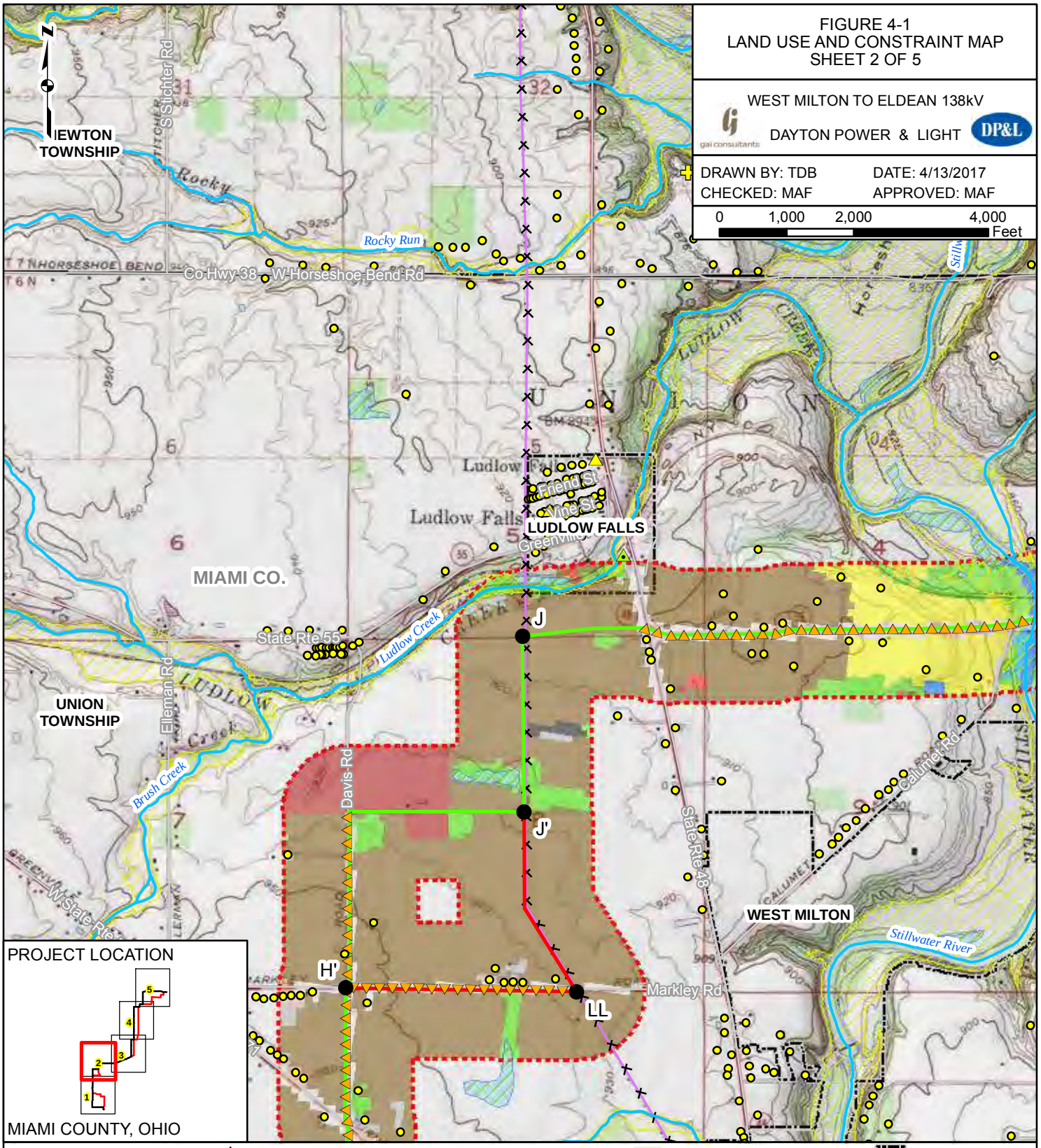
DRAWN BY: TDB DATE: 4/13/2017
CHECKED: MAF APPROVED: MAF

0 1,000 2,000 4,000 Feet



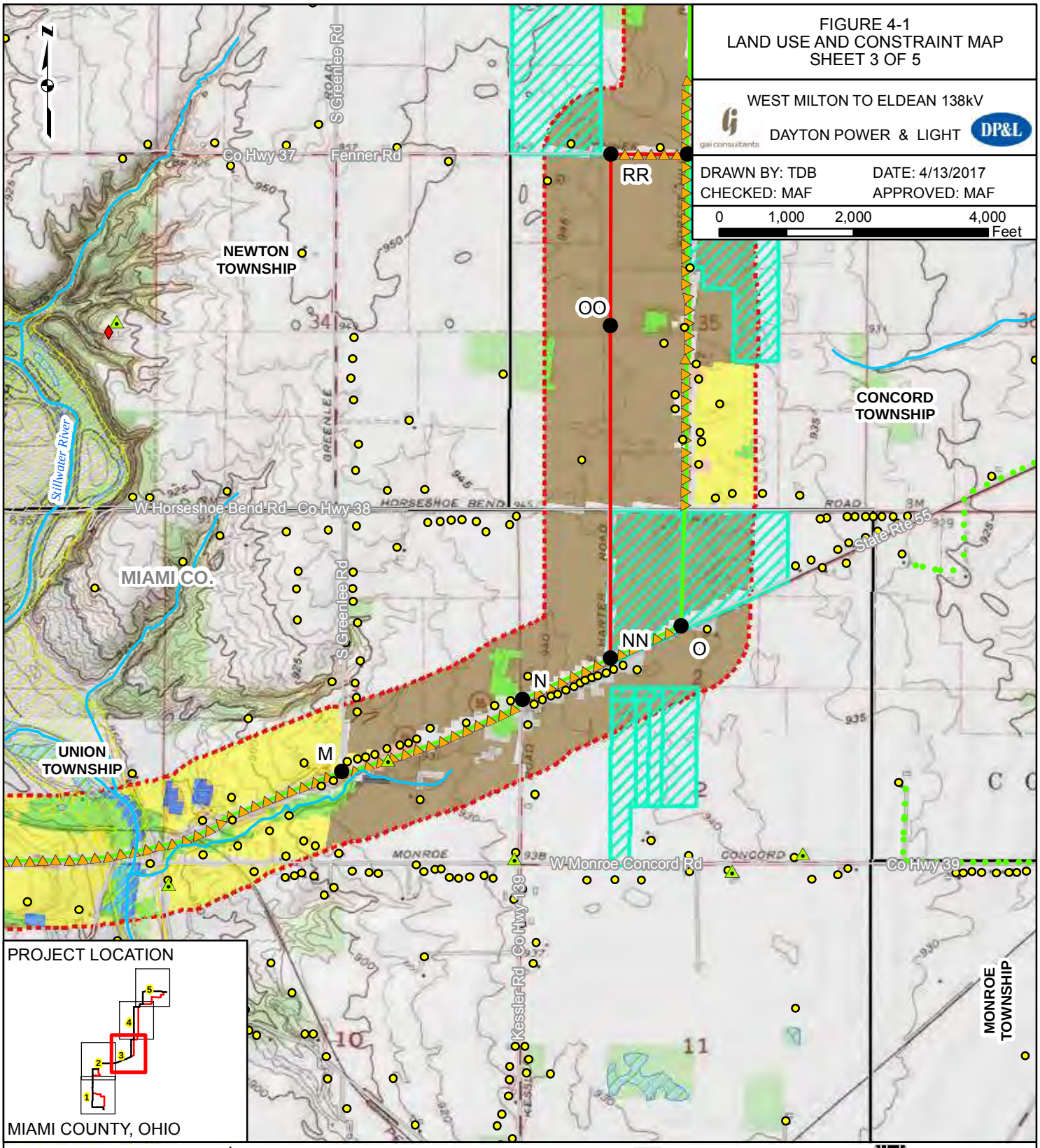
REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLES: PLEASANT HILL (1984), TROY (1982), WEST MILTON (1983), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. USGH NHD, 2010; USGS 2011 NLCD, 2013; MIAMI COUNTY, 2013; USGS NHD, 2014; FEMA NFHL, 2012; POWER ENGINEERS, 2014. USFWS, 2014; ODNR, 2014; OHPO, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\4_1_DPL_WEST_MILTON_ELDEN_LAND_USE_2017_04_13.mxd



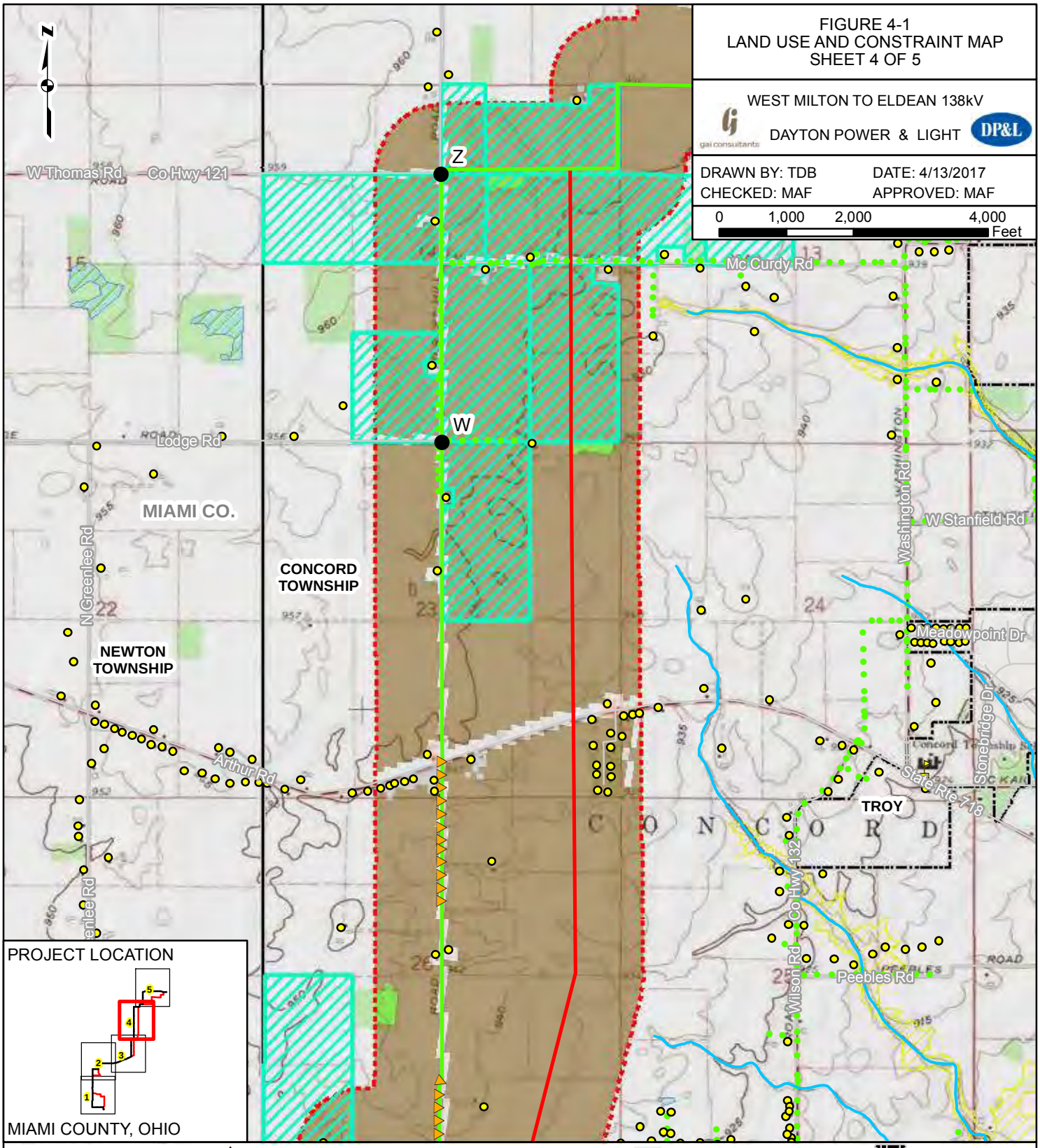
REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLES: PLEASANT HILL (1984), TROY (1982), WEST MILTON (1983), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. USGH NHD, 2010; USGS 2011 NLCD, 2013; MIAMI COUNTY, 2013; USGS NHD, 2014; FEMA NFHL, 2012; POWER ENGINEERS, 2014. USFWS, 2014; ODNR, 2014; OHPO, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\4_1_DPL_WEST_MILTON_ELDEN_LAND_USE_2017_04_13.mxd



REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLES: PLEASANT HILL (1984), TROY (1982), WEST MILTON (1983), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. USGH NHD, 2010; USGS 2011 NLCD, 2013; MIAMI COUNTY, 2013; USGS NHD, 2014; FEMA NFHL, 2012; POWER ENGINEERS, 2014. USFWS, 2014; ODNR, 2014; OHPO, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\4_1_DPL_WEST_MILTON_ELDEN_LAND_USE_2017_04_13.mxd



REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLES: PLEASANT HILL (1984), TROY (1982), WEST MILTON (1983), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. USGH NHD, 2010; USGS 2011 NLCD, 2013; MIAMI COUNTY, 2013; USGS NHD, 2014; FEMA NFHL, 2012; POWER ENGINEERS, 2014. USFWS, 2014; ODNR, 2014; OHPO, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\4_1_DPL_WEST_MILTON_ELDEN_LAND_USE_2017_04_13.mxd

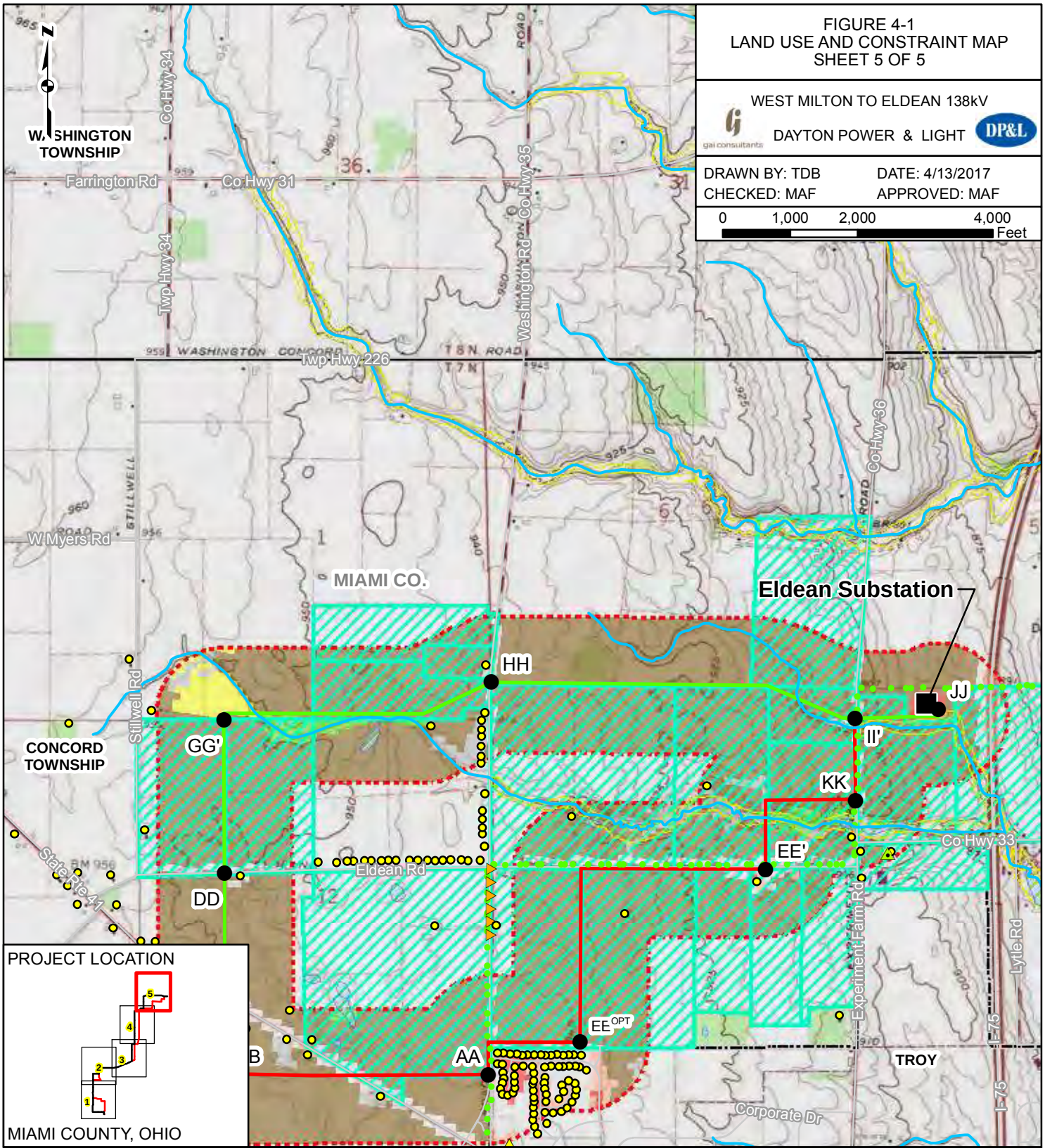
FIGURE 4-1
LAND USE AND CONSTRAINT MAP
SHEET 5 OF 5

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

DRAWN BY: TDB DATE: 4/13/2017
CHECKED: MAF APPROVED: MAF

0 1,000 2,000 4,000 Feet



Preferred Route
Alternative Route
Node
DP&L Distribution Line
Pioneer Distribution Line
Cemetery
Church
School
National Register
Historic Structure
Residence
Existing Transmission Line
NWI Wetland
FEMA 100-Year Floodplain
2000-Foot Study Corridor
Agricultural District
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceuous Wetlands
Evergreen Forest
Hay/Pasture
Herbaceuous
Open Water
Road Centerline
NHD Waterway
City Limit
Township Boundary
County Boundary

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLES: PLEASANT HILL (1984), TROY (1982), WEST MILTON (1983), OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 10/2015. USGH NHD, 2010; USGS 2011 NLCD, 2013; MIAMI COUNTY, 2013; USGS NHD, 2014; FEMA NFHL, 2012; POWER ENGINEERS, 2014. USFWS, 2014; ODNR, 2014; OHPO, 2013.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\4_1_DPL_WEST_MILTON_ELDEN_LAND_USE_2017_04_13.mxd

4906-15-05 FINANCIAL DATA

(A) OWNERSHIP

Dayton Power & Light, Incorporated ("DP&L") will construct, own, operate, and maintain the proposed West Milton-Eldean 138 kV Transmission Line. Both the Preferred Route and the Alternate Route are 16.6 miles long and will connect the existing West Milton Substation with the Eldean Substation.

Both routes would consist of new construction in mostly new right-of-way or easement corridors. Where the transmission line would be co-located with an existing DP&L transmission line, existing easements would be negotiated with landowners for additional width. DP&L would negotiate for easements for new right-of-way with landowners for the transmission line route that is selected.

The Preferred and Alternate Routes are aligned adjacent to road right-of-way for approximately 9.1 miles and 7.2 miles, respectively, out of the total route length of 16.6 miles. Much of this existing road right-of-way length is occupied by overhead electric distribution lines and communication cables. DP&L plans to transfer the electric distribution lines they own and operate onto the new pole structures being installed for the proposed transmission line. For distribution circuit lines and cables owned and operated by others, DP&L will negotiate with those entities concerning transfer of these utilities to the new transmission poles, where necessary and feasible.

It is possible that some landowners may not agree to easements for right-of-way after negotiation attempts by DP&L. As necessary, where DP&L cannot reach an easement agreement with landowners located on the transmission line route approved by the OPSB, DP&L will evaluate the feasibility and potential for minor route adjustments with landowners in some cases. DP&L may also utilize appropriation to obtain the necessary right-of-way to construct the transmission line.

(B) ELECTRIC CAPITAL COSTS

Estimates of applicable intangible and capital costs for both Preferred and Alternate Routes are identified in Table 5-1.

Table 5-1: Estimates of Applicable Intangible and Capital Costs for the Preferred and Alternate Routes

FERC Account Number	Description	Preferred Route ($)	Alternate Route ($)
350	Land and Land Rights	1,000,000	1,000,000
352	Structures & Improvement	0	0
353	Station Equipment	400,000	400,000
354	Towers & Fixtures	0	0
355	Pole & Fixtures	4,800,000	5,000,000
356	Overhead Conductors & Devices	3,500,000	3,500,000
357	Underground Conductors & Devices	0	0
358	Underground-to-overhead Conversion Equipment	0	0
359	Right-of-way Clearing, Roads, Trails or Other Access	225,000	200,000
	TOTAL	**9,925,000**	**10,200,000**

(C) GAS CAPITAL COST

DP&L does not propose to construct, own or operate any natural gas transmission lines or facilities as part of or in conjunction with the proposed Project.

4906-15-06 SOCIOECONOMIC AND LAND USE IMPACT ANALYSIS

(A) SOCIOECONOMIC CHARACTERISTICS

This section of the Application provides a summary of a literature search and map review for the area within 1,000 feet on each side of both the proposed Preferred and Alternate transmission line centerlines. Onsite investigations were conducted within 100 feet of each side of the Preferred and Alternate Routes. The Preferred Route was completed in its entirety while approximately 94% (15.6 miles) of the Alternate Route (16.6 miles) was field-surveyed while the remainder was not yet reviewed due to either no landowner response or access refusal. The remaining Alternate Route land parcels, all of which consists of cultivated crop land, will be surveyed as agreements are obtained from three landowners. Where possible, public rights-of-way ("ROW") were utilized to observe land use along these Alternate Route parcels and data from the desktop analysis and field reviews were used to characterize the potential effects of construction, operation, and maintenance of the proposed Project. This report section also provides details on various aspects of public interaction; health, safety, and aesthetic information; cultural resources, and noise emissions.

On March 27, 2014, The Dayton Power and Light Company (DP&L) filed a Letter Motion and Memorandum requesting limited waivers regarding the Project and this Application. In this letter, DP&L requested a waiver that proposed conducting field studies and investigations for ecological and cultural resources for only the Preferred Route. On May 7, 2014, a letter was issued by an Administrative Law Judge granting DP&L's motion for waiver. In an e-mail dated April 20, 2015, the OPSB requested ecological field studies for the Alternate Route. This Section of the application includes results of investigations of both the Preferred Route and Alternate Route.

A review of publicly available data for the study area was performed to assess general socioeconomic and land use characteristics. Results of this review are summarized below.

Both routes begin at the West Milton Substation located on West Frederic Garland Road in the Village of West Milton and terminate at the Eldean substation located on Experiment Farm Road on the northwest edge of Troy, Ohio (refer to Figure 4-1). Each route, including the area within 1,000 feet on each side of each proposed transmission line centerline, is located entirely within Miami County. Both routes pass west of the City of Troy, south of the Village of Ludlow Falls, and

west of the Village of West Milton. Demographic data compiled from the U.S. Census Bureau, including population, average household size, and median household size is summarized in Table 6-1.

Table 6-1: Study Area Demographics of the Preferred and Alternate Route

Municipality	2010 Population	2000 Population	Percent Change (%)	Average Household Size (2010)	Median Household Income ($) (2012)
Miami County	102,506	98,868	3.7	2.48	52,292
Concord Township	30,353	27,335	11.0	2.53	53,930
Union Township	9,871	10,222	-3.4	2.45	52,076
Ludlow Falls Village	208	210	-1.0	1.9	32,500
West Milton Village	4,630	4,645	-0.3	2.35	50,763
City of Troy Data - Applies to Only the Alternate Route					
City of Troy	25,058	21,999	13.9	2.53	50,403

Source: U.S. Census Bureau, 2014

(B) TRANSMISSION ROUTES, SUBSTATION SITES, AND LAND USE

Figure 4-1 illustrates the area 1,000 feet to all sides of the Preferred and Alternate transmission routes at 1:24,000 scale. The land use data was derived from the U.S. Geological Service ("USGS") 2011 Multi-Resolution Land Characteristics Consortium National Land Cover Database 2011 (Jin et al., 2013), and was verified based on field review. Due to siting constraints, the Alternate Route has approximately 34% in common with the Preferred Route. Where these two routes share a common alignment they are referred to as the "common route". Among other information, Figure 4-1 shows the following features enumerated below.

(1) Transmission Line Alignments

The centerlines for both the Preferred and Alternate transmission routes are depicted on Figure 4-1. Both are briefly described in Section 4906-15-04(A)(1)(a) of this application.

(2) Substation Sites

No new substations are proposed. The proposed transmission line will connect the existing West Milton and Eldean Substations.

(3) General Land Use

The land use along the two route alternatives consists largely of agricultural land, road frontage adjacent to public road ROW, and residential lots. No major areas of commercial, industrial, or institutional land use occur within the immediate area with the exception of a rock quarry mining operation located northwest of the village of West Milton. The Stillwater River, designated as a scenic river by the state, is crossed by both route alternatives adjacent to the bridge on State Route 55 where an existing overhead distribution line exists.

A land use constraint map for the Preferred and Alternate Routes is presented on Figure 4-1. Additional details for various land use categories are discussed below.

(a) Residential: Analysis of aerial photographs with field verification indicates that there are 195 residences within 1,000 feet of the Preferred Route, 20 of which are within 100 feet. There are 297 residences within 1,000 feet of the Alternate Route, 10 of which are within 100 feet. Developed land use and residences are depicted on Figure 4-1.

(b) Commercial: There are four commercial land uses within 1,000 feet of both the Preferred Route and Alternate Route. The total number of unique commercial land uses (businesses) is five and includes an agricultural/animal sanctuary, a general contractor business, a fabric crafts business, the Union Township Life Squad, and a catering facility. The Union Township Life Squad is approximately 120 feet west of the Preferred Route. All other identified commercial uses were at least 400 feet away from the Preferred or Alternate Routes.

(c) Industrial: One industrial land use was identified within 1,000 feet of the Preferred Route which consists of the Barrett Paving Materials Ludlow Quarry located northwest of West Milton and the end of Davis Road. The Preferred Route passes over the southeast portion of this quarry. Industrial use is depicted on Figure 4-1.

(d) Cultural: Cemeteries are depicted on Figure 4-1.

(e) Agricultural: Approximately 86% of the land crossed by the Preferred Route and 85% of the Alternate Route are classified as agricultural (cultivated, hay, grassland, and pasture combined). Agricultural land use, including Agricultural District Land is depicted in Figure 4-1.

(f) Recreational: One recreational use was identified within 1,000 feet of the Preferred Route and Alternate Route. This is the Lowry Complex, adjacent to the Milton-Union High School on Milton-Potsdam Road in West Milton. Specifically, the common route passes within approximately 980 feet of the Lowry Complex and the Milton-Union High School, depicted on Figure 4-1.

(g) Institutional (e.g., schools, hospitals, churches, government facilities, etc.): The Preferred Route alignment is within approximately 40 feet of a property boundary of land owned by the Great Lakes Conference of the Brethren in Christ Church. The specific portion of this property that is adjacent to the Preferred Route is used for a camp that includes several small summer sleeping quarters. The First Lutheran Church, located on Washington Road just west of the City of Troy municipal limits, is approximately 960 feet southeast of the Alternate Route. These institutional uses are depicted on Figure 4-1. No hospitals, government facilities, or other institutional uses were identified within 1,000 feet of the Preferred or Alternate Routes.

(4) Transportation Corridors

Both the Preferred Route and the Alternate Routes cross State Route 41 within a half-mile of each other west of Troy. The Preferred Route crosses State Route 718 at North Forest Hill Road and the Alternate Route crosses State Route 718 approximate 0.4 miles east of this location. The Preferred Route is co-located with Forest Hill Road until it approaches State Route 55 where it turns west to follow adjacent to road ROW. The Alternate Route follows Fenner Road a short distance then picks up on the short Harter Road until it meets State Route 55 to join the common route. The common route follows the State Route 55 southwest on the north-side ROW and then crosses to the south side of State Route 55 approximately 0.4-mile east of State Route 48. The common route then crosses State Route 55 to the north and State Route 48. The common route crosses State Route 571 at Davis Road. The existing roads and highways are further illustrated on Figures 4-1 and 7-1, including county and township roads.

(5) Existing Utility Corridors

Existing electric transmission lines within 1,000 feet of the Preferred and Alternate Routes include the West Milton-Fort Miami 345 kV line, the West Milton-Greenville 138 kV line, the Covington-West Milton 69 kV line, and the West Milton-Miami 138 kV line; all connecting to the West Milton Substation. Numerous distribution lines are also within 1,000 feet of the Preferred and Alternate Routes. No major natural gas or hazardous liquid pipelines were identified within 1,000 feet of the Preferred or Alternate Routes. Existing transmission lines are illustrated on Figure 4-1.

(6) Noise-Sensitive Areas

Noise sensitive areas within the vicinity of the transmission line routes are limited to residences and churches. Noise sensitive areas within the vicinity of the Preferred Route include 195 residences within 1,000 feet of the Preferred Route, 20 of which are within 100 feet; and one church-owned property. There are 297 residences within 1,000 feet of the Alternate Route, 10 of which are within 100 feet; and one church (Brethren in Christ Church). Residences and churches are depicted on Figure 4-1.

(7) Agricultural and Agricultural District Land

On March 2, 2017 the Miami County Auditor provided, via email, a list of parcels enrolled in the Agricultural District Land program. The data provided fulfill the requirement of Ohio Administrative Code 4906-15-06(B)(7) which states that Agricultural District Land must be enrolled at least 60 days prior to submission of the application. Thirty-three Agricultural District Land parcels were identified within 1,000 feet of the Preferred Route and 35 Agricultural District Land parcels were identified within 1,000 feet of the Alternate Route. Twenty Agricultural District Land parcels are located within the proposed Preferred Route 75-foot ROW and 18 Agricultural District Land parcels are located within the proposed Alternate Route 75-foot ROW. Agricultural land and Agricultural District Land are depicted with on Figure 4-1.

(C) LAND USE IMPACTS

Potential land use impacts were evaluated based on review of databases, aerial photography, and site visits. The current land use within 1,000 feet of the proposed transmission lines consists primarily of agricultural production. A description of the impact of the proposed Facility on land use is provided below in Sections 4906-15-06(C)(2) and (3). Mitigation measures are discussed below in Section 4906-15-06(C)(4).

Table 6-2: Land Use within the Preferred and Alternate Route Study Areas (within 1,000 feet)

Land Use Category	Preferred Study Area		Alternate Study Area	
	Acres	% of Study Area	Acres	% of Study Area
Agricultural (Cultivated)	3,152.1	78	3,114.9	77
Developed (Open Space)	298.5	7	328.5	8
Agricultural (Pasture/Hay)	231.5	6	242.9	6
Forested	175.6	4	173.4	4
Grassland/Herbaceous	63.8	2	56.8	2
Developed (Mixed)	110.2	3	100.9	3
Open Water	18.0	<1	20.1	<1
Total	4,050	100	4,037	100

(1) Number of Residential Structures

Residential development within the Preferred Route study area consists primarily of single-family homes along transportation corridors. The Alternate Route study exhibits similar development patterns an additional residences in housing developments in the City of Troy and the Village of West Milton. There are 195 residential structures within 1,000 feet of the Preferred Route and 20 residential structures within 100 feet of the Preferred Route. There are 297 residential structures within 1,000 feet of the Alternate Route and 10 residential structures within 100 feet of the Alternate Route. Table 6-3 lists the parcel numbers, addresses and route information for the residential structures.

Table 6-3: Residential Structures within 100 feet of the Preferred and Alternative Routes

Parcel Number	Address	Route
C06003400	1620 North Forest Hill Road, Troy, OH	Preferred
C06004510	520 North Forest Hill Road, Troy, OH	Preferred
C06005400	72 South Forest Hill Road, Troy, OH	Preferred
C06006250	725 North Forest Hill Road, Troy, OH	Preferred
C06006700	500 South Forest Hill Road, Troy, OH	Preferred
C06006950	4595 West Fenner Road, Troy, OH	Alternate
C06007100	481 South Forest Hill Road, Troy, OH	Preferred
C06007600	1490 South Forest Hill Road, Troy, OH	Preferred
C06007830	1800 South Forest Hill Road, Troy, OH	Preferred
C06008300	4340 West Fenner Road, Troy, OH	Alternate
L32024890	5510 West State Route 55, Ludlow Falls, OH	Common
L32025050	5792 West State Route 55, Ludlow Falls, OH	Common
L32025150	5560 West State Route 55, Ludlow Falls, OH	Common
L32025650	5145 West State Route 55, Troy, OH	Common
L32026450	6853 West State Route 55, Ludlow Falls, OH	Common
L32042200	8010 Emerick Road, West Milton, OH	Preferred
L32043115	6691 South Jay Road, West Milton, OH	Preferred
L32051350	6508 West State Route 55, Ludlow Falls, OH	Common
L32052610	7565 West Markley Road, West Milton, OH	Alternate
L32054710	3914 South Davis Road, Ludlow Falls, OH	Preferred
L32060250	5990 South Davis Road, West Milton, OH	Preferred
L32060900	5635 South Davis Road, West Milton, OH	Preferred
L32066400	4470 South Davis Road, West Milton, OH	Common

(2) Construction Impacts

Project infrastructure within the Preferred Route ROW is anticipated to include approximately 580 standard wood poles (direct imbed) and additional steel pole angle structures with below-grade concrete foundations where an angle in the alignment exists. A 75-foot construction ROW is planned with the final transmission line ROW. Where the transmission line runs parallel with the road ROW, the maintained ROW will be scaled back to 37.5 feet. Existing public roads and farm field roads will be the primary means to access construction work areas. If temporary access roads are required, a 15-foot wide path will be established from a stabilized construction entrance

to the ROW. Results of the ecological investigations will be utilized to minimize impacts to natural resources during construction planning.

(a) Residential Use: Twenty and 10 residences were identified with 100 feet of the Preferred Route and Alternate Route, respectively. No residences would be acquired in order to construct the transmission line as currently planned. Construction impacts to residences are anticipated to include minor increases in noise in certain locations, primarily associated with the limited construction phase. Construction-related noise would be temporary in nature and limited to standard business hours. Additionally, construction noise would be negligible to some extent due to ambient noise levels associated with local roads. Construction would be limited to a few days to one week at any particular location, thus limiting the duration of impacts.

(b) Commercial Use: Five businesses were identified within the study area. These businesses include an agricultural/animal sanctuary, a general contractor, a fabric crafts business, the Union Township Life Squad, and a catering facility. Construction impacts to commercial land use due to the Project would be similar to residential impacts, primarily consisting of short-term construction noise.

(c) Industrial Use: The only identified industrial land use is an active rock quarry within the Preferred Route ROW. No adverse impacts are anticipated to result from construction of the proposed Project.

(d) Cultural Sites and Structures

Preferred Route: One historic structure, no National Register of Historic Places ("NRHP") sites, and no historic districts were identified within 1,000 feet of this Route. Eight archaeological sites were recorded within 1,000 feet of the Preferred Route; three archaeological sites were recorded within 100 feet located within or near the ROW of State Route 55, approximately 0.4-mile east of the Stillwater River. These three small sites would be avoided for pole structure placement during engineering design. Note that State Route 55 itself is recorded as a historic structure (not included in the above count) and the Preferred Route would be located adjacent to the ROW of the road. One cemetery is located within 1,000 feet of the Preferred Route near the West Milton Substation.

Alternate Route: Due to the Alternate Route being common with the Preferred Route along State Route 55, the same results apply to the Alternate Route for the specific State Route 55 section near the Stillwater River. For the entire Alternate Route, three historic structures, no NRHP sites, and no historic districts were identified within 1,000 feet of this Route. Twelve archaeological

sites were recorded within 1,000 feet of the Alternate Route; three archaeological sites were recorded within 100 feet located within or near the ROW of State Route 55. These three small sites will be avoided for pole structure placement during engineering design. Note that State Route 55 itself is recorded as a historic structure (not included in the above count) and the Alternate Route would be located adjacent to the ROW of the road. One cemetery is located within 1,000 feet of the Alternate Route near the West Milton Substation.

(e) Agricultural Use: According to NLCD 2011 Land Use Data, cultivated crops were the dominant land use with approximately 3,152 acres (78%) of the Preferred Route and 3,115 acres (77%) of the Alternate Route. The types of crops observed near the proposed routes during the 2015 agricultural season in order of dominance included corn, soybean and wheat. Hayfields and pastures made up an additional 6% of the Preferred Route and 6% of the Alternate Route. The above acreages and percentages are based on the 2,000-foot-wide corridor centered over the route centerline.

Potential impacts to agricultural use resulting from Project construction include temporary damage to crops (one season at most) during the growing season, minor and temporary disturbance of drainage patterns, disruption of plow/harvest patterns, and a reduction of tillable land at the pole structure locations. Crop production would be allowed immediately adjacent to the pole structures and guy wires where applicable.

(f) Recreational Use: No adverse impacts due to construction are anticipated to result from construction of the proposed Project.

(g) Institutional Use (e.g., schools, hospitals, churches, government facilities, etc.): Two institutions were identified within the 1,000 foot review area on either side of the route alignments. These include the First Lutheran Church, adjacent to the Alternate Route; and the property owned by the Great Lakes Conference of the Brethren in Christ Church adjacent to the Preferred Route. Construction impacts to institutional use due the Project would be similar to residential impacts, primarily consisting of short-term construction noise.

(3) Operation and Maintenance Impacts

(a) Residential Use: The most likely operational and maintenance impacts to residential structures are associated with the prohibition of new development within the transmission line ROW and continued vegetation management to meet the North American Electric Reliability Corporation ("NERC") reliability standards. The objective of the NERC vegetation management

standard is to prevent vegetation-related outages by maintaining vegetation within acceptable limits under overhead lines. The vegetation management activities typically occur every five years.

(b) Commercial Use: No adverse impacts to commercial land use are anticipated due to operation and maintenance of the proposed transmission line.

(c) Industrial Use: No adverse impacts to industrial land use are anticipated due to operation and maintenance of the proposed transmission line.

(d) Cultural Use: No adverse impacts are expected due to the operation and maintenance of the proposed transmission line.

(e) Agricultural Use: Although there is a high percentage of agricultural activity (primarily crop production) within the study area, maintenance of the Preferred Route or Alternate Route is anticipated to only minimally impact land use within the proposed transmission line ROW. Maintenance will primarily consist of occasional repair activities and vegetation management in a few select areas. Maintenance impacts beyond the ROW are not expected.

(f) Recreational Use: No adverse impacts to recreational land use are anticipated due to operation and maintenance of the proposed transmission line.

(g) Institutional Use (e.g., schools, hospitals, churches, government facilities, etc.): No adverse impacts to institutional land use are anticipated due to operation and maintenance of the proposed transmission line.

(4) Mitigation Procedures

In addition to avoidance of sensitive resources, other procedures will be used to reduce impacts during Project construction. These procedures include the development of a Stormwater Pollution Prevention Plan for the project to reduce the potential for project related erosion and sedimentation to occur; the use of Best Management Practices; and seeding and mulching of disturbed soils. The proposed Project was sited primarily in agricultural land, which is land that has already been disturbed.

Ongoing operation and maintenance impacts will likely be infrequent; and not require heavy equipment.

(a) Residential Use: Mitigation for impacts to residential use associated with the prohibition of new development within the transmission line ROW and vegetation management will be determined during the easement acquisition process.

(b) Commercial Use: No adverse impacts to commercial land use are anticipated, therefore no mitigation is proposed for commercial properties.

(c) Industrial Use: No adverse impacts to industrial land use are anticipated; therefore, no mitigation is proposed for industrial properties.

(d) Cultural Use: No mitigation measures are anticipated for cultural resources beyond the engineering design to avoid pole structure placement within the vicinity of previously recorded archaeological sites, and new sites that may be located during future field studies if required.

(e) Agricultural Use: DP&L will use existing public roads and farm roads where available to limit the amount of crop area disturbed during construction. Restoration of disturbed agricultural fields will be accomplished by de-compacting the soil, removing rocks, and re-spreading stockpiled topsoil, as necessary. Any drainage ditches, field drainage tiles, or fencing damaged by construction activities will be repaired. Payment to the property owner may also be provided for as part of easement negotiations.

(f) Recreational Use: No adverse impacts to recreational land use are anticipated, therefore no mitigation is proposed for these properties.

(g) Institutional Use (e.g., schools, hospitals, churches, government facilities, etc.): No adverse impacts to institutional land use are anticipated, therefore no mitigation is proposed for these properties.

(D) PUBLIC INTERACTION INFORMATION

(1) Counties, Townships, Villages, and Cities

Miami County and the townships of Concord and Union are located within 1,000 feet of both the Preferred and Alternate Routes. The City of Troy is within 1,000 feet of the Alternate Route. There are no cities within 1,000 feet of any portion of the Preferred Route. The villages of Ludlow Falls and West Milton are within 1,000 feet of the both the Preferred and Alternate Routes.

(2) Public Officials Contacted

The DP&L public coordination staff has contacted several local officials including the West Milton Mayor, Miami County Commissioners, and township trustees (Concord and Union) to inform them of the Project need and plans. Appendix 6-1 includes the name and addresses of the public officials that have been contacted regarding the application.

(3) Public Information Programs

DP&L held public information meetings on March 25, 2014 at the West Milton-Union High School and July 9, 2014 in the Concord Elementary School located in western Troy. The public was invited to review route maps depicting the Preferred and Alternate Routes as well as information concerning construction and operational requirements. Public notices in local newspapers were developed and published; the notices fully described the Project and met the OPSB regulatory requirements. DP&L and GAI Consultants, Inc. ("GAI") representatives facilitated the informational meetings which were designed in an open house format. The project summary, including a route alternatives map and Project need information, that was made available to the public in the form of handouts are included as Appendix 6-2.

(4) Liability Compensation

DP&L will maintain insurance against claims and liability for personal injury, death, and property damage arising from the operation of the transmission line and facilities. The insurance policy or policies will insure DP&L to the extent of their interests. DP&L maintains excess Commercial General Liability insurance covering indemnity to at least $5,000,000. This insurance is on a per occurrence basis and is established to include automobile and contractual liability.

(5) Public Interest, Convenience, and Necessity

The Project will serve the public interest by helping to ensure that adequate transmission voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory NERC reliability standards. Refer to Section 4906-02 of this Application for a more detailed discussion of the need for the proposed Project.

(6) Tax Revenues

The Preferred and Alternate Routes are located within Miami County and Concord and Union townships and the villages of Ludlow Falls and West Milton. The proposed Project will have a significant positive impact on the local tax base, including local school districts and other taxing

districts that service the area where the proposed transmission line will be located. DP&L will pay property taxes on utility facilities in each township.

Based on 2014 tax rates, the estimated property taxes to be distributed by township (a portion of which includes Miami County) over the first year after the Project are as follows:

Preferred Route	
Union Township	$ 330,177
Concord Township	$ 258,069
Total:	$ 588,247
Alternate Route	
Union Township	$ 345,859
Concord Township	$ 247,779
Total:	$ 593,638

(7) Impact on Regional Development

Impacts on regional development are anticipated to be positive as a result of increased transmission line reliability to residential, commercial, institutional, and industrial users throughout the region. No negative impacts to development are foreseen for this project. Refer to Section 4906-15-02 of this Application for a more detailed discussion of the need for the proposed Project.

(E) HEALTH, SAFETY, AND AESTHETIC INFORMATION

(1) Compliance with Safety Regulations

The construction and operation of the Project will comply with the requirements specified in the NERC 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. DP&L's Safety policies comply with federal, state and local regulations and policies. DP&L's policies are developed by DP&L's management under the guidance of AES Corporation's ("AES") management and board of directors. All parties are responsible to ensure that DP&L's policies meet or exceed the requirements set forth by all of DP&L's regulating entities.

The first priority of all DP&L operating areas is to ensure the safety of all our employees, contractors and the public. Safety takes this priority very seriously and incorporates safety into all aspects of operations. Safety takes precedence over all other utility operations and is listed first amongst the mission and values of AES.

(2) Electric and Magnetic Fields

This section provides electric and magnetic field ("EMF") calculation results for the DP&L West Milton-Eldean 138 kV Transmission Project. Electric and magnetic field magnitudes were calculated for the two representative cross-sections of the transmission line design as shown in the Figure 6A sketch. The first cross-section (left) is the 138 kV circuit in a vertical alternating configuration with 12.47 kV distribution underbuild on a horizontal cross-arm, and the second cross-section (right) is the 138 kV vertical circuit by itself.

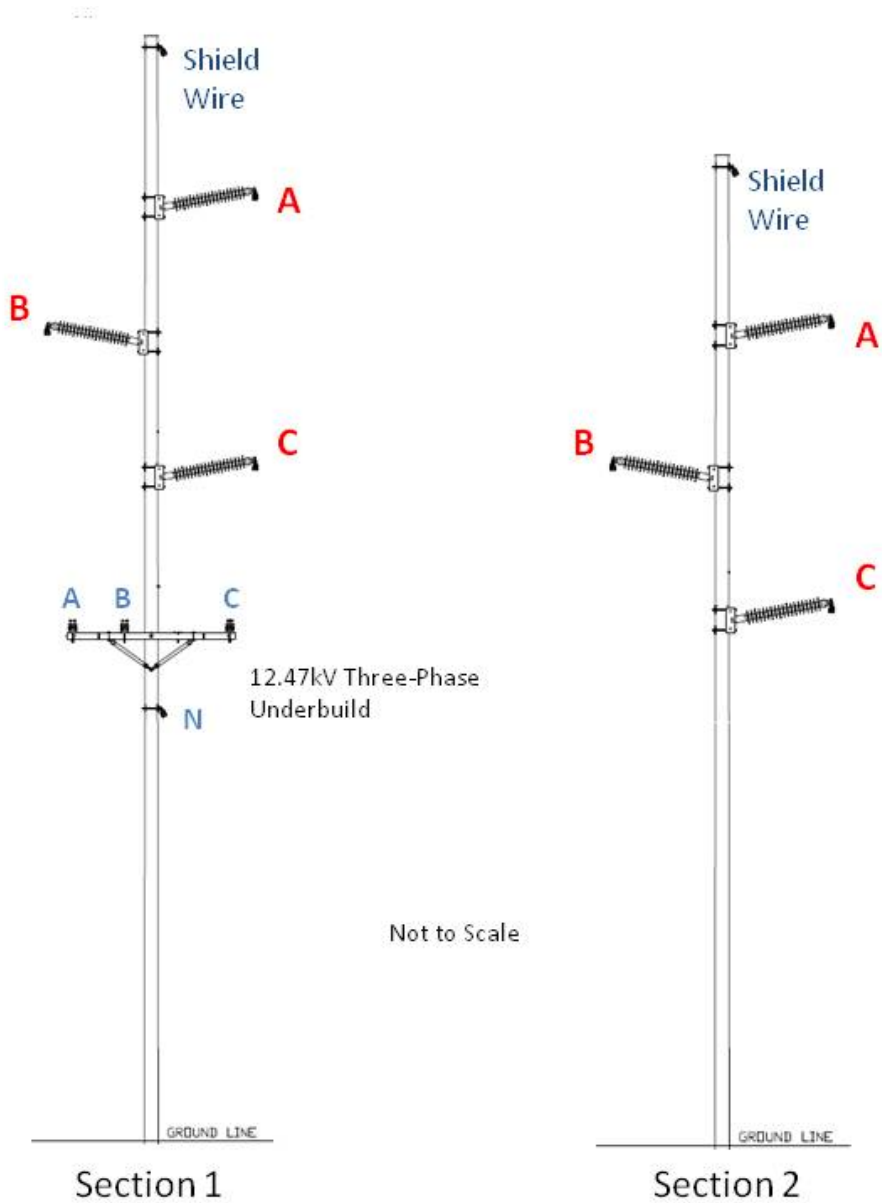


Figure 6A. Two transmission line cross-section models used to calculate electric and magnetic fields.

For both cross-section models, the 138 kV circuit consists of three 1.340 inch diameter 1351.5kcm AAC conductors with a 0.375 inch diameter galvanized steel ground wire at the top of the pole. The 12.47 kV distribution circuit (beneath the 138 kV circuit in the first cross-section only) consists of 0.814 inch diameter 477kcm ACSR conductors—three phase conductors on the cross-arm and a neutral on the steel pole.

The 12.47 kV system is stepped down from 138 kV via delta-wye connected transformers, and thus, the 138 kV circuit is assumed to lead the 12.47 kV circuit by 30 degrees per DP&L.

Calculations described in this report were performed using the Corona and Field Effects program developed by engineers at the Bonneville Power Administration ("BPA"). The BPA program utilizes exact electric and magnetic field solutions for two-dimensional cross-section models that assume infinite straight line conductors at a constant height. The approximate lowest sag height for each cross-section span is used for the calculations to arrive at estimates of worst-case field magnitudes; electric and magnetic field magnitudes generally decrease moving toward the pole structures because of increasing conductor height from the ground.

Table 6-4 lists the coordinates for each of the phase conductors, shield wire, and neutral as modeled in the two representative cross-sections. Dimensions are in feet with horizontal (x) values relative to the pole center line and with conductor heights (y) relative to ground level for the section being modeled based on calculated conductor sag as provided by GAI. Calculations were performed for a 12.47 kV underbuild with a single phase conductor (1A) and also with three phase conductors (1B). Dashes in the table indicate that the conductor is not included in that specific cross-section model.

Table 6-4: Conductor Position Coordinates for each Modeled Cross-Section (Relative to centerline and Ground Level).

Model	138kV Circuit Conductors								12.47kV Underbuild Conductors							
	A phase		B phase		C phase		shield wire		A phase		B phase		C phase		neutral	
	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)	x (ft)	y (ft)
Section 1A	5.33	48.75	-5.33	43.00	5.33	36.83	0.50	63.00	-4.25	26.00	--	--	--	--	0.50	22.17
Section 1B	5.33	48.75	-5.33	43.00	5.33	36.83	0.50	63.00	-4.25	26.00	-1.25	26.00	4.25	26.00	0.50	22.17
Section 2	5.33	39.92	-5.33	34.00	5.33	27.83	0.50	54.42	--	--	--	--	--	--	--	--

Electric and magnetic field magnitudes are calculated for each of the cross-sections at two-foot intervals along paths crossing beneath the line at a height of 3.28 ft (one-meter) aboveground level. The ROW is assumed to be approximately 37.5 feet to either side of the pole center line (x=0); calculations are shown 40 feet to both sides of the center line. Electric and magnetic field results are presented in the next two sections.

(a) Electric Field Strength Results: Electric fields are calculated assuming phase-to-phase voltages at 105% of the 138 kV rating (144.9 kV) for the transmission conductors, and a maximum of 15 kV for distribution circuit. As noted above, the cross-section models use estimated lowest conductor heights for the representative cross-sections as provided by GAI in sag diagrams (attached at the end of this report). Figure 6B shows the calculated root mean square (*rms)*

electric field magnitude as a function of position along paths that cross beneath the lines at a height of 3.28 feet (1m) above ground level.

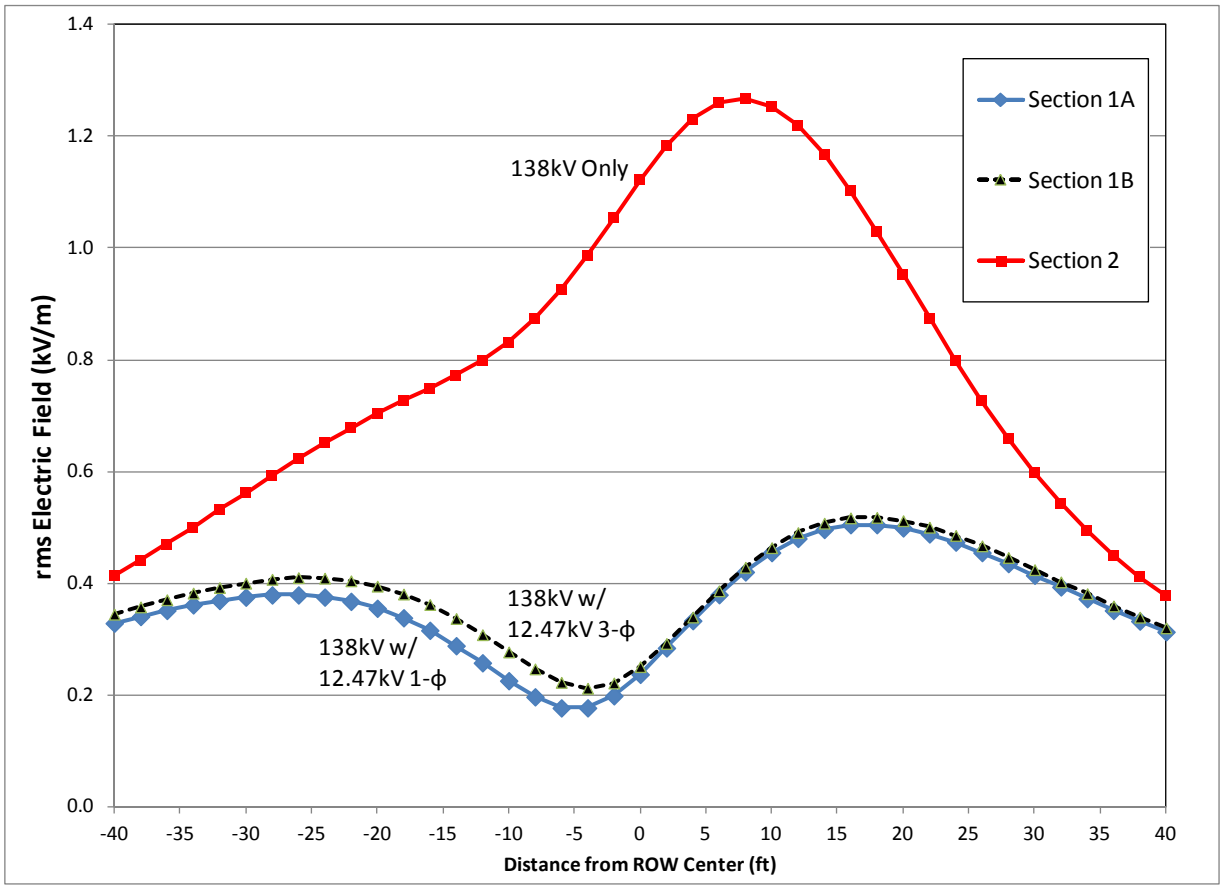


Figure 6B. Calculated rms electric field magnitudes for the three representative cross-sections, at one-meter height.

The largest electric fields occur beneath the 138 kV circuit alone (Section 2 in Figure 6A), with a maximum of 1.3 kV/m. One can see that the electric fields from the 138 kV circuit are shielded to some extent by the underbuild conductors as evidenced by lower electric field peaks with a maximum of approximately 0.5 kilovolts per meter (kV/m) for both the single-phase (1A) and three-phase (1B) underbuild configurations. Electric field calculations results are summarized in Table 6-5 which lists the electric field magnitudes (kV/m) at EROW (both sides) and the maximum beneath the lines.

Table 6-5: Electric and magnetic field results summary listing of the calculated rms field magnitudes; electric fields in kV/m and magnetic fields in units of milligauss (mG) at both sides EROW and maximum beneath the line.

Model		Electric Field (kV/m)	Magnetic Field (mG)		
Cross-Section	Description	105% Nominal Voltage	Summer Normal Load	Short-Term Emergency Load	Winter Normal Load
1A	138kV w/ 1-ph 12.47kV	0.36/0.50/0.33	44/123/54	56/157/67	61/173/74
1B	138kV w/ 3-ph 12.47kV	0.34/0.52/0.34	46/125/57	57/158/71	63/175/78
2	138kV alone	0.44/1.27/0.41	50/138/57	63/171/71	86/234/96
		EROW/MAX/EROW	EROW/MAX/EROW	EROW/MAX/EROW	EROW/MAX/EROW

(b) Magnetic Field Strength Results: Magnetic field calculations were performed for the two cross-sections models under three load scenarios: summer normal, short-term emergency, and winter normal. The power flow ratings for these three load scenarios are listed in Table 6-6. Balanced three-phase currents are assumed for all calculations except for the single-phase underbuild scenario (1A) in which all single-phase current is assumed to return on the neutral conductor.

Table 6-6. Circuit Power Ratings for Three Load Scenarios Used For Magnetic Field Calculations

Load Condition	138kV Circuit	12.47kV Circuit
Summer Normal	307 MVA	13 MVA
Short-Term Emergency	382 MVA	17 MVA
Winter Normal	419 MVA	19 MVA

Figures 6C to 6E show calculated magnetic fields from the two cross-section models for the Table 6-6 load scenarios. Magnetic fields are largest with the 138 kV circuit by itself with the larger phase-to-phase spacing and lower height without the underbuild. The 138 kV circuit load scenarios of 307, 382, and 419 MVA correspond to 1284, 1598, and 1753 amperes of three-phase load current, respectively, while the 13, 17, and 19MVA scenarios at 12.47 kV correspond to 602, 787, and 880 amperes of three-phase load.

Magnetic field results from the two cross-section models for both sides of the ROW (EROW) and maximum values beneath the lines are summarized in Table 6-5 for the three load scenarios.

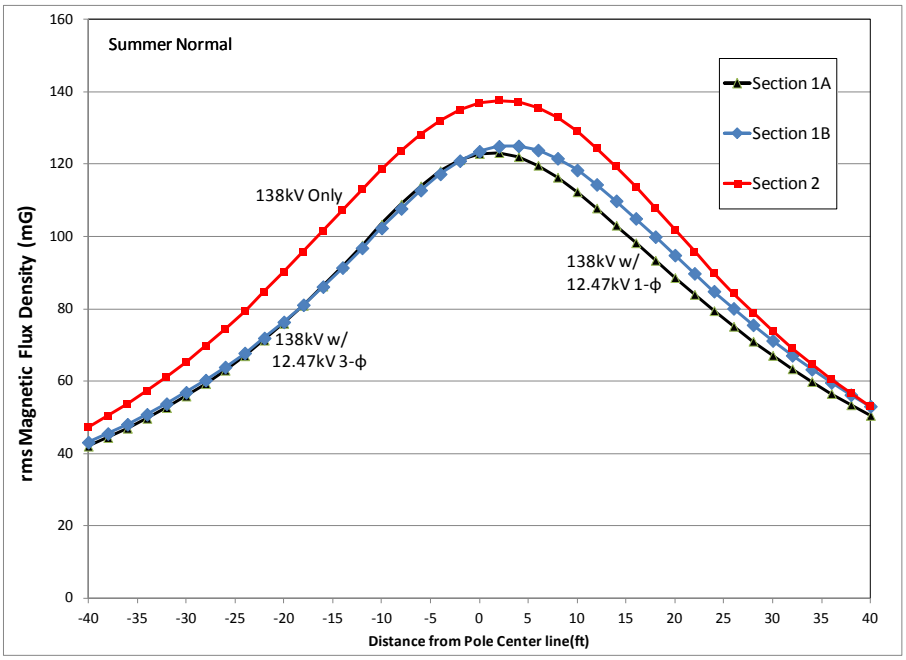


Figure 6C. Calculated magnetic fields from three cross-sections under the summer normal load scenario

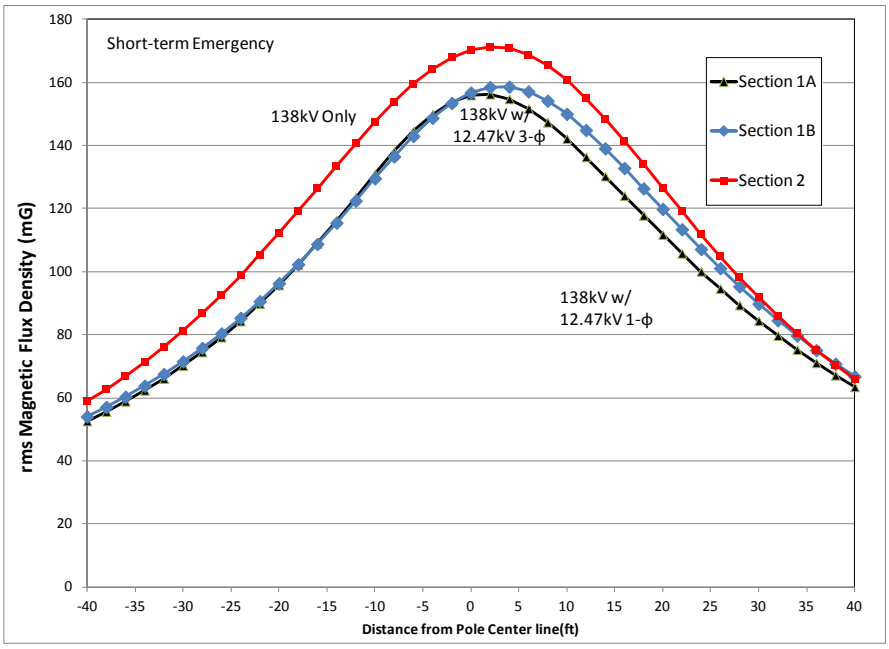


Figure 6D. Calculated magnetic fields from three cross-sections under short-term emergency load scenario

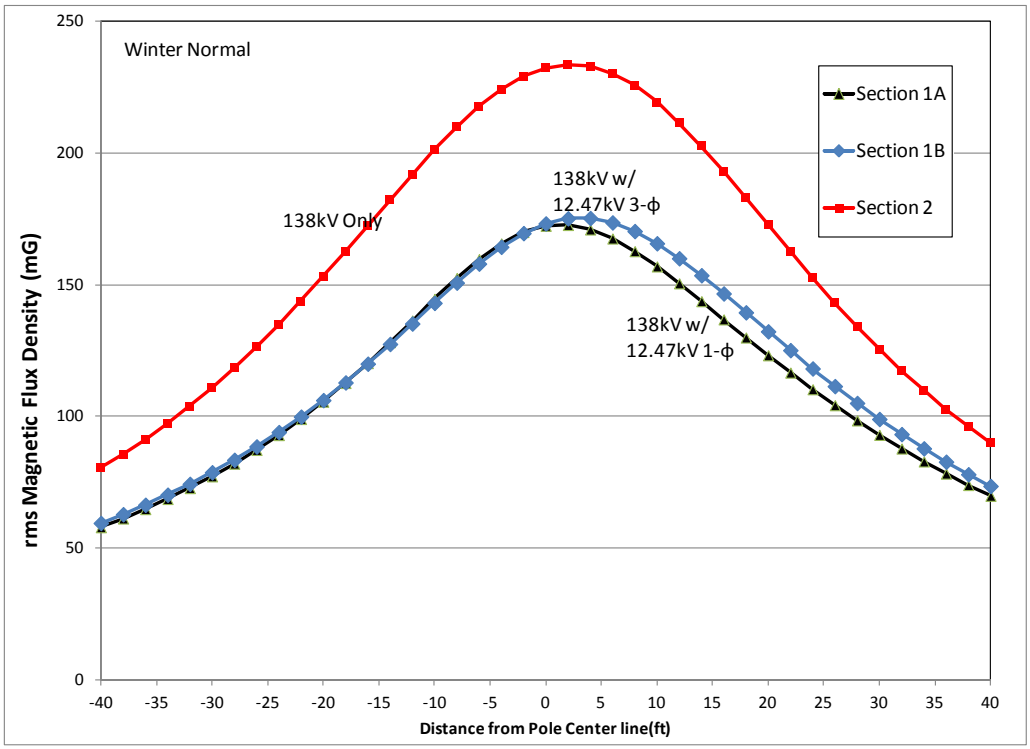


Figure 6E. Calculated magnetic fields from three cross-sections under the winter normal load scenario.

(c) Current State of EMF Knowledge: Humans are all continually exposed to a wide variety of natural and man-made electric and magnetic fields. They are generated anywhere there is a flow of electricity including appliances and power equipment. Electric fields are associated with the voltage of a source. Magnetic fields are associated with the flow of current in a wire. The strength of these fields decreases rapidly with distance from the source. Electricity is a beneficial part of our daily lives, but whenever electricity is generated, transmitted, or used, electric and magnetic fields are created. A large volume of research and analysis on the question of health effects related to electric and magnetic fields ("EMF") exposure has been generated over many decades (with an increase of interest over the past 25 years).

Developments

In 1992, the U.S. Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program ("EMF-RAPID") in the Energy Policy Act (PL 102-486). In the RAPID program, the National Institute of Environmental Health Sciences ("NIEHS"), National

Institutes of Health ("NIH") and the Department of Energy ("DOE") were designated to fund, direct, and manage research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to power-line EMF.

Solid and relevant EMF results were generally obtained under the research supported by the NIEHS (through the EMF-RAPID program). The NIEHS program supported researchers in the task of determining what, if any, aspects of EMF interactions with biological systems were (1) real and reproducible, and (2) had the potential to increase the risk of cancer. In 1999 the NIEHS submitted its report to the U.S. Congress: "NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields." The report concluded the following:

> *"The scientific evidence suggesting that extremely low frequency fields (ELF)-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults….In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies….No indication of increased leukemias in animals have been observed…..virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between ELF-EMF at environmental levels and changes in biological function or disease status. The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern….The NIEHS does not believe that other cancers or non-cancer outcomes provide sufficient evidence of a risk to currently warrant concern."* (NIEHS, 1999, 9-10)

<u>Sources of Additional Information</u>

The following federal government agencies' websites provide additional information on EMF:

1. Centers for Disease Control and Prevention / National Institute of Occupational Safety and Health: http://www.cdc.gov/niosh/topics/emf/
2. National Institute of Environmental Health Sciences / National Institute of Health: http://www.niehs.nih.gov/health/topics/agents/emf/

(d) Company's Line Design Considerations: DP&L designs its transmission line facilities according to National Electrical Safety Code specifications, engineering parameters and cost. DP&L proposes to install the 138 kV transmission line primarily on wood tangent structures supported on horizontal post insulators. Reverse phasing of circuits is not an option for this Project since it consists of constructing a single circuit. The sections of transmission line that will have distribution lines underbuild is estimated to have lower EMF strengths.

(e) Procedures for Addressing Public Inquiries Regarding EMF: Information on electric and magnetic fields is available on DP&L's website (http://www.dpandl.com/education/electricity-information/electric-and-magnetic-fields/). It describes the basics of electric fields and magnetic fields, scientific research efforts, and DP&L's commitment to safety and sharing information on any new research findings on this topic.

(3) Aesthetic Impacts

Direct and indirect visual resource impacts are difficult to distinguish because the effects occur at the same time and place but simultaneously occur at a further removed distance (e.g., impacts as a result of views from sensitive recreation area and scenic quality impacts on vegetation and landform). Impacts may be considered short-term and long-term.

The proposed Project has the potential to result in three basic types of impacts to visual resources. Construction impacts are considered temporary, and result from the presence of construction vehicles and equipment that cause ground disturbance, equipment structure contrasts, and air emissions. Operations and maintenance impacts may be short-term or long-term. Maintenance activities are also considered short-term (and periodic), and are also related to the presence of construction vehicles and equipment and associated ground and air disturbances. Operations impacts are primarily associated with the long-term use and presence of the Project (transmission lines, structures, and access roads) in the landscape. Visual contrast, including the effects of light and glare, are produced during construction, operations, and maintenance of the Project.

The general types of impacts caused by the construction, operations, and maintenance of the Project include:

- Introduction of visually dominant transmission structures (wood single pole) that contrast with the developed or natural landscape;
- Potential glare created by the presence of the conductors (wires) and associated marker balls (if used for avian mitigation or air traffic safety);
- Landform and vegetation contrasts (grading and vegetation removal) caused by the construction of access roads or road improvements, pulling and tensioning sites, work areas, and laydown areas; and
- Structure contrast caused by construction equipment, helicopter conductor stringing, and staging areas.

(a) Views of the Proposed Facility: The viewsheds of both the Preferred and Alternate Routes from residences, through-travelers, and recreational users may be altered by the transmission line. Local residents and commuters will likely be most sensitive to the visual impacts resulting from the Project. The primary vantage points would be along State Route 55 where the Common Route runs adjacent to the roadway for 2.9 miles and the Preferred Route extends another 0.2 miles beyond Harter Road, in addition to Forest Hill Road and Davis Road. State Route 55 is also where the Common Route crosses the Stillwater River which is part of a registered State Scenic River System (ODNR, 2014). Visual impacts along State Route 55 would be lessened because there are existing distribution lines and communication cables in the road ROW.

The Preferred and Alternate Routes also cross State Route 41, State Route 48, State Route 718, and State Route 571. Visual impacts may be less significant in these locations because the viewer would be crossing under the transmission lines as opposed to traveling parallel to them, thus reducing the overall duration of viewing. Also, existing utility lines are present in many of these locations.

(b) Structure Design Features: The use of a single pole design as opposed to a lattice tower with a larger footprint will reduce visual impacts. Additionally, much of the Proposed and Alternate Routes are conterminous with existing distribution lines and communication cables. DP&L proposes to relocate those distribution lines it owns onto the new transmission line poles to minimize the number of pole structures within the utility ROW. DP&L would coordinate with owners of other distribution lines and communication cables to determine the feasibility of utilizing the same approach where such utility lines are owned and maintained by others.

(c) Facility Effect of the Site and Surrounding Area: As described above, the proposed Project would increase the number of structures and conductors to rural agricultural landscape. It will be visible from public roads and nearby residences. Vegetation management required for safe operation would likely have minimal impacts on aesthetics because both Routes are only about 4% forested.

(d) Visual Impact Minimization: The degree of visual minimization of the Project is largely limited by engineering constraints and uniform elevations in the area. As discussed above, visual impacts have been minimized through the use of single tangent wooden poles, co-locating with existing transmission line corridors when practical, co-locating adjacent to road ROW and siting the project in open land where the need for vegetation management is minimal. Additionally,

angle structures that are required at turns or bends in the transmission line alignment will be single poles with foundations where feasible. Longer spans will be incorporated in the design as well when cost-effective and technically feasible.

(4) Estimate of Radio and Television Interference

Radio interference ("RI") can be experienced in the AM broadcast ban (535-1605 kHz) and FM band (88-108 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 lines planned for this Project. Gap-type discharge such as 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.

DPL does not have any formal policy for radio & television interference other than investigation of any complaints. With the advent of digital television broadcasts, complaints of interference from electric lines are very rare.

(F) IMPACT ON CULTURAL RESOURCES

(1) Cultural Resources Studies and Agency Correspondence

POWER Engineers conducted a cultural resources records review of online resources from the Ohio Historic Preservation Office ("OHPO"). The purpose of this review was to identify known cultural resources in the vicinity of the Project so that impacts to these resources can be minimized. Cultural resources include archaeological and historical sites, such as cemeteries, buildings, structures, objects, and districts. The literature review included the following resources consulted online:

1. Archaeological Atlas of Ohio, William C. Mills, 1915
2. United States Geological Survey (USGS) 7.5' series topographic maps
3. Ohio Archaeological Inventory files ("OAI")
4. Ohio Historic Inventory files ("OHI")
5. NRHP on OHI files
6. Determinations of Eligibility files (DOE on OHI)

7. State Historic Preservation Office Cultural Resource Management/contract archaeology files (OHI)

Results of the records review indicate that there are several prehistoric archaeological sites near the project corridor.

Preferred Route: Seven prehistoric archaeological sites and one historical archaeological site are located within 1,000 feet of the Preferred Route. All seven prehistoric sites are near where State Route 55 crosses the Stillwater River (MI0072, MI0073, MI0074, MI0075, MI0076, MI0077, and MI0078). The one historic archaeological site (MI0127) is located near the West Milton Substation.

Two historic structures are listed on the OHI within 1,000 feet of the Preferred Route. One of these structures (MIA0137801) is thought to be State Route 55 itself, or a demolished structure formerly adjacent to the highway, as it is identified as “transportation” for historical use. The other structure (MIA0069201) is located approximately 611 feet south of the Preferred Route near the Stillwater River crossing. This structure was constructed circa 1880 in an Italianate architectural style. No NRHP-listed properties have been recorded within 1,000 feet of the Preferred Route.

Alternate Route: Eleven prehistoric archeological sites are recorded in the OAI within 1,000 feet of the Alternate Route. Seven of these sites are the same as those listed for the Preferred Route as they are located on the common route on State Route 55 east of the Stillwater River. One of the 11 sites is located near Eldean Road (MI0204); two sites are located west of Washington Road (MI0191 and MI0192); one site (MI0014) is near South Jay Road near the village of West Milton. Two OHI prehistoric archaeological sites are recorded within 1,000 feet of the Alternate Route. One of these sites is the same as the OAI site (MI0204) near Eldean Road. The second site (MI0127) is recorded at or near the existing West Milton Substation.

Four historic structures are listed on the OHI within 1,000 feet of the Alternate Route. These include MIA0151905 which is, according to OHPO records, located near Eldean Road as a single dwelling structure and barn and was constructed circa 1880 in a colonial revival style. The other listing (MIA0026201) on South Jay Road is a single dwelling structure with agricultural buildings and was constructed circa 1815 in a vernacular architectural style. The third is MIA0069201 located 611 feet south of the Alternate Route near the Stillwater River, as described above for the Preferred Route. The fourth is State Route 55 itself as mentioned above (MIA0137801). No NRHP-listed properties have been recorded within 1,000 feet of the Alternate Route.

There is one cemetery listed on the OHI within 1,000 feet of the Project. The West Branch Friends Cemetery is located approximately 654 feet south of the existing West Milton Substation.

Four Phase 1 Cultural Resource Management Surveys are listed within a study area of 0.5-mile around the Project centerline. These surveys were performed for the following projects: the West Milton Substation Upgrade (1990); the Transportation Project No. MIA-55-4.15 (1979); the Proposed 5.67-Mile Eldean 138 kV Transmission Project (1998); and the Proposed West Milton Low-Head Dam Removal and Stillwater River Restoration Project (2011).

Additional details regarding Cultural Resources may be found in the Cultural Resource Management Literature Review Report developed by POWER Engineers and being provided to the Ohio Power Siting Board ("Board") under separate cover.

2) Construction Impacts

No direct impacts to above ground cultural resources (i.e., cemeteries or historic structures) are anticipated from Project construction. Indirect impacts may result from visual effects. These potential effects are described in Section 4906-15-06(E)(3). Most of the Project Study Area lies within previously disturbed contexts including road ROW, existing utility ROW, and cultivated agricultural fields. The proposed Project has the potential to impact unknown prehistoric archaeological sites.

3) Operation and Maintenance Impacts

Impacts resulting from operation and maintenance of the proposed transmission line are not anticipated.

4) Mitigation Procedures

As described above, the proposed Project is not anticipated to directly impact known cultural resources within the study area, and no specific mitigation measures are proposed at this time. Due to the potential for impacts to unknown prehistoric archaeological sites, POWER Engineers recommends that steps be taken to initiate a Phase 1 level archaeological investigation prior to Project actions when risks cannot be avoided through Project engineering design (pole structure placement to avoid ground disturbance at previously identified archaeological sites). The OHPO will be consulted on the need for a Phase I cultural resources survey.

(G) NOISE EMISSIONS

Noise is generally defined as unwanted sound. Noise can impact the human environment by interfering with speech, interfering with sleep, causing hearing loss, and causing physical or mental stress. Since a person's response to noise is subjective, it can vary from person to person. Levels that are considered acceptable or unacceptable are generally associated with various environments.

(1) Construction

Construction noise can be created from on-site and off-site sources. On-site noise sources would principally consist of the operation of heavy-duty diesel and gasoline-powered construction equipment. Off-site noise sources would include vehicles commuting to and from the job site, as well as from trucks transporting material to the staging areas or construction ROW. The following site and ground disturbing construction activities would be required to construct the new transmission line; 1) centerline surveyed and staked; 2) existing access roads improved only where necessary; 3) work areas cleared as needed; 4) materials distributed along centerline; 5) pole holes and or foundations installed, and poles erected; 6) ground wire, conductors installed; and 7) the site would be cleaned-up and reclaimed.

(a) Dynamiting or Blasting Activities: None anticipated.

(b) Operation of Earth Moving and Excavating Equipment: Noise levels from the equipment at distances of 50 feet are shown in Table 6-7. The maximum intermittent land based construction noise levels would range from approximately 80 to 90 dB(A) at 50 feet for supporting structure assembly and tamping operations. Direct noise impacts would result from construction activities occurring adjacent to sensitive receptors, such as houses and churches. However, this noise would be short-term, occurring mostly during daylight hours. It should be noted that noise levels are calculated based on the assumption that noise from a localized source is reduced by approximately 6 dB(A) with each doubling of distance from the source of noise. Noise impacts resulting from construction will be temporary. The anticipated duration of the entire project is approximately 14 months, with noise-generating activities during construction limited to one to two weeks maximum at any particular location.

Table 6-7: Typical Construction Noise Sources

Construction Activity	Average Construction Activity Sound Level at 50 Feet from Source (dBA)
Compactors (Rollers)	74
Front Loaders	78
Backhoes	83
Tractors	86
Scrapers, Graders	87
Pavers	87
Trucks	88
Concrete Mixers	81
Concrete Pumps	82
Cranes (Moveable)	81
Cranes (Derrick)	87
Pumps	70
Generators	77
Compressors	81
Pneumatic Wrenches	86
Jack Hammers and Rock Drills	89
Pile Drivers (Peak)	100
Vibrators	75
Saws	77
Compactors (Rollers)	74
Front Loaders	78

Note: Sound level with all pertinent equipment operating (Bolt et al. 1971)

In comparison to these construction noise levels, the following are some typical levels for noise sources (standing adjacent to these sources) in a residential environment[1]:

- Refrigerator 42 dBA
- Microwave 57 dBA
- Kitchen Exhaust Fan 70 dBA
- Hairdryer 87 dBA
- Clothes Washer 67 dBA

[1] Noise Pollution Clearinghouse Online Library, Typical Noise levels, www.nonoise.org.

- Lawnmower 91 dBA
- Circular Saw 102 dBA

(c) Driving of Piles: None anticipated.

(d) Erection of Structures: Structures will be erected by vehicle-mounted cranes.

(e) Truck Traffic: Truck traffic is anticipated to be limited to construction equipment access and material delivery.

(f) Installation of Equipment: The equipment will be installed using standard practices and equipment.

(2) Operation and Maintenance

Power lines can generate a small amount of sound energy. The audible noise from line sources is composed of two components:

1. A broadband (random) component characterized as having high frequency content (different from more common environmental noises).
2. Pure tone (hum) components, most noticeably second and fourth harmonics of the power frequency are superimposed on the broadband noise.

No significant noise impacts are anticipated from the operation of the proposed transmission line. Noise impacts from maintenance operations will primarily related to vegetation management within the ROW and infrequent repairs to the structures, insulators, and conductors. Vegetation management activities will be short in duration and typically occur on a 5-year cycle. Overall, noise impacts generated by operation and maintenance activities are not anticipated to be significant.

(3) Mitigation Procedures

As the primary source of noise for the proposed Project will be a result of construction activities, emphasis will be placed upon maintaining construction equipment in proper working condition with functioning mufflers and performing construction activities during daylight hours. No additional mitigation is planned beyond what is described here.

(H) OTHER SIGNIFICANT ISSUES

There are no other significant socioeconomic or land use impact issues anticipated beyond those addressed elsewhere in this Application.

(I) REFERENCES

Bolt, Beranek & Newman (Prepared under contract for the EPA), Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, December 31, 1971.

Jin, S., Yang, L., Danielson, P., Homer, C., Fry, J., and Xian, G. 2013. A comprehensive change detection method for updating the National Land Cover Database to circa 2011. *Remote Sensing of Environment*, 132: 159 – 175.

Ohio Department of Natural Resources – Division of Watercraft, 2014. List of Ohio's Scenic Rivers. Available from http://watercraft.ohiodnr.gov/scenicrivers. (accessed 10/22/14)

U.S. Census Bureau; generated by Todd Chadwell; using American FactFinder; http://factfinder2.census.gov; (25 September 2014)

Appendix 6-1

Local Public Officials Served Copy of Certificate Application

APPENDIX 6-1

Public Officials Contacted and Officials to be Served
Copy of Certificate Application

Village of West Milton
Jason Tinnerman
Mayor
701 S. Miami Street
West Milton, OH 45383

Miami County Board of Commissioners

Ron Widener
Commissioner
201 West Main St.
Troy, OH 45373

Jack Evans
Commissioner
201 West Main St.
Troy, OH 45373

John W. O'Brien
Commissioner
201 West Main St.
Troy, OH 45373

Concord Township

Thomas N. Mercer
2625 Seneca Drive
Troy, OH 45373
937-308-2591

Don Pence
2751 Meadowpoint Drive
Troy, Ohio 45373
937-216-4211

William B. Whidden
2365 Black Oak Dr.
Troy, Ohio 45373
937-335-0431

APPENDIX 6-1 (continued)

Union Township

Jim L. Albaugh
Trustee
9497 Markley Road
Laura, Ohio 45337

William G. O'Brien
Trustee
9497 Markley Road
Laura, Ohio 45337

Philip S. Mote
Trustee
9497 Markley Road
Laura, Ohio 45337

Marjorie D. Coate
Trustee
9497 Markley Road
Laura, Ohio 45337

Appendix 6-2
Public Information Meetings

Dayton Power & Light's West Milton to Eldean 138kV Transmission Line Project

The Dayton Power and Light Company (DP&L) has plans to strengthen the transmission system within Miami County by proposing the construction of a new 17-mile, 138,000-volt (138 kV) transmission line from the existing West Milton Substation to the existing Eldean Substation located northwest of Troy, Ohio.

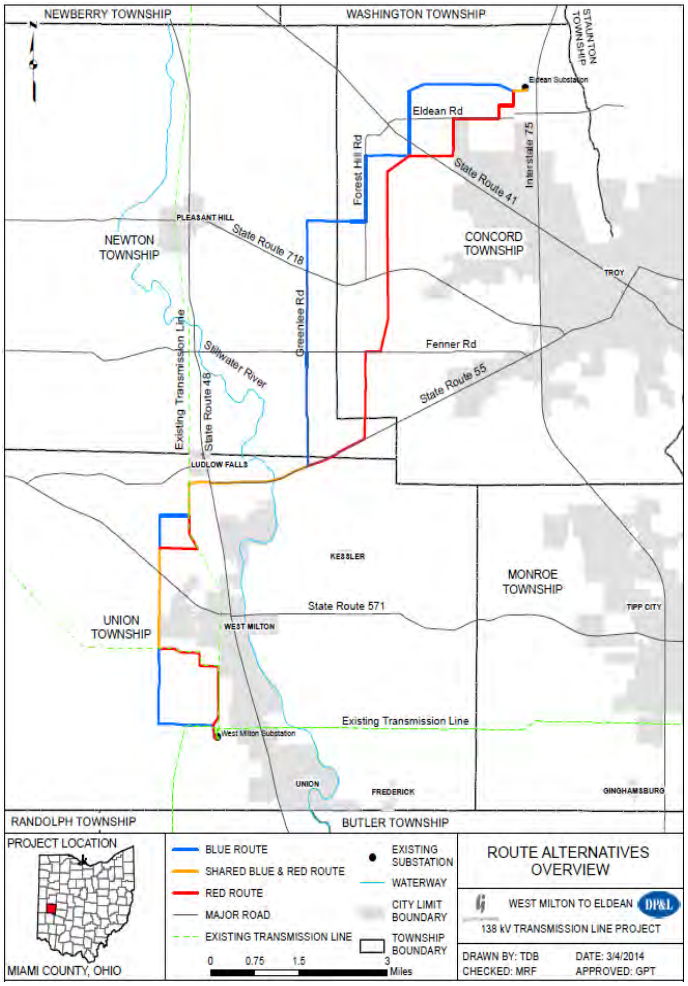
The proposed new 138 kV line will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory Federal Energy Regulatory Commission (FERC)/North American Electric Reliability Corporation (NERC) reliability standards. The new line will improve service reliability to the customers in the area.

DP&L has extensively studied the general area between the two substations to identify multiple route options for the transmission line in an effort to minimize any impacts to sensitive areas and land uses. Based on the study's preliminary results, DP&L has identified the transmission line routes that are shown on the map.

These routes under consideration largely follow road right-of-way (often where electric distribution lines already exist) and DP&L's existing transmission line right-of-way (north and west of West Milton). The proposed routes were also designed to align with property lines. It is anticipated that the new line will be installed on single wood poles, with steel poles at select locations, averaging 65-90 feet in height.

The Ohio Power Siting Board (OPSB) is responsible for reviewing information for the project, including public comments and input, and determining whether to issue a Certificate of Environmental Compatibility and Public Need approving the project. DP&L plans to file an application with the OPSB in mid 2014 for the board's review and approval of the transmission line siting. The application will include a preferred and alternate route for most sections of the project area. If the application is approved by the OPSB, construction of the transmission line could begin in 2017.

Public comments will be accepted and considered by DP&L staff as part of the process of further evaluating the proposed routes. Interested parties may also send written comments or questions to: The Dayton Power and Light Company, ATTN: W. Milton-Eldean Project Team, 1900 Dryden Road, Area 420, Dayton, Ohio 45439, or request information or comment by leaving a message at 937-331-4314.



Estimated Project Schedule

2014	March - Open House Meeting
	April – Field Inspections
	June – OPSB Application
	TBD – OPSB Public Hearings
	TBD – OPSB Approval
2015	Easement Procurement
2016	Engineering & Material Procurement
2017	Construction
2018	Project In-Service

Dayton Power & Light's West Milton to Eldean 138kV Transmission Line Project

Points of Interest

Ohio Power Siting Board (OPSB) Process

The OPSB is a separate entity within the Public Utilities Commission of Ohio, which is authorized to review and approve applications to build major utility facilities. Before filing an application to build a facility, the company is required to hold a public informational meeting, during which company representatives inform stakeholders about the company's plans and gather public input for consideration in developing the application.

Once the company submits its application for the new facility, the OPSB staff reviews it for completeness. After OPSB staff has determined the application to be complete, legal notices will be published in newspapers in those areas impacted by the proposed facility. The legal notices will include a listing of area libraries where a copy of the application may be viewed. The application can also be viewed online by going to the OPSB Web site. Interested persons are encouraged to submit written comments to the Docketing Division, 180 E. Broad Street, 11th floor, Columbus, OH 43215.

OPSB staff will make a formal request for comments from other agencies and parties, and then make a recommendation to the full Board. After the OPSB staff makes its recommendation, formal public hearings are held. These hearings enable citizens, interest groups and governmental entities to present testimony.

The OPSB can be reached at:

- Phone: 1-866-270-6772
- Mailing Address: The Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215
- Website: http://www.opsb.ohio.gov/opsb

Field Inspections

Following the informational meeting, field inspections of the corridors will begin. The OPSB application process requires these inspections as part of the research of socioeconomic and ecological land use impacts. Property owners will be contacted before inspections occur to coordinate access where needed. Inspections are performed on foot and are non-invasive; however some minor random soil sampling will be taken.

Easement Procurement

Easement procurement is scheduled to take place in 2015, once a route has been approved. A representative will contact each affected property owner and explain specifically where the line will go and request an easement. Compensation is based on market value of the interest being purchased. In most cases, the landowner will be able to continue to use the property beneath the line in any manner not inconsistent with the operation of the transmission line. The Company will seek the right to trim trees and other vegetation from the area beneath and surrounding the line.

Construction

Interruption of electric service is not anticipated during the construction of the transmission line. In the event an outage is required, it would typically be on an individual basis to transfer facilities from old to new poles and of very short duration. We would notify affected customers beforehand.

Property/Crop Damage

While trees will need to be removed from the easement area, DP&L will work with property owners to restore land and landscaping back to their original condition following construction activities. Compensation will be made for lost crops resulting from related project activities.

Dayton Power & Light's West Milton to Eldean 138kV Transmission Line Project

The Dayton Power and Light Company (DP&L) has plans to strengthen the transmission system within Miami County by proposing the construction of a new 17-mile, 138,000-volt (138 kV) transmission line from the existing West Milton Substation to the existing Eldean Substation located northwest of Troy, Ohio.

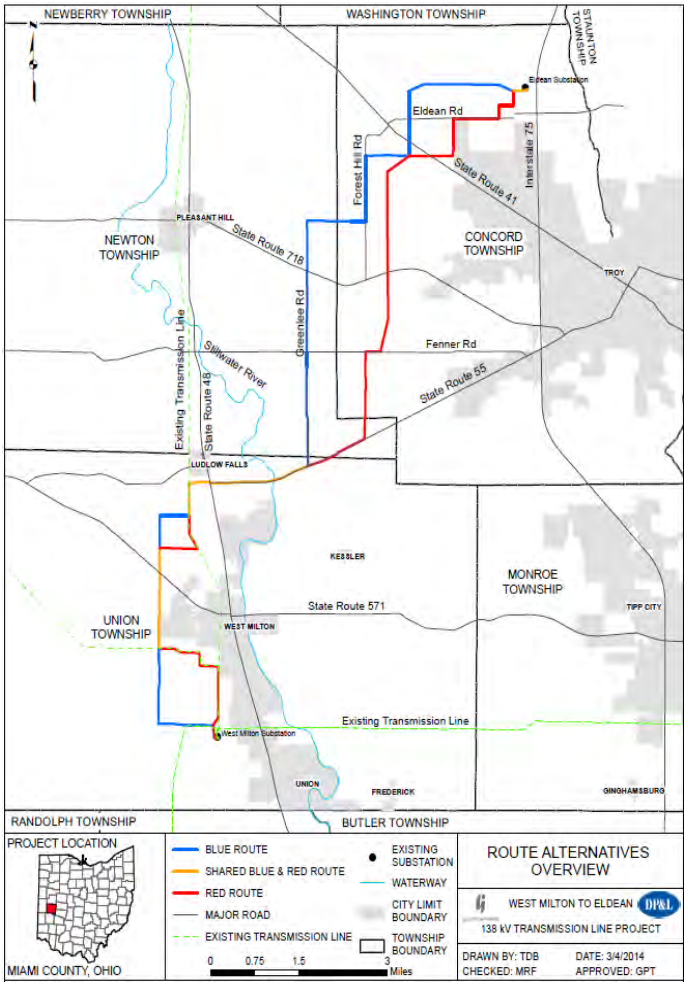
The proposed new 138 kV line will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory Federal Energy Regulatory Commission (FERC)/North American Electric Reliability Corporation (NERC) reliability standards. The new line will improve service reliability to the customers in the area.

DP&L has extensively studied the general area between the two substations to identify multiple route options for the transmission line in an effort to minimize any impacts to sensitive areas and land uses. Based on the study's preliminary results, DP&L has identified the transmission line routes that are shown on the map.

These routes under consideration largely follow road right-of-way (often where electric distribution lines already exist) and DP&L's existing transmission line right-of-way (north and west of West Milton). The proposed routes were also designed to align with property lines. It is anticipated that the new line will be installed on single wood poles, with steel poles at select locations, averaging 65-90 feet in height.

The Ohio Power Siting Board (OPSB) is responsible for reviewing information for the project, including public comments and input, and determining whether to issue a Certificate of Environmental Compatibility and Public Need approving the project. DP&L plans to file an application with the OPSB in mid 2014 for the board's review and approval of the transmission line siting. The application will include a preferred and alternate route for most sections of the project area. If the application is approved by the OPSB, construction of the transmission line could begin in 2017.

Public comments will be accepted and considered by DP&L staff as part of the process of further evaluating the proposed routes. Interested parties may also send written comments or questions to: The Dayton Power and Light Company, ATTN: W. Milton-Eldean Project Team, 1900 Dryden Road, Area 420, Dayton, Ohio 45439, or request information or comment by leaving a message at 937-331-4314.



Estimated Project Schedule

2014	March - Open House Meeting
	April – Field Inspections
	June – OPSB Application
	TBD – OPSB Public Hearings
	TBD – OPSB Approval
2015	Easement Procurement
2016	Engineering & Material Procurement
2017	Construction
2018	Project In-Service

Dayton Power & Light's West Milton to Eldean 138kV Transmission Line Project

Points of Interest

Estimated Project Schedule

2014 July - Open House Meeting
August – Field Inspections
September – OPSB Application
TBD – OPSB Public Hearings
TBD – OPSB Approval
2015 Easement Procurement Start
2016 Engineering & Material Procurement
2017 Construction
2018 Project In-Service

Ohio Power Siting Board (OPSB) Process

The OPSB is a separate entity within the Public Utilities Commission of Ohio, which is authorized to review and approve applications to build major utility facilities. Before filing an application to build a facility, the company is required to hold a public informational meeting, during which company representatives inform stakeholders about the company's plans and gather public input for consideration in developing the application.

Once the company submits its application for the new facility, the OPSB staff reviews it for completeness. After OPSB staff has determined the application to be complete, legal notices will be published in newspapers in those areas impacted by the proposed facility. The legal notices will include a listing of area libraries where a copy of the application may be viewed. The application can also be viewed online by going to the OPSB Web site. Interested persons are encouraged to submit written comments to the Docketing Division, 180 E. Broad Street, 11th floor, Columbus, OH 43215. DP&L's case number for the project is 14-0469-EL-BTX

OPSB staff will make a formal request for comments from other agencies and parties, and then make a recommendation to the full Board. After the OPSB staff makes its recommendation, formal public hearings are held. These hearings enable citizens, interest groups and governmental entities to present testimony.

The OPSB can be reached at:

- Phone: 1-866-270-6772
- Mailing Address: The Ohio Power Siting Board
  180 East Broad Street
  Columbus, Ohio 43215
- Website: http://www.opsb.ohio.gov/opsb

Field Inspections

Following the informational meeting, field inspections of the corridors will begin. The OPSB application process requires these inspections as part of the research of socioeconomic and ecological land use impacts. Property owners will be contacted before inspections occur to coordinate access where needed. Inspections are performed on foot and are non-invasive; however some minor random soil sampling will be taken.

Easement Procurement

Easement procurement is scheduled to start in 2015, once a route has been approved. A representative will contact each affected property owner and explain specifically where the line will go and request an easement. Compensation is based on market value of the interest being purchased. In most cases, the landowner will be able to continue to use the property beneath the line in any manner not inconsistent with the operation of the transmission line. The Company will seek the right to trim trees and other vegetation from the area beneath and surrounding the line.

Construction

Interruption of electric service is not anticipated during the construction of the transmission line. In the event an outage is required, it would typically be on an individual basis to transfer facilities from old to new poles and of very short duration. We would notify affected customers beforehand.

Property/Crop Damage

While trees will need to be removed from the easement area, DP&L will work with property owners to restore land and landscaping back to their original condition following construction activities. Compensation will be made for lost crops resulting from related project activities.

Notice of Public Information Meeting for Proposed Major Utility Facility

The Dayton Power and Light Company (DP&L) invites residents of Miami County and other interested members of the public to attend an informational open house to discuss its proposed West Milton-Eldean Transmission Line Project---a new 17-mile, 138,000-volt (138 kV) transmission line from the existing West Milton Substation to the existing Eldean Substation located northwest of Troy, Ohio.

The public informational open house will be held from 6 to 8 PM, Wednesday, July 9, in the Gymnasium at Concord Elementary School, 3145 State Route 718, Troy, Ohio 45373.

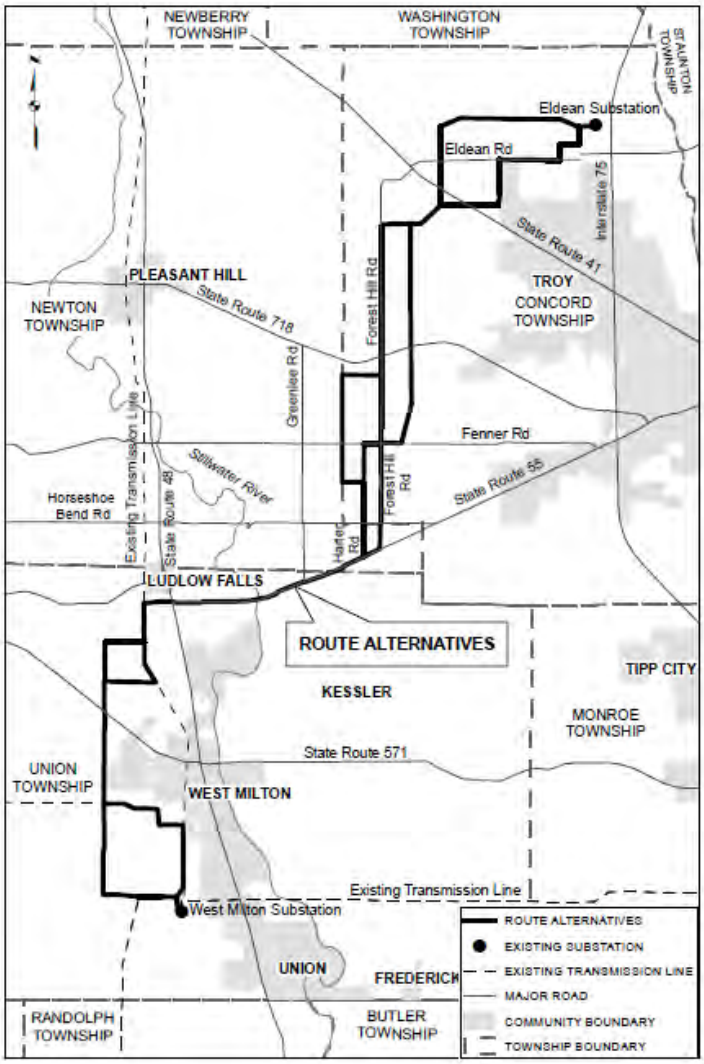
The proposed new 138 kV line will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory Federal Energy Regulatory Commission (FERC)/North American Electric Reliability Corporation (NERC) reliability standards. The new line will improve service reliability to the customers in the area.

DP&L has extensively studied the general area between the two substations to identify multiple route options for the transmission line in an effort to minimize any impacts to sensitive areas and land uses. Based on the study's preliminary results, DP&L has identified the transmission line routes that are shown on the map.

These routes under consideration largely follow road right-of-way (often where electric distribution lines already exist) and DP&L's existing transmission line right-of-way (south and west of West Milton). The proposed routes were also designed to align with property lines where feasible. It is anticipated that the new line will be installed on single wood poles, with steel poles at select locations, averaging 65-90 feet in height.

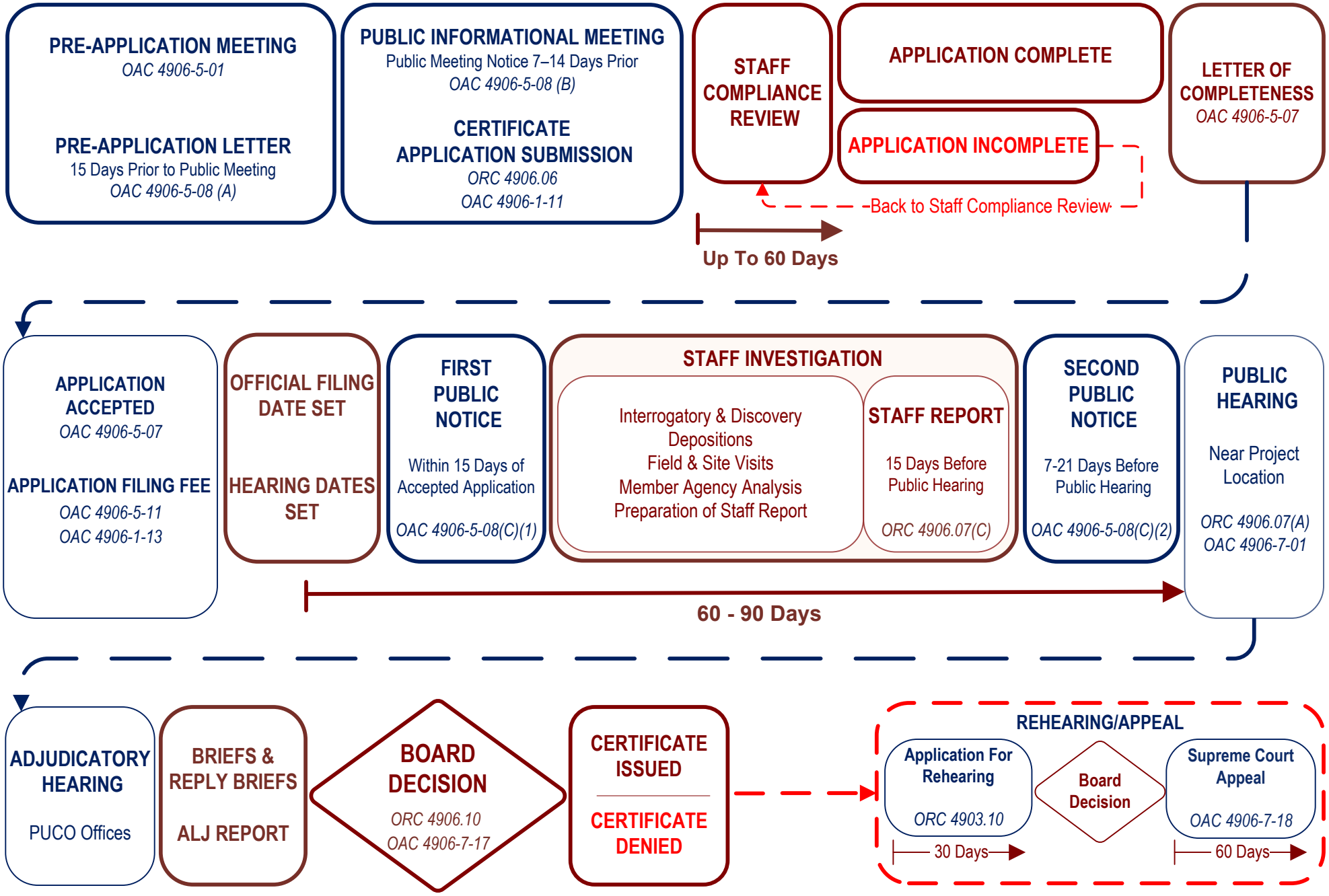
The Ohio Power Siting Board (OPSB) is responsible for reviewing information for the project, including public comments and input, and determining whether to issue a Certificate of Environmental Compatibility and Public Need approving the project. DP&L plans to file an application with the OPSB in 2014 for the board's review and approval of the transmission line siting. The application will include a preferred and alternate route for most sections of the project area. If the application is approved by the OPSB, construction of the transmission line could begin in 2017.

Public comments will be accepted and considered by DP&L staff as part of the process of further evaluating the proposed routes. Interested parties may also send written comments or questions to: The Dayton Power and Light Company, ATTN: W. Milton-Eldean Project Team, 1900 Dryden Road, Area 420, Dayton, Ohio 45439, or request information or comment by leaving a message at 937-331-4314.



OHIO POWER SITING PROCESS FLOWCHART

(Statute/Rule References and Select Blocks are Clickable Internet Links)



October 2012

Construction and Operation are Monitored by the Board

Conditions of Certificate Apply for the Life of the Facility

Working Draft
Subject to Administrative Review

4906-15-07 ECOLOGICAL IMPACT ANALYSIS

This section summarizes the results of a desktop assessment and onsite investigations of ecological resources within the study area of the proposed West Milton–Eldean 138 kV transmission line project. A map and literature search was conducted for a corridor 1,000 feet on either side of the Preferred and Alternate Route centerlines. A field study was conducted for a 200-foot corridor (within 100 feet of either side of the centerline) for the Preferred and Alternate Routes. The sections below provide ecological information for the Preferred Route and the Alternate Route separately unless the two routes share a common segment. Where the Preferred Route and Alternate Route share a common alignment they are referred to as the "common" route.

On March 27, 2014, The Dayton Power and Light Company ("DP&L") filed a letter motion and memorandum requesting limited waivers regarding the project and this Application. In this letter, DP&L requested a waiver for reporting the results of field studies and investigations for ecological and cultural resources for only the Preferred Route in this Application. On May 7, 2014, a letter was issued by the Administrative Law Judge in this case granting DP&L's motion for waiver. In an e-mail dated April 20, 2015, the OPSB requested ecological field studies for the Alternate Route.

(A) SUMMARY OF ECOLOGICAL IMPACT STUDIES

In support of preparation of this Application, a thorough desktop review of published mapping, aerial photography, and ecological information within 1,000 feet of either side of the Preferred and Alternate Route centerlines was conducted prior to the field studies. Mapping sources included USGS 7.5-minute topographic quadrangle maps, U.S. Fish and Wildlife Service ("USFWS") National Wetland Inventory ("NWI") maps, and U.S. Department of Agriculture ("USDA") Natural Resource Conservation Service ("NRCS") soil survey maps.

From October 2014 through October 2015, POWER Engineers, Inc. (POWER) ecologists, at the request of DP&L, conducted an ecological field study to quantify the occurrence and quality of wetlands and streams and document vegetation and wildlife within the review corridor of 100 feet on either side of the of the Preferred Route centerline (200 feet total width). Additionally, POWER ecologists performed ecological field studies within the 200-foot review corridor of the Alternate Route to the extent permissible from June 2015 through October 2015. Results and findings from this field study are described in greater detail in the sections below.

All of the Preferred Route and 94% of the Alternate Route was field surveyed. All of the unsurveyed Alternate Route (1.0 mile) consists of cultivated corn or soybean fields. These corridors were reviewed using several sources of aerial imagery and geographic information system tools.

(B) ECOLOGICAL FEATURES

An aerial imagery map at a scale of 1:24,000 illustrating areas within 1,000 feet or more of the Preferred and Alternate Route centerlines can be found in Figure 7-1. Mapped features within 1,000 feet of the proposed routes were reviewed using desktop map resources and digital published data. Field-delineated streams and wetlands within the 200-foot survey corridor boundary, and soil associations, are provided in Figure 7-1 as well. Representative photographs of the delineated aquatic resource features can be found in Appendix 7-1.

(1) Transmission Line Alignments

The Proposed Preferred and Alternate Route alignments including the area 1,000 feet on either side of the Routes and the proposed turning points are included on Figure 7-1. In the discussion below, the term “survey corridor” refers to the corridor 100 feet either side of the Preferred Route and Alternate Route centerlines, which was surveyed for streams, wetlands, and other ecological features by the field ecologists. “Construction corridor” refers to the area 37.5 feet either side of the Preferred and Alternate Route centerline that will be used during construction. The construction corridor is the same width (75 feet) as the proposed permanent ROW easement that would be acquired from landowners.

(2) Substation Locations

No new transmission substations are proposed for this Project.

(3) All Areas Currently Not Developed for Agricultural, Residential, Commercial, Industrial, Institutional, or Cultural Purposes

(a) Streams and Drainage Channels: Field evaluations were conducted on streams within the survey corridors of the Preferred and Alternate Routes. Three streams that drain areas greater than one square mile were assessed using Ohio EPA's (“OEPA”) Qualitative Habitat Evaluation Index (“QHEI”) method. Within the QHEI scoring convention, streams are classified based on their drainage area. QHEI streams that drain an area greater than 20 square miles are classified as "large streams", and streams that drain an area less than 20 square miles are classified as "headwater streams." QHEI-classified streams are assigned a narrative rating based upon their

score. The narrative rating gives a general indication of aquatic assemblages that may be found at any given site. Five narrative ratings scale the 100 point scoring system. Very poor streams have a QHEI score of less than 30. Poor streams have a QHEI score between 30 and 42. Fair streams have a QHEI score between 43 and 54. Good streams have a QHEI score between 55 and 69. Streams that have a QHEI score greater than or equal to 70 are classified as excellent (OEPA, 2006).

QHEI evaluations were conducted on the Stillwater River (Stream 5) which is crossed by the Preferred and Alternate Route common survey corridor and two additional streams [Jones Run (Stream 9 on Alternate Route), a tributary to the Stillwater River and an unnamed tributary (Stream 6 on both Preferred and Alternate Routes) to the Great Miami River]. The evaluations were conducted at or near the proposed transmission line crossing of the streams. According to the Ohio Administrative Code ("OAC") rule 3745-1-21 (OEPA Beneficial Use Designations for streams), the Stillwater River is classified as exceptional warm water habitat ("EWH"), and scored 69 on the QHEI scale. The Jones Run stream is classified as warm water habitat ("WWH") and scored 52.5 for QHEI and the unnamed tributary of the Great Miami River scored 57.5 for the QHEI (no Ohio stream use designation). Streams with a drainage basin less than one square mile were evaluated using the OEPA's Headwater Habitat Evaluation Index ("HHEI") method. The HHEI is a rapid field assessment method for physical habitat that can be used to appraise the biological potential of most Primary Headwater Habitat ("PHWH") streams. Headwater streams are typically considered to be first and second-order streams, meaning streams that have no upstream tributaries and those that have only first-order tributaries, respectively. Headwater streams are scored on the basis of channel substrate composition, bank full width, and maximum pool depth. Assessed areas result in a score (0 to 100) that is converted to a specific PHWH stream class. Streams that are scored from 0 to 29.9 are typically grouped into "Class I PHWH Streams", 30 to 69.9 are "Class II PHWH Streams", and 70 to 100 are "Class III PHWH Streams". Evidence of anthropogenic alterations to the natural channel resulted in a "Modified" qualifier for the stream (OEPA, 2012).

HHEI evaluations were conducted on four streams in the Preferred Route survey corridor and six streams in the Alternate Route survey corridor. The evaluations were conducted at or near the proposed transmission line crossing of each stream.

Locations of delineated streams within the survey corridor can be found on Figure 7-1. Copies of the QHEI and HHEI forms for the streams delineated within 100 feet of the Preferred and Alternate Routes are included in Appendix 7-2. Table 7-1 lists specific details of each delineated stream, including HHEI or QHEI score, rating, flow regime, stream length within the survey corridor, and stream length within the proposed construction corridor.

The Preferred Route crosses seven streams, with a total of 1,960 linear feet of stream within the survey corridor, and 334 linear feet within the proposed construction and permanent easement ROW. One of the streams is crossed twice by the Preferred Route on separate sections of the stream (referred to as Stream 6-A and 6-B). The Alternate Route crosses ten streams with a total of 1,735 linear feet of streams within the survey corridor, and 663 linear feet within the proposed construction corridor and ROW. Both the Preferred and Alternate Routes cross the Stillwater River (Stream 5), which is part of a registered State Scenic River System (ODNR, 2014).

TABLE 7-1
DELINEATED STREAMS WITHIN 100 FEET OF THE PREFERRED AND ALTERNATE ROUTES

Stream ID	Route	Flow Regime	Stream Form	Score	Narrative Rating	Length (ft) within Survey Corridor	Length (ft) Within Construction Corridor
Stream 1	Preferred	Ephemeral	HHEI	36	Modified Class II	96	32
Stream 2	Common	Ephemeral	HHEI	50	Modified Class II	107	44
Stream 3	Common	Ephemeral	HHEI	45	Modified Class II	239	74
Stream 4	Common	Intermittent	HHEI	70	Class III	23	0
Stream 5	Common	Perennial (Stillwater R.)	QHEI	69	Good	209*	78*
Stream 6	Alternate	Perennial	QHEI	57.5	Good	279	110
Stream 6-A	Preferred	Intermittent	QHEI	37	Poor	288	106
Stream 6-B	Preferred	Intermittent	QHEI	48.5	Fair	998	0
Stream 7	Alternate	Intermittent	HHEI	39	Class II	120	55
Stream 8	Alternate	Intermittent	HHEI	65	Class II	172	75
Stream 9	Alternate	Perennial (Jones Run)	QHEI	52.5	Fair	183	74
Stream 10	Alternate	Intermittent	HHEI	61	Modified Class II	237	98
Stream 11	Alternate	Ephemeral	HHEI	53	Modified Class II	166	56

* Left bank measurement utilized for reference lengths.

(b) Lakes, Ponds, and Reservoirs: No major lakes or reservoirs were observed within the proposed ROW of the Preferred or Alternate Routes. Aerial photography and NWI map references indicate that 11 ponds are located within 1,000 feet of the Preferred Route, and 13 ponds are located within 1,000 feet of the Alternate Route. Locations of ponds within 1,000 feet of both routes are shown on Figure 7-1. Along the Preferred Route, one pond is within 100 feet of the centerline. This pond (Pond 1) has a total estimated acreage of 0.26 acres, with a 0.08-acre portion within the survey corridor and is identified on Figure 7-1. Pond 1 is not within the construction corridor. Impacts to ponds and lakes are not anticipated by the construction, operation or maintenance of the proposed transmission line. Best Management Practices ("BMPs") including utilization of silt fencing and straw bales, will be used where appropriate during construction to minimize runoff siltation.

(c) Marshes, Swamps and Other Wetlands: The United States Army Corps of Engineers ("USACE") defines wetlands 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 (Environmental Laboratory, 1987). To identify whether wetlands exist on the Preferred and Alternate Routes, wetland criteria, as established by the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0), environmental scientists performed a desktop review of available resources prior to the field wetland delineation of the Project area. Desktop analysis also included review of USFWS NWI maps and the NRCS soil survey and hydric soil list for Miami County, Ohio for areas within 1,000 feet of the Preferred and Alternate Routes. NWI areas are shown on Figure 7-1.

In addition to the ponds discussed above, other NWI features mapped within 1,000 feet of the Preferred and Alternate Routes include twelve NWI features in the vicinity of the southern portion of the Preferred and Alternate Routes, and eight NWI features in the vicinity of the Alternate Route in the northern portion. Two NWI features were mapped within 100 feet of the centerline for the Preferred Route and four NWI features were mapped within 100 feet of the centerline for the Alternate Route.

The Ohio Rapid Assessment Method ("ORAM") was developed to determine the relative ecological quality and level of disturbance of a particular wetland through a field evaluation. Wetlands are scored on the basis of hydrology, upland buffer, habitat alteration, special wetland communities, and vegetation communities. Each of these subject areas is further divided into subcategories under ORAM v5.0 resulting in a score that describes the wetland using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance). Wetlands scored from 0 to 29.9 are grouped into "Category 1", 30 to 59.9 are "Category 2" and 60 to 100 are "Category 3". Transitional zones exist between "Categories 1 and 2" from 30 to 34.9 and between "Categories 2 and 3" from 60 to 64.9. However, according to the OEPA, if the wetland score falls into the transitional range, it must be given the higher Category unless scientific data can prove it should be in a lower category (Mack, 2001).

The Preferred Route crosses two wetlands, with 0.16 acres of wetland within the survey corridor. No portions of these wetlands are located within the proposed construction ROW. The Alternate Route crosses two wetlands, with 0.35 acres of wetland within the survey corridor and 0.16 acres

of wetland within the construction ROW. Corresponding USACE and ORAM forms completed during the wetland delineation work are included in Appendix 7-3. Field delineated wetlands within the survey corridor are mapped on Figure 7-1 and are summarized in Table 7-2.

Table 7-2: Delineated Wetlands within 100 Feet of the Preferred and Alternate Routes

Wetland ID	Route	Cowardin Wetland Type[1]	ORAM Score	ORAM Category	Acreage within Survey Corridor	Acreage within Construction Corridor
Wetland A[2]	Preferred	PEM	42.5	Category 2	0.11	0.00
Wetland A[2]	Alternate	PEM	42.5	Category 2	0.22	0.13
Wetland B	Common	PEM	38	Category 2	0.05	0.00
Wetland C	Alternate	PEM	26	Category 1	0.02	0.00
Wetland D	Alternate	PEM	44	Category 2	0.06	0.03

[1] Cowardin et al., 1979;

[2] Wetland A occurs at convergence point of the Preferred and Alternate Routes and is therefore listed twice to account for acreages within each survey corridor.

(d) Woody and Herbaceous Vegetation Land: Although the landscape within the study area is dominated by cultivated crops, woody and herbaceous plants, typical of agricultural and developed areas are interspersed within the construction corridor of the proposed routes. Habitat descriptions applicable to both proposed routes are provided in section 4906-15-07(E).

(e) Locations of Threatened and Endangered Species: Coordination with the USFWS and the Ohio Department of Natural Resources ("ODNR") was initiated during preliminary planning of the Project. Consultation letters were sent to each agency in 2013, a second request for updates was made in April 2015, and a third request was sent in February 2017. The recent response from ODNR' Office of Real Estate, in conjunction with the ODNR Division of Fish and Wildlife (DOW), on March 15, 2017 indicated three species have presence Natural Heritage Database records within one-mile of the project area. Those respective species are identified in Table 7-3. The response also indicated that the Project was within the range of four state endangered species including the club shell mussel, the rayed bean mussel, the snuffbox mussel, and the Iowa darter. The ODNR concluded that the Project will not likely impact these species if no in-stream work on perennial streams is performed. No in-stream work that would impact perennial streams is planned for the Project. Additionally, it was indicated a portion of the project is within the vicinity of one or more records for the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. Presence of the Indiana bat has been established from West McCurdy Road to the southern terminus of the

project, and therefore additional summer surveys would not constitute presence/absence in the area. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31.

The recent USFWS response, dated March 1, 2017, indicated that the proposed Project is within the range of four federally protected species in Miami County, Ohio including two bat species and two mussel species. The proposed project is in the vicinity of one or more confirmed records of Indiana bats. Therefore, USFWS recommends that trees ≥3 inches dbh be saved wherever possible. USFWS concludes since the project will result in a small amount of forest clearing relative to the available habitat in the immediately surrounding area, habitat removal is unlikely to result in significant impacts to these species. Since Indiana bat presence in the vicinity of the project has been confirmed, clearing of trees ≥3 inches dbh during the summer roosting season may result in direct take of individuals. If any caves or abandoned mines may be disturbed, further coordination with USFWS is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and tree removal is unavoidable, USFWS recommends that removal of any trees ≥3 inches dbh only occur between October 1 and March 31. USFWS indicates that following the seasonal tree clearing recommendation should ensure that any effects to Indiana bats and northern long-eared bats are insignificant or discountable. Since Indiana bat presence has already been confirmed in the project vicinity, any additional summer surveys would not constitute presence/absence surveys for this species.

Correspondence letters from the USFWS and ODNR are included as Appendix 7-4. Table 7-3 identifies state and federally listed species that may occur, or are known to occur, within select locations in the Project area. Additional information all listed species is provided below.

Table 7-3 ODNR and USFWS Listed Species within the Project Area

Common Name	Scientific Name	Animal or Plant	State Status	Federal Status
Indiana Bat*	*Myotis sodalis*	Animal	Endangered	Endangered
Club Shell Mussel	*Pleurobema clava*	Animal	Endangered	Endangered
Snuffbox Mussel	*Epioblasma triquetra*	Animal	Endangered	Endangered
Rayed Bean Mussel	*Villosa fabalis*	Animal	Endangered	Endangered
Iowa Darter	*Etheostoma exile*	Animal	Endangered	None
Northern long-eared bat	*Myotis septentrionalis*	Animal	Species of Concern	Threatened
Creek Heelsplitter*	*Lasmigona compressa*	Animal	Species of Concern	None
Wood's Hellebore*	*Melanthium woodii*	Plant	Threatened	None

***ODNR Natural Heritage Database record**

The Project corridor lies within the range of the Indiana bat (*Myotis sodalis*) which is a federally-listed endangered species and the northern long-eared bat which was federally-listed as a threatened species on April 2, 2015. Aerial photography of the Project area shows that habitat availability for bats along the proposed Project is limited. It was recommended by the USFWS that any trees exhibiting habitat characteristics (such as dead or live trees and snags with peeling or exfoliating bark, and split tree trunk and/or branches and cavities), as well as other surrounding trees, remain uncut wherever possible. USFWS stated that any unavoidable tree removal should occur between October 1 and March 31. Potential roost trees were marked and global positioning system data points were taken along the Preferred Route and Alternate Route during the ecological field survey.

According to the USFWS, the proposed Project also lies within the range of the rayed bean (*Villosa fabalis*) and the snuffbox (*Epioblasma triquetra*), both freshwater mussels that are currently listed as federally endangered. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). The USFWS confirmed via

e-mail that a mussel survey need not be conducted for the snuffbox if construction activities would not impact the Stillwater River (e.g., no increase in sedimentation). No impacts to any endangered mussel species are anticipated due to the fact that no activities are planned within the Stillwater River. The impacts to small streams will be minimized during any required installations of temporary bridge crossings.

Wood's hellebore (*Melanthium woodii;* synonym *Veratrum woodii*) is a state-listed threatened plant species in Ohio. ODNR's Division of Natural Areas and Preserves describes this species as being restricted to a few river systems and mature, undisturbed habitats (ODNR, 1984). The mature plant is described as having large, corrugated leaves that are distinct from other native Ohio plants. Wood's hellebore grows on shaded stream terraces and mesic slopes that may be irregularly inundated. This species has been recorded within approximately 0.3-mile of the construction corridor. Alignments for the Preferred and Alternate Routes near the one riparian corridor are proposed to be constructed within existing utility and transportation ROW where habitat is already disturbed. Impacts to Wood's hellebore are not anticipated.

Creek heelsplitter (*Lasmigona compressa*) is listed as a species of special concern in Ohio due to low abundance. This species of freshwater mussel most frequently occurs in headwater streams (Krebs, 2009). The creek heelsplitter grows to about four inches (10 cm) and is elongate to oval in shape with a distinctly compressed shell. Preferred substrates for this mussel include sand, fine gravel and mud. Impacts to this species are not anticipated due to the limited impacts to streams proposed by this Project.

(4) Soil Associations

The soil associations crossed by the Preferred and Alternate Routes include the Miamian-Crosby-Brookston (s6046), Randolph-Milton-Millsdale-Miamian (s6054), Miamian-Losantville-Crosby-Celina (s6051), and Sleeth-Ockley-Eldean (s6047) soil associations (USDA, 2013). Figure 7-1 shows the soil associations in the study area. Based on soils data, areas with slopes greater than 12% or highly erodible soils are generally limited stream corridors in the study area. No soil conditions were found that would potentially limit construction of the proposed Project.

(C) STREAMS AND BODIES OF WATER

(1) Construction Impact

The Preferred Route crosses seven streams, with a total of 1,960 linear feet of stream within the 200-foot survey corridor, and 334 linear feet within the proposed 75-foot wide construction corridor. The Alternate Route crosses ten streams, with a total of 1,735 linear feet of stream within the survey corridor, and 663 linear feet within the proposed construction corridor. The locations and approximate extents of these streams are shown on Figure 7-1.

DP&L will not perform mechanized clearing within 25 feet of any stream, and will hand cut only trees in these areas that could potentially interfere with safe construction and operation of the line. Field investigations indicated that no streams would need to be filled or permanently impacted and no streams would need to be crossed by construction vehicles. Construction crews will access pole installation locations by utilizing existing farm roads and fields. Should a stream crossing need to occur, construction crews will utilize a temporary access bridge. Additional details related to any necessary temporary access bridges will be detailed in the Project's Stormwater Pollution Prevention Plan ("SWPPP").

(2) Operation and Maintenance Impact

No impacts to streams are anticipated once the transmission line is in operation. As part of maintenance activities, only selective clearing of vegetation interfering with the operation of the transmission line will be needed. No lakes, ponds, or other waterbodies will be affected by the operation or maintenance of the Preferred or Alternate Routes.

(3) Mitigation Procedures

The Project's SWPPP and BMPs will be implemented during all construction stages in order to reduce sediment runoff and soil erosion. Seeding and mulching will occur in disturbed areas, and be monitored until restoration is complete.

(D) WETLAND IMPACTS

(1) Construction Impacts

Preferred Route: The Preferred Route construction corridor does not cross any wetlands. Two ORAM Category 2 wetlands totaling 0.16-acre were identified within the survey corridor. No portions of these wetlands are located within the proposed construction ROW. No Category 1 or

Category 3 wetlands were delineated along the Preferred Route. The locations and extent of these wetlands within the survey corridor are shown on Figure 7-1. Table 7-2 provides detailed information on wetlands delineated within the Preferred Route survey corridor.

Alternate Route: The Alternate Route centerline crosses two ORAM Category 2 wetlands for a total of approximately 83 feet. These two wetlands comprise 0.28 acres of the Alternate Route survey corridor. One additional ORAM Category 2 wetland of 0.6 acres and one ORAM Category 1 wetland of 0.02 acres were also identified within the survey corridor. These two wetlands respectively comprise 0.13 and 0.03 acres of the construction corridor. The locations and extents of these wetlands are shown on Figure 7-1. Table 7-2 provides detailed information on wetlands delineated within the Alternate Route survey corridor.

No permanent impacts to wetlands are anticipated during the construction process. BMP measures will be used near wetlands to prevent filling and sedimentation as a result of nearby construction activities. There are no wetlands within the Preferred Route construction corridor. Wetlands along the Alternate Route are expected to be spanned by the transmission line with the new structures installed outside of wetland boundaries. In order to reduce potential sedimentation impacts to nearby wetlands, BMPs such as silt fences and construction matting will be implemented. Due to the nature of the topography along the routes, sedimentation runoff potential into wetlands will be minimal. Construction equipment will only cross wetlands using construction matting, if necessary.

Soil disturbance within wetlands during construction is not anticipated. No fill material will be placed in any wetland areas along the routes. No structures would be placed in wetlands along the Preferred or Alternate Routes. Wetlands will be marked with stakes before any clearing activities occur in order to avoid incidental vehicle impacts.

(2) Operation and Maintenance Impact

Wetland areas will not be impacted by the operation or maintenance of the transmission line. Vegetation within these areas may require periodic cutting for trees that may interfere with the operation of the transmission line. It is anticipated that such activities would not result in erosion or water quality degradation.

(3) Mitigation Procedures

No construction activities will occur within wetlands. Natural re-vegetation in any incidentally disturbed wetland areas will begin after construction crews have completed the installation activities. Wetland mitigation, although not expected to be necessary, will be addressed by obtaining any necessary wetland permits.

(E) VEGETATION IMPACTS

(1) Construction Impacts

This section describes the potential impacts on vegetation community types along the proposed routes during construction. The Preferred and Alternate Routes are dominated by agricultural cropland interspersed with young to mature oak-hickory mixed mesophytic forests and grassland pasture. Habitat descriptions, applicable to both the Preferred and Alternate Routes, and details on the anticipated impacts of construction are provided below.

Oak-Hickory Mixed Mesophytic Forest: Oak-Hickory mixed mesophytic forest and woodlands are present along a very small portion of the Preferred and Alternate Routes. Woody species dominating these areas include red oak (*Quercus rubra*), shagbark hickory (*Carya ovata*), sugar maple (*Acer saccharum*), black walnut (*Juglans nigra*), green ash (*Fraxinus pennsylvanica*), and black locust (*Robinia pseudoacacia*). The dominant shrub-layer species included sugar maple, invasive Amur honeysuckle (*Lonicera mackii*), American elm (*Ulmus Americana*), and invasive garlic mustard (*Alliaria petioiata*).

The Preferred Route crosses approximately 0.15-mile of oak-mixed mesophytic forest. The Alternate Route passes through approximately 0.19-mile of oak-mixed mesophytic forest along the route. The proposed permanent ROW is 75 feet (37.5 feet on either side), with overlap of the highway ROW where it is adjacent. Approximately 2.6 acres of this forest would be cleared if the Preferred Route is constructed, while 2.7 acres would be cleared if the Alternate Route is constructed. The potential impacts on woody and herbaceous vegetation along the Preferred and Alternate Routes will be limited to the clearing of woody vegetation within the proposed new transmission line ROW, where required. Tree limbs and trunks removed during construction will be wind-rowed, chipped and disposed of appropriately, or disposition will be based on the landowner's preference.

Pasture and grassland: Pastures and hay fields containing various grasses and forbs, as well as residential lawns, were observed within the study area. Pasture areas may be grazed continually or

on rotation and are periodically managed by mowing. The Preferred and Alternate Routes cross approximately 0.08-mile and 0.29-mile of pasture and grasslands, respectively.

Agricultural Cropland: Agricultural cropland identified along the proposed Preferred and Alternate Route is predominantly used for corn and soybean cultivation. Approximately 76 acres of agricultural cropland is located within the 75-foot construction ROW of the Preferred Route, while approximately 99 acres of cropland is located within the Alternate Route. Potential impacts to agricultural use resulting from Project construction include damage to crops during the growing season, disturbance of drainage patterns, disruption of plow/harvest patterns, and a reduction of tillable land at the utility pole locations.

(2) Operation and Maintenance Impacts

Vegetation impacts within either operational transmission line route will be minimal. Any undeveloped land that remains undisturbed by construction will be maintained in its current early-successional state. Any routine mowing or cutting along the Preferred or Alternate Routes is not expected to result in a significant environmental impact to the vegetation.

(3) Mitigation Procedures

Soils in upland and non-agricultural areas that are disturbed by construction will be seeded and mulched in accordance with the SWPPP. Any disturbance that may occur in wetland areas will be mitigated through the use of BMPs. If any unanticipated significant disturbance occurs within wetlands, top soil will be segregated and replaced so that the existing seed bank will naturally recolonize these areas. Additional seeding in these areas may be necessary if the existing seed bank proves to be deficient. These measures should preserve the aesthetic qualities along the route, prevent erosion, and promote habitat diversity.

(F) COMMERCIAL, RECREATIONAL, AND THREATENED/ENDANGERED SPECIES IMPACTS

The Project is located in both suburban and rural landscapes. Land use within the Preferred and Alternate Route study areas consists of cultivated crops, pastures, residential lawns, and infrequent wood lots. Potential habitat for various wildlife species exists within the study areas for both routes. Lists of commercial and recreational wildlife species were obtained from the ODNR-DOW annual hunting and trapping regulations, and listed below. Lists of protected species were obtained from USFWS and ODNR which are based on the species' reported range within

Miami County. Details on the expected impacts of construction, operation and maintenance, and mitigation procedures can be found below.

(1) Construction Impacts

(a) Commercial Species: The commercially important species along the proposed routes consist of those hunted or trapped for fur or other byproducts, including the following:

- 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 expected to inhabit the proposed routes and indications of this species in the area were observed during field surveys.
- Gray Fox (*Urocyon cinereogenteus*): Gray fox habitat is generally dominated by wooded areas with some partially open brush land with little human presence. This species is expected to inhabit the proposed routes, but was not observed.
- Long-tailed weasel (*Mustela frenata*): The long-tailed weasel is found throughout the state of Ohio in areas adjacent to rivers, lakes, streams, or marshes, where they feed on small mammals. This species is expected to inhabit the proposed routes, but was not observed.
- Mink (*Mustela vison*): The mink is almost invariably found near water, both running water of streams and rivers and the standing waters of marshes and lakes. This animal is drawn to areas of cluttered vegetation or wooded banks that offer protection and is expected to inhabit the proposed routes, but was not observed.
- Muskrat (*Ondatra zibethicus*): The muskrat is abundant throughout Ohio and prefers areas near intermittent streams, drainage courses, and farm ponds. It is the most extensively trapped furbearer in the State of Ohio. This species is likely to inhabit aquatic habitats within the proposed routes, but was not observed.
- Red fox (*Vulpes vulpes*): The red fox occurs throughout Ohio and is most prevalent in areas of maximum interspersion of woodland, cropland, brush, pastures, and edges of open areas that provide suitable hunting ground. It is likely that the species inhabits the proposed routes, but was not observed.
- Raccoon (*Procyon lotor*): The raccoon is abundant and widespread in Ohio, even in many suburban areas. Raccoons are found principally around aquatic and woodland habitats, with occasional forages into croplands. This species is expected to inhabit the proposed

routes near wooded and residential areas. Indications of this species were observed during field surveys.

- Striped skunk (*Mephitis mephitis*): The skunk prefers a semi-open habitat of mixed woods, brush, farmland, open grassland, and small caves in proximity to water. These mammals are common statewide. This species is expected to inhabit the proposed routes, but was not observed.
- Virginia opossum (*Didelphis virginiana*): The opossum's preferred habitat is an area interspersed with woods, wetlands, and farmland. This species is expected to inhabit the proposed routes but was not observed.

(b) Recreational Species: Recreational terrestrial species consist of those hunted as game. Recreational species expected to inhabit areas along the proposed routes include the following:

- American woodcock (*Scolopax minor*): Woodcock are native Ohio shorebirds that prefer a combination of wet, early successional understory and drier uplands. They prefer to nest in northeast and northwest Ohio along Lake Erie, or wherever habitat is suitable. Typical nests in Ohio are found in reverting brushy fields or in young, second growth woods.
- Eastern cottontail rabbit (*Sylvilagus floridanus*): it is abundant in both rural and urban areas and prefers field borders, brushy areas, and thickets that occur along the proposed routes.
- Gray, red, and fox squirrels (*Sciurus carolinensis*, *Tamiasciurus hudsonicus* and *S. niger*): These tree squirrel species occur throughout the State of Ohio. The fox squirrel is primarily an inhabitant of small, typically isolated woodlots. Indications of this species were observed along the proposed routes. The gray squirrel and red squirrel prefer more extensive woodland areas. Gray squirrels were observed during field surveys.
- White-tailed deer (*Odocoileus virginianus*): White-tailed deer occur throughout Ohio. Deer are a very adaptable animal that can be found in almost all habitats in the region. Signs and several sightings of this species were observed along the proposed routes.
- Wild turkey (*Meleagris gallopavo*): Wild turkeys are very adaptable animals. Although they prefer mature forests, with substantial cover and suitable food sources, they can live successfully in areas with as little as 15 percent forest cover.
- Woodchuck (*Marmota monax*): The woodchuck or groundhog is a common rodent found throughout Ohio. It prefers sloped areas at the fringe of wooded and open areas.

- Wood duck (*Aix sponsa*): The wood duck prefers mature riparian corridors along streams, quiet backwaters of lakes and ponds bordered by large trees, and secluded wooded swamps as ample areas to raise young. They feed on acorns, berries, and grapes on the forest floor. This species was not observed, but the quality of the riparian corridor along the Still Water River or nearby ponds could support wood ducks.
- Game Fish: Based upon the nature of the surface waters crossed, various game fish are anticipated to inhabit the streams that are crossed by the proposed routes.
- Bluegill sunfish (*Lepomis macrochirus*): Bluegill sunfish are found throughout the state in nearly every stream and water body. Their preferred habitat is clear, warm lakes with some rooted vegetation. This species is likely to occur in the Stillwater River and ponds along the routes.
- Green sunfish (*Lepomis cyanellus*): Green sunfish are present in most lakes, reservoirs, and streams. They are tolerant of turbid water unlike most other sunfish species. They appear to have no preference for a particular bottom type, but are usually associated with some type of structure such as brush, vegetation, or rocks. This species is likely to occur in perennial streams and ponds along the routes.
- Longear sunfish (*Lepomis megalotis*): Longear sunfish favor sluggish, clear streams of moderate size with beds of aquatic vegetation to seek shelter in. This species is likely to occur in perennial streams and ponds along the routes.
- Smallmouth bass (Micropterus dolomieu): Smallmouth bass are native to Ohio and are found in every county of the state. Smallmouth bass thrives in streams with gravel or rock bottoms with a visible current. This species is likely to occur in larger perennial streams and possibly ponds along the routes.

(c) Protected Species:

The USFWS and ODNR were contacted on February 22, 2017 and February 14, 2017, respectively, regarding the potential for occurrence of threatened and endangered species in the Project vicinity. Eight species of concern are listed within the Project range in Miami County, Ohio and are presented in Table 7-3. None of these species were observed at the time of the field reconnaissance. Some low quality habitat for Indiana bats and northern long-eared bats was identified within woodlots at the time of the field reconnaissance. To avoid direct impacts to bat roosting and foraging habitat, USFWS recommends that tree clearing be performed between

October 1 and March 31. DP&L proposes to limit tree removal activities to those times outside of the summer roosting months for these species. In the event tree removal must occur during the seasonal restriction in some portions of the Project area, DP&L will coordinate with the USFWS and ODNR and conduct any necessary surveys to establish Indiana bat and/or northern long-eared presence or probable absence in any allowable areas outside of the known occurrence areas from West McCurdy Road to the southern terminus of the project, if allowed by the USFWS and ODNR, or alternatively re-initiate consultation.

Based on the nature of the proposed project activities and habitat characteristics of the surrounding vicinity and expected clearing schedules, construction impacts to protected species are not anticipated.

(2) Operation and Maintenance Impacts

During operation of the transmission line along the proposed routes, any impacts on protected wildlife that may be present should be minor. While portions of the transmission line corridors will need to be cleared, the undeveloped land not disturbed by construction will retain its current vegetation composition. Periodic maintenance along the transmission line corridors is not expected to result in a significant impact to the local wildlife. Given the quantity of comparable habitat throughout the Project area, impacts to local wildlife from transmission line operations are also expected to be negligible.

(3) Mitigation Procedures

The Preferred Route and Alternate Route (with the exception of 1.0 mile of cultivated crop land) were examined in the field by ecologists to assess the general habitat conditions. No significant problem areas that would require the use of special mitigation measures for wildlife have been identified.

(G) SLOPES AND ERODIBLE SOILS

(1) Construction Impact

Based on the Miami County soil survey and field reconnaissance, slopes that exceed 12 percent or highly erodible soils were identified only in limited areas, generally adjacent to streams (Stillwater River), along the Preferred or Alternate Routes. A SWPPP will be implemented during construction to control erosion and sedimentation.

(2) Operation and Maintenance Impact

Once the transmission line is in place, no impacts or erosion hazards are expected.

(3) Mitigation Procedures

No special mitigation procedures are anticipated beyond those required as part of the stormwater permit and SWPPP. Sediment fence, straw bales and other BMPs will be implemented when construction takes place adjacent to storm water or sewer inlets.

(H) SITE-SPECIFIC INFORMATION

This section is not applicable as the site characteristics and potential impacts are adequately covered above.

REFERENCES

Cowardin, L.M., F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, US Fish and Wildlife Service, US Department of the Interior, Washington, DC. 103 p.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 100 p., plus appendices.

Krebs, A.K. 2009. Atlas of the Freshwater Mussels (Unionidae)(Cdlass Bivalvia: Order Unionoida) Recorded at the Old Woman Creek National Estuarine Research Reserve & State Nature Preserve, Ohio and surrounding watersheds. Department of Biological, Geological and Environmental Sciences, Cleveland State University, Cleveland, OH. 38p.

Mack, John J. 2001. Ohio Rapid Assessment Methods for Wetlands Manual for Using Version 5.0. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.

Ohio Administrative Code. 2011. State of Ohio: Water Quality Standards, Chapter 3745-1.

Ohio Department of Natural Resources – Division of Natural Areas and Preserves, 1984. Melanthium woodii (Robins ex Wood) Bodkin, Wood's Hellebore. Available from http://naturepreserves.ohiodnr.gov/portals/dnap/pdf/Rare_Plant_Abstracts/Melanthium_woodii.pdf (accessed 11/05/14)

Ohio Department of Natural Resources – Division of Watercraft, 2014. List of Ohio's Scenic Rivers. Available from http://watercraft.ohiodnr.gov/scenicrivers. (accessed 03/11/15)

Ohio Department of Natural Resources – Division of Wildlife, 2015. Hunting and Trapping Regulations. Available from http://wildlife.ohiodnr.gov/huntingandtrappingregulations. (accessed 03/11/15)

Ohio Environmental Protection Agency. 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Division of Surface Water, Columbus, Ohio.

Ohio Environmental Protection Agency. 2012. Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams. Version 3.0. Ohio EPA Division of Surface Water, Columbus, Ohio.

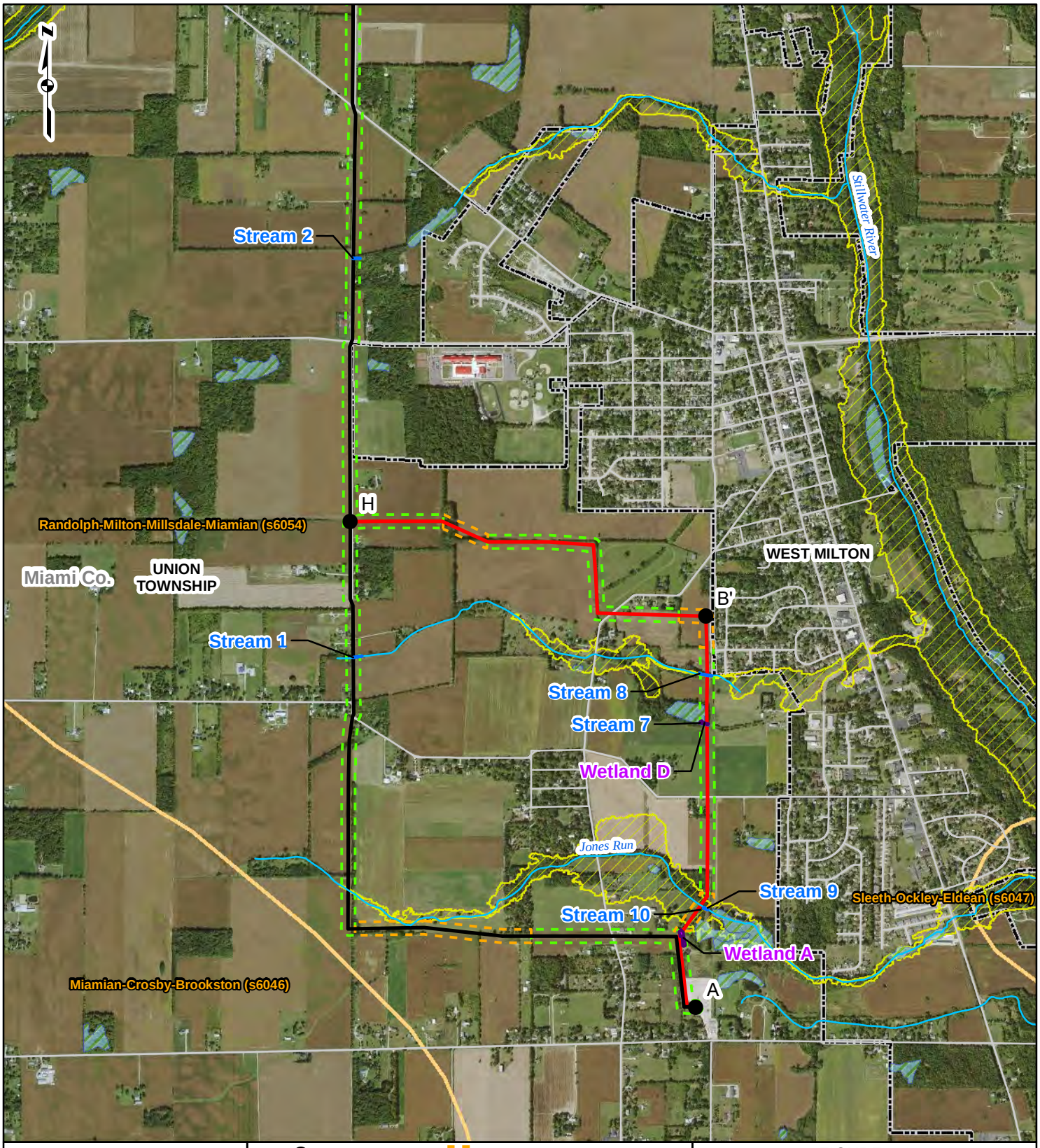
United States Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region, Version 2.0. Eds: J.S. Wakely, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-16. Vicksburg, MS: US Army Engineer Research and Development Center. 130 p., plus appendices.

United States Army Corps of Engineers. 2007. Jurisdictional Determination Form Instructional Guidebook. Available from http://www.usace.army.mil.

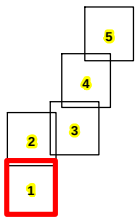
United States Department of Agriculture, Natural Resources Conservation Service. 2013. Soil Survey Geographic Database for Miami County, Ohio. Fort Worth, Texas. http://websoilsurvey.nrcs.usda.gov. Accessed October 2014.

United States Fish and Wildlife Service. 2011. National Wetlands Inventory for Ohio. Washington, D.C. United Stated Fish and Wildlife Service, Division of Habitat Resource Conservation.

United States Geological Survey. 1973. 7.5-Minute Topographic Quadrangle Maps. Troy, OH, Pleasant Hill, OH, West Milton, OH.



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Preferred Route
Route Alternative
NHD Waterway
Delineated Stream
Delineated Wetland
Delineated Pond
200- Ft. Study Corridor
200- Ft. Study Corridor (No Access)
Road Centerline
NWI Wetland
FEMA 100-Year Floodplain
City Limit
Township Boundary
County Boundary
General Soil Assocation

0 1,000 2,000 4,000 Feet

FIGURE 7-1
WETLAND DELINEATION AND STREAM ASSESSMENT MAP
SHEET 1 OF 5

WEST MILTON TO ELDEAN 138kV

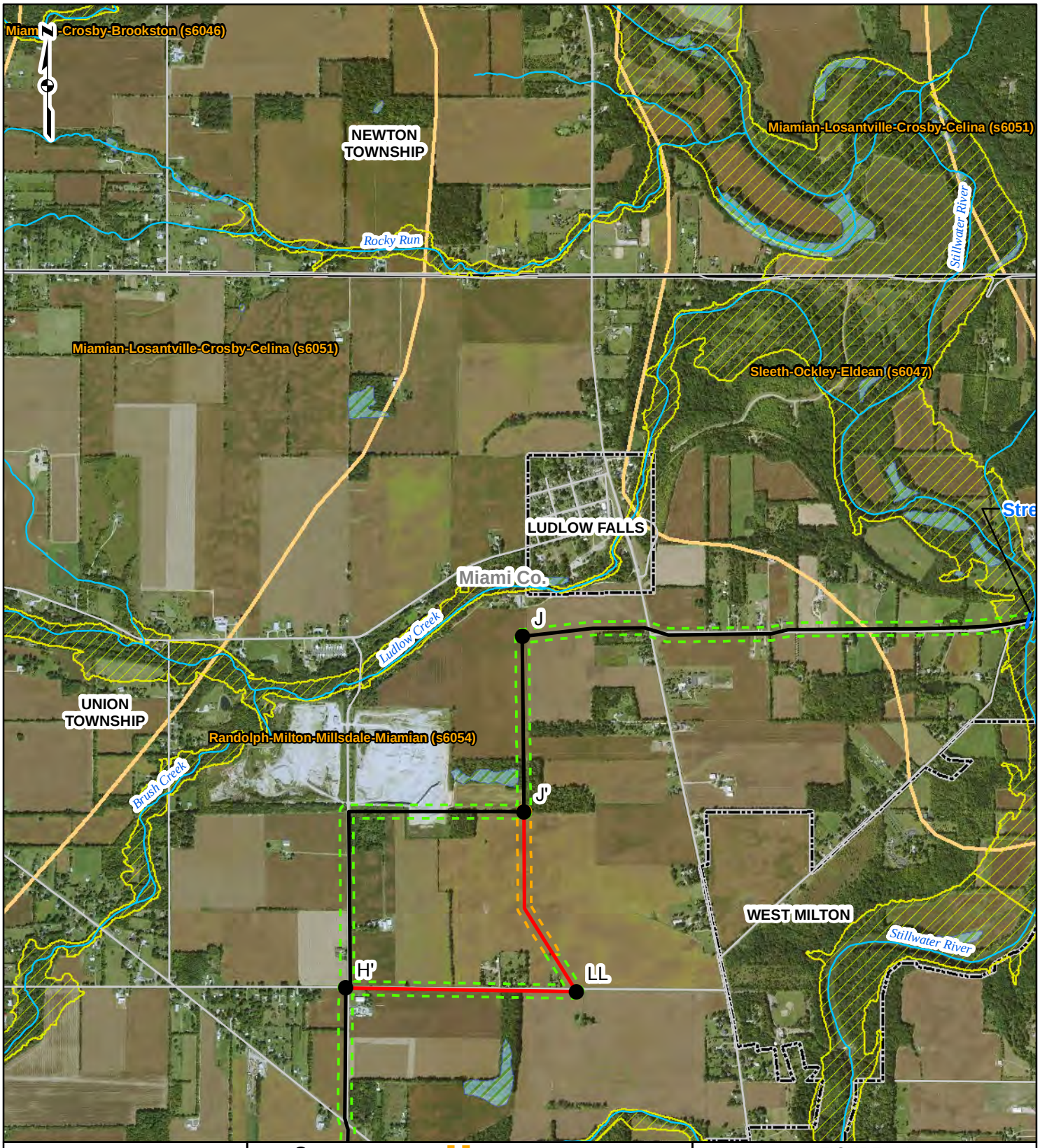
gai consultants

DAYTON POWER & LIGHT

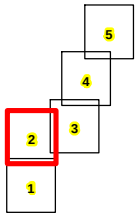
DRAWN BY: TDB DATE: 7/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE:USDA FSA NAIP, 2013; NRCS, 2006; MIAMI COUNTY, 2013; U.S. CENSUS TIGER ROADS, 2014; FEMA NFHL, 2015; USGS NATIONAL HYDROGRAPHY DATASET (NHD), 2014; POWER ENGINEERS, 2015; USFWS, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\7_1_WETLAND_DELINEATION_STREAM_ASSESSMENT_2015_07_21.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

- Node
- Preferred Route
- Route Alternative
- NHD Waterway
- Delineated Stream
- Delineated Wetland
- Delineated Pond
- 200- Ft. Study Corridor
- 200- Ft. Study Corridor (No Access)
- Road Centerline
- NWI Wetland
- FEMA 100-Year Floodplain
- City Limit
- Township Boundary
- County Boundary
- General Soil Assocation

0 1,000 2,000 4,000 Feet

FIGURE 7-1
WETLAND DELINEATION AND STREAM ASSESSMENT MAP
SHEET 2 OF 5

WEST MILTON TO ELDEAN 138kV

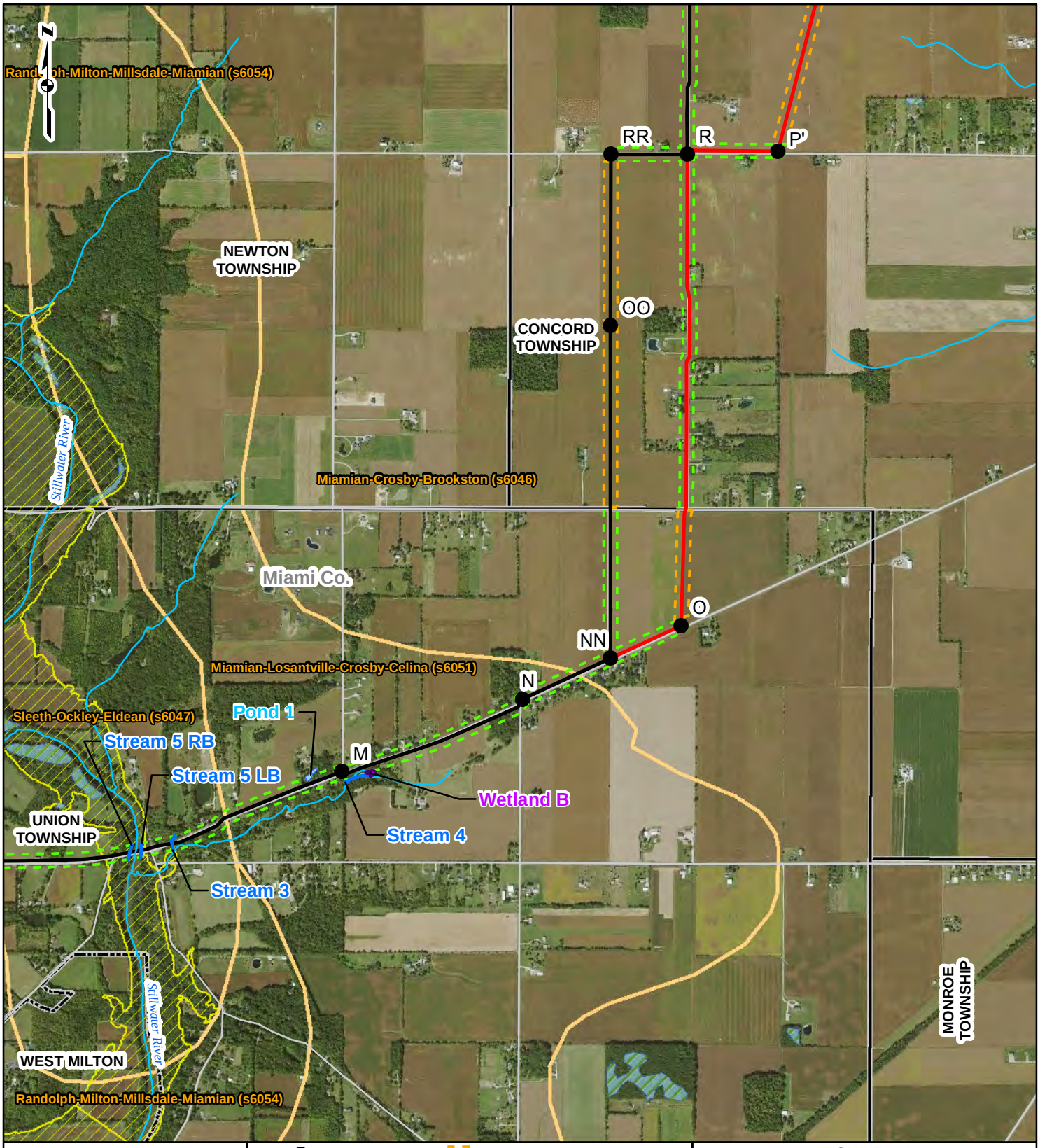
gai consultants

DAYTON POWER & LIGHT

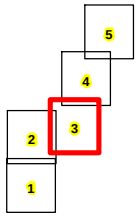
DRAWN BY: TDB DATE: 7/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE:USDA FSA NAIP, 2013; NRCS, 2006; MIAMI COUNTY, 2013; U.S. CENSUS TIGER ROADS, 2014; FEMA NFHL, 2015; USGS NATIONAL HYDROGRAPHY DATASET (NHD), 2014; POWER ENGINEERS, 2015; USFWS, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\7_1_WETLAND_DELINEATION_STREAM_ASSESSMENT_2015_07_21.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

Node
Preferred Route
Route Alternative
NHD Waterway
Delineated Stream
Delineated Wetland
Delineated Pond
200- Ft. Study Corridor
200- Ft. Study Corridor (No Access)
Road Centerline
NWI Wetland
FEMA 100-Year Floodplain
City Limit
Township Boundary
County Boundary
General Soil Assocation

0 1,000 2,000 4,000 Feet

FIGURE 7-1
WETLAND DELINEATION AND STREAM ASSESSMENT MAP
SHEET 3 OF 5

WEST MILTON TO ELDEAN 138kV

gai consultants

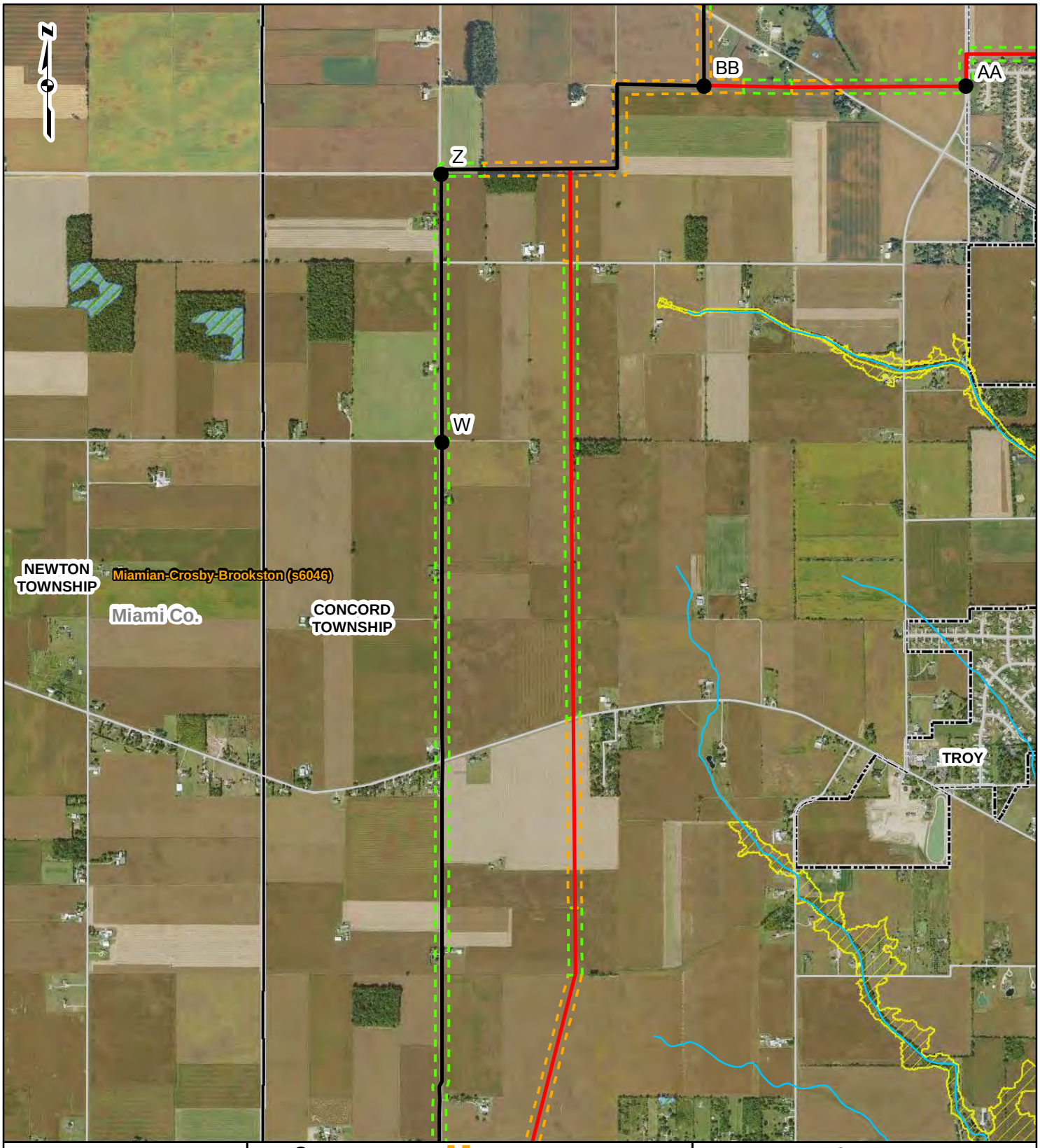
DAYTON POWER & LIGHT

DP&L

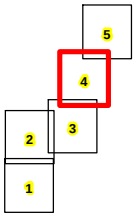
DRAWN BY: TDB DATE: 7/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE:USDA FSA NAIP, 2013; NRCS, 2006; MIAMI COUNTY, 2013; U.S. CENSUS TIGER ROADS, 2014; FEMA NFHL, 2015; USGS NATIONAL HYDROGRAPHY DATASET (NHD), 2014; POWER ENGINEERS, 2015; USFWS, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\7_1_WETLAND_DELINEATION_STREAM_ASSESSMENT_2015_07_21.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

- Node
- Preferred Route
- Route Alternative
- NHD Waterway
- Delineated Stream
- Delineated Wetland
- Delineated Pond
- 200- Ft. Study Corridor
- 200- Ft. Study Corridor (No Access)
- Road Centerline
- NWI Wetland
- FEMA 100-Year Floodplain
- City Limit
- Township Boundary
- County Boundary
- General Soil Assocation

0 1,000 2,000 4,000 Feet

FIGURE 7-1
WETLAND DELINEATION AND STREAM ASSESSMENT MAP
SHEET 4 OF 5

WEST MILTON TO ELDEAN 138kV

gai consultants

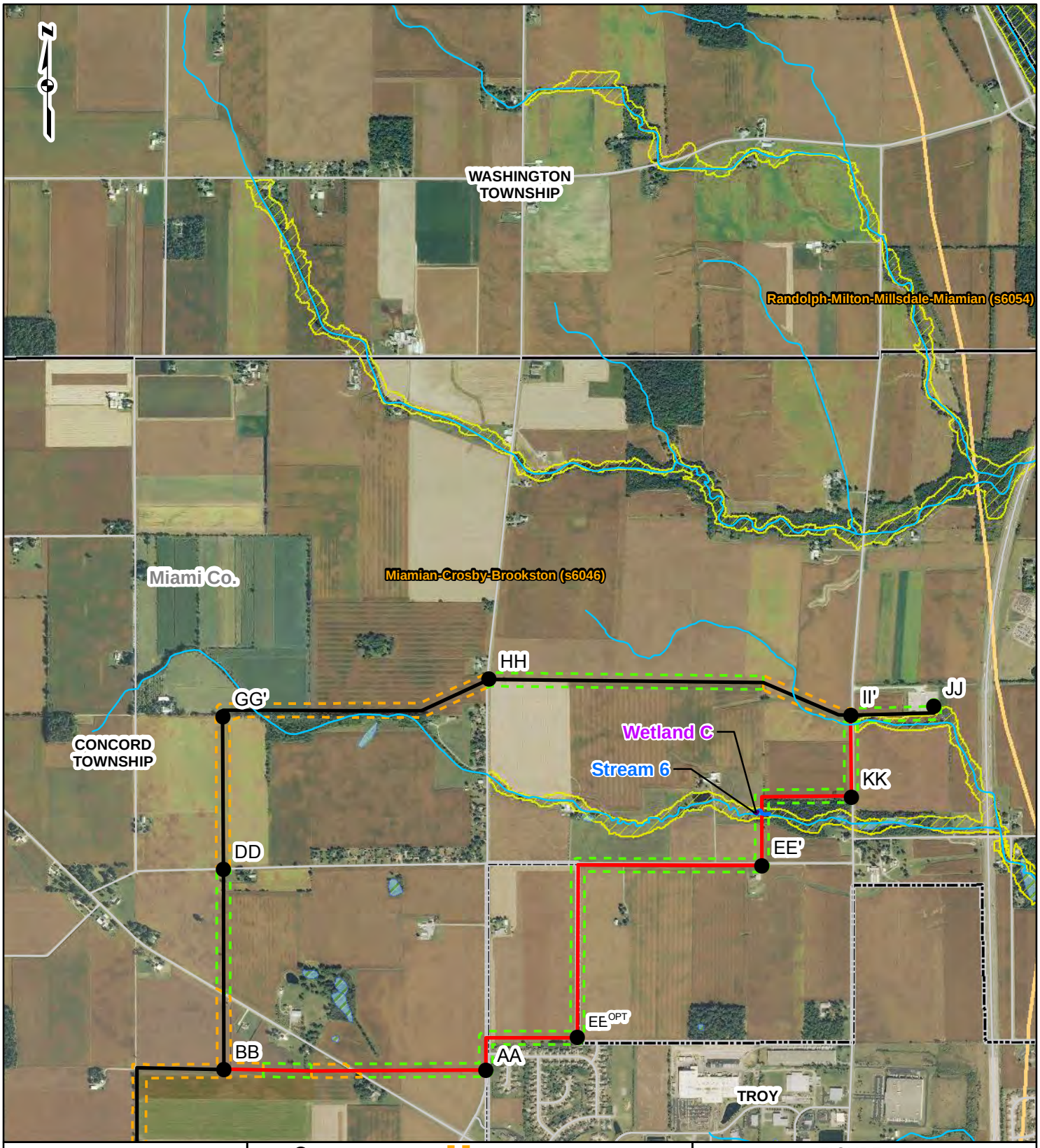
DAYTON POWER & LIGHT

DP&L

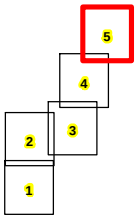
DRAWN BY: TDB DATE: 7/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE:USDA FSA NAIP, 2013; NRCS, 2006; MIAMI COUNTY, 2013; U.S. CENSUS TIGER ROADS, 2014; FEMA NFHL, 2015; USGS NATIONAL HYDROGRAPHY DATASET (NHD), 2014; POWER ENGINEERS, 2015; USFWS, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\7_1_WETLAND_DELINEATION_STREAM_ASSESSMENT_2015_07_21.mxd



PROJECT LOCATION



MIAMI COUNTY, OHIO

- Node
- Preferred Route
- Route Alternative
- NHD Waterway
- Delineated Stream
- Delineated Wetland
- Delineated Pond
- 200- Ft. Study Corridor
- 200- Ft. Study Corridor (No Access)
- Road Centerline
- NWI Wetland
- FEMA 100-Year Floodplain
- City Limit
- Township Boundary
- County Boundary
- General Soil Assocation

0 1,000 2,000 4,000 Feet

FIGURE 7-1
WETLAND DELINEATION AND STREAM ASSESSMENT MAP
SHEET 5 OF 5

WEST MILTON TO ELDEAN 138kV

DAYTON POWER & LIGHT

DRAWN BY: TDB DATE: 7/21/2015
CHECKED: MAF APPROVED: MAF

REFERENCE:USDA FSA NAIP, 2013; NRCS, 2006; MIAMI COUNTY, 2013; U.S. CENSUS TIGER ROADS, 2014; FEMA NFHL, 2015; USGS NATIONAL HYDROGRAPHY DATASET (NHD), 2014; POWER ENGINEERS, 2015; USFWS, 2014.

Z:\Energy\2012\G121196.00 - DPL West Milton to Eldean\GIS\PROJECT_FILES\OPSB_APPLICATION\7_1_WETLAND_DELINEATION_STREAM_ASSESSMENT_2015_07_21.mxd

APPENDIX 7-1
Photographs of Aquatic Resources

Stream 1: Downstream, Looking East

Stream 1: Upstream, Looking West

Stream 2: Downstream, Looking East

Stream 3: Upstream, Looking North

Stream 3: Downstream, Looking South

Stream 4: Upstream, Looking East

Stream 4: Downstream, Looking West

Stream 5: Upstream, Looking North

Stream 5: Downstream, Looking South

Stream 6: Downstream, Looking East

Stream 6:Upstream, Looking West

Stream 6-A: Upstream, Looking North

Stream 6-A: Downstream, Looking South

Stream 6-B: Upstream, Looking West

Stream 6-B: Downstream, Looking East

Stream 7: Downstream, Looking East

Stream 7: Upstream, Looking West

Stream 8: Upstream, Looking West

Stream 8: Downstream, Looking East

Stream 9: Upstream, Looking West

Stream 9: Downstream, Looking East (through existing DP&L right-of-way)

Stream 10: Upstream, looking West (overflow, dregded channel from pond)

Stream 10: Downstream, looking East (overflow, dregded channel from pond)

Stream 11: Downstream, looking East (channelized drainage)

Stream 11: Downstream, looking West (channelized drainage)

Wetland A: Looking North

Wetland A: Looking South

Wetland B: Looking East

Wetland B: Looking North

Wetland C: Looking Southwest

Wetland C: Looking West

Wetland D: Looking West

Wetland D: Looking East

Pond 1: Looking North

APPENDIX 7-2
Ohio EPA HHEI and QHEI Stream Assessment Forms

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 36

SITE NAME/LOCATION: Stream 1

SITE NUMBER: ____ RIVER BASIN: Great Miami DRAINAGE AREA (mi²): 0.25

LENGTH OF STREAM REACH (ft): 126 LAT. 39.95103 LONG. -84.35072 RIVER CODE: ____ RIVER MILE: ____

DATE: 10/06/14 SCORER: TER COMMENTS: Channelized Drainage Ditch

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☑	SILT [3 pt]	50%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☐	COBBLE (65-256 mm) [12 pts]	10%	☐	CLAY or HARDPAN [0 pt]	0%
☑	GRAVEL (2-64 mm) [9 pts]	20%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	20%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 10.00% (A) Substrate Percentage Check (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points

Substrate Max = 40: 16

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 0

Pool Depth Max = 30: 0

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

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

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 2.10

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☑	☑	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS: Channelized drainage ditch within Ag fields

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

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☑ Dry channel, no water (Ephemeral)

COMMENTS ____

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

- ☑ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☑ EWH Name: Stillwater River Distance from Evaluated Stream 1.79

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/06/14 Quantity: 0.03

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 50%

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

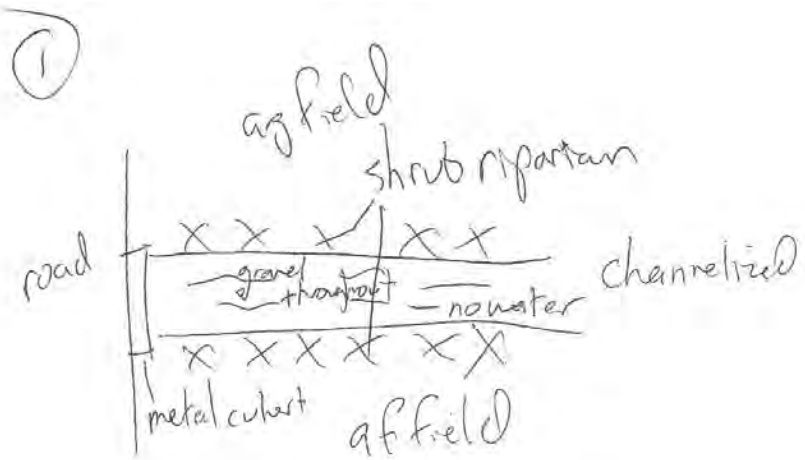
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

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

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

FLOW →



October 24, 2002 Revision

Save as pdf Reset Form

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 50

SITE NAME/LOCATION **Stream 2**

SITE NUMBER _____ RIVER BASIN **Great Miami** DRAINAGE AREA (mi²) **0.25**

LENGTH OF STREAM REACH (ft) **106** LAT. **39.96731** LONG. **-84.35123** RIVER CODE _____ RIVER MILE _____

DATE **10/06/14** SCORER **TER** COMMENTS **Channelized Drainage Ditch**

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☐	SILT [3 pt]	10%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☑	COBBLE (65-256 mm) [12 pts]	30%	☐	CLAY or HARDPAN [0 pt]	0%
☐	GRAVEL (2-64 mm) [9 pts]	40%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	20%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%** (A) Substrate Percentage Check (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 **TOTAL NUMBER OF SUBSTRATE TYPES: 4**

HHEI Metric Points

Substrate Max = 40

25

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters): 0**

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters): 3.50**

Bankfull Width Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☑	Moderate 5-10m	☐	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☑	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS Channelized drainage ditch along side

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

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☑ Dry channel, no water (Ephemeral)

COMMENTS _____

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

- ☐ None
- ☐ 0.5
- ☑ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☑ EWH Name: Stillwater River Distance from Evaluated Stream 1.61

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/06/14 Quantity: 0.03

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 20%

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

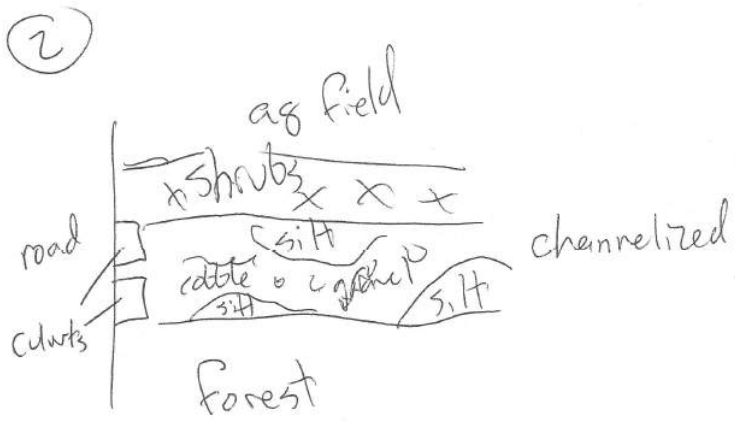
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

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

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

FLOW →



October 24, 2002 Revision

Save as pdf Reset Form

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 45

SITE NAME/LOCATION **Stream 3**

SITE NUMBER _____ RIVER BASIN **Great Miami** DRAINAGE AREA (mi²) **0.15**

LENGTH OF STREAM REACH (ft) **200** LAT. **39.99503** LONG. **-84.31362** RIVER CODE _____ RIVER MILE _____

DATE **10/06/14** SCORER **TER** COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☐	SILT [3 pt]	10%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☑	COBBLE (65-256 mm) [12 pts]	40%	☐	CLAY or HARDPAN [0 pt]	0%
☐	GRAVEL (2-64 mm) [9 pts]	30%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	20%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **40.00%** (A) Substrate Percentage Check (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 **TOTAL NUMBER OF SUBSTRATE TYPES: 4**

HHEI Metric Points

Substrate Max = 40

25

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters): 0**

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters): 3.50**

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Moderate 5-10m	☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS culerted stream coming from drain tiles

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

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☑ Dry channel, no water (Ephemeral)

COMMENTS _____

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

- ☐ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☑ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☑ EWH Name: Stillwater River Distance from Evaluated Stream 0.09

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/06/14 Quantity: 0.03

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 20%

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

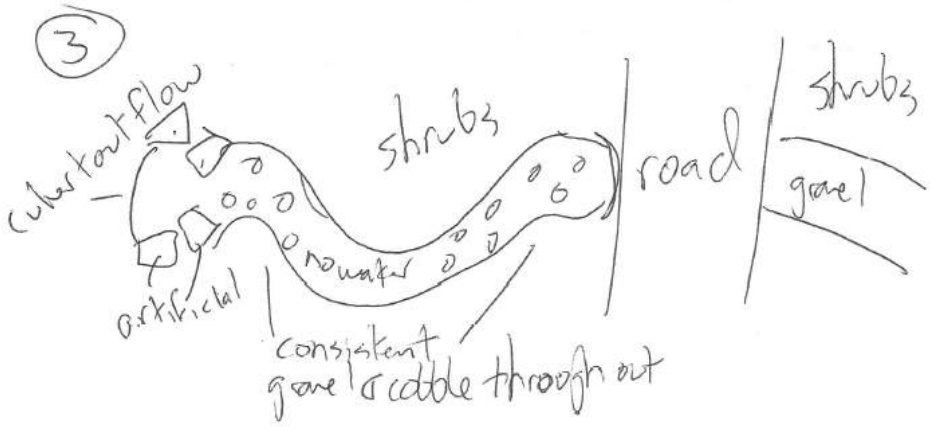
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

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

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

FLOW →



October 24, 2002 Revision

Save as pdf Reset Form

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 70

SITE NAME/LOCATION: Stream 4

SITE NUMBER: ____ RIVER BASIN: Great Miami DRAINAGE AREA (mi²): 0.50

LENGTH OF STREAM REACH (ft): 200 LAT. 39.99781 LONG. -84.30382 RIVER CODE: ____ RIVER MILE: ____

DATE: 10/06/14 SCORER: TER COMMENTS: ____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☐	SILT [3 pt]	10%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☑	COBBLE (65-256 mm) [12 pts]	30%	☐	CLAY or HARDPAN [0 pt]	0%
☑	GRAVEL (2-64 mm) [9 pts]	50%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	10%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 30.00% (A) Substrate Percentage Check (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points

Substrate Max = 40: 25

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 20

Pool Depth Max = 30: 25

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

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

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 2.80

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☑	☐	Wide >10m	☐	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☑	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☑	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

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

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

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

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☑ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☑ EWH Name: Stillwater River Distance from Evaluated Stream 0.61

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/06/14 Quantity: 0.03

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 20%

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

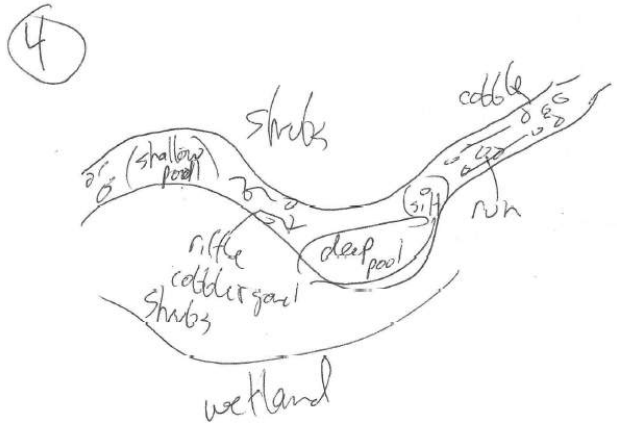
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

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

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

FLOW →



October 24, 2002 Revision

Save as pdf Reset Form

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

OhioEPA

QHEI Score: 69

Stream & Location: Stream 5 RM: _ _ _._ Date: 10/ 6 / 14

Stillwater River Scorers Full Name & Affiliation:

River Code: _ _ _ - _ _ _ - _ _ _ STORET #: _ _ _ _ _ _ Lat./ Long.: (NAD 83 - decimal °) 39.99456/-84.31584 Office verified location ☒

1] SUBSTRATE

Check *ONLY* **Two** substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	5	5	☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	10	10	☐ ☐ DETRITUS [3]		
☒ ☐ COBBLE [8]	30	30	☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	5	5	☐ ☒ SILT [2]	30	30
☐ ☐ SAND [6]	20	20	☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

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

Check ONE (*Or 2 & average*)

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☒ TILLS [1]	☐ MODERATE [-1]
☐ WETLANDS [0]	☒ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	SILT
☐ RIP/RAP [0]	☐ EXTENSIVE [-2]
☐ LACUSTURINE [0]	☐ MODERATE [-1]
☐ SHALE [-1]	☒ NORMAL [0]
☐ COAL FINES [-2]	☐ NONE [1]
	EMBEDDEDNESS

Comments

Substrate 13 Maximum 20

2] INSTREAM COVER

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

	UNDERCUT BANKS [1]	3	POOLS > 70cm [2]		OXBOWS, BACKWATERS [1]
3	OVERHANGING VEGETATION [1]	1	ROOTWADS [1]	2	AQUATIC MACROPHYTES [1]
	SHALLOWS (IN SLOW WATER) [1]	1	BOULDERS [1]	2	LOGS OR WOODY DEBRIS [1]
2	ROOTMATS [1]				

AMOUNT

Check ONE (*Or 2 & average*)

- ☐ EXTENSIVE >75% [11]
- ☒ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover 15 Maximum 20

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☐ LOW [2]	☒ FAIR [3]	☒ RECOVERING [3]	☐ LOW [1]
☒ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel 9 Maximum 20

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

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

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

Comments

residential and agricultural land uses beyond 100m

Riparian 8 Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH — Check **ONE** (*ONLY!*)

- ☒ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH — Check ONE (*Or 2 & average*)

- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☒ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY — Check ALL that apply

☐ TORRENTIAL [-1]	☒ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☒ FAST [1]	☐ INTERMITTENT [-2]
☒ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current 10 Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

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

Comments

Riffle / Run 5 Maximum 8

6] GRADIENT

(8 ft/mi) ☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (601 mi²)

%POOL: 20 %GLIDE: %RUN: 60 %RIFFLE: 20

Gradient 10 Maximum 10

A] SAMPLED REACH

Check ALL that apply

METHOD

- [ ] BOAT
- [x] WADE
- [ ] L. LINE
- [x] OTHER

STAGE

1st -sample pass- 2nd

- [ ] HIGH [ ]
- [ ] UP [ ]
- [x] NORMAL [ ]
- [ ] LOW [ ]
- [ ] DRY [ ]

DISTANCE

- [ ] 0.5 Km
- [ ] 0.2 Km
- [ ] 0.15 Km
- [x] 0.12 Km
- [ ] OTHER

_____ meters

CLARITY

1st --sample pass-- 2nd

- [ ] < 20 cm [ ]
- [x] 20-<40 cm [ ]
- [ ] 40-70 cm [ ]
- [ ] > 70 cm/ CTB [ ]
- [ ] SECCHI DEPTH [ ]

CANOPY

- [ ] > 85%- OPEN
- [x] 55%-<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10%- CLOSED

1st pass _____ cm

2nd _____ cm

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

B] AESTHETICS

- [ ] NUISANCE ALGAE
- [ ] INVASIVE MACROPHYTES
- [ ] EXCESS TURBIDITY
- [ ] DISCOLORATION
- [ ] FOAM / SCUM
- [ ] OIL SHEEN
- [ ] TRASH / LITTER
- [ ] NUISANCE ODOR
- [ ] SLUDGE DEPOSITS
- [ ] CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: [ ] >100ft^2 [ ] >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

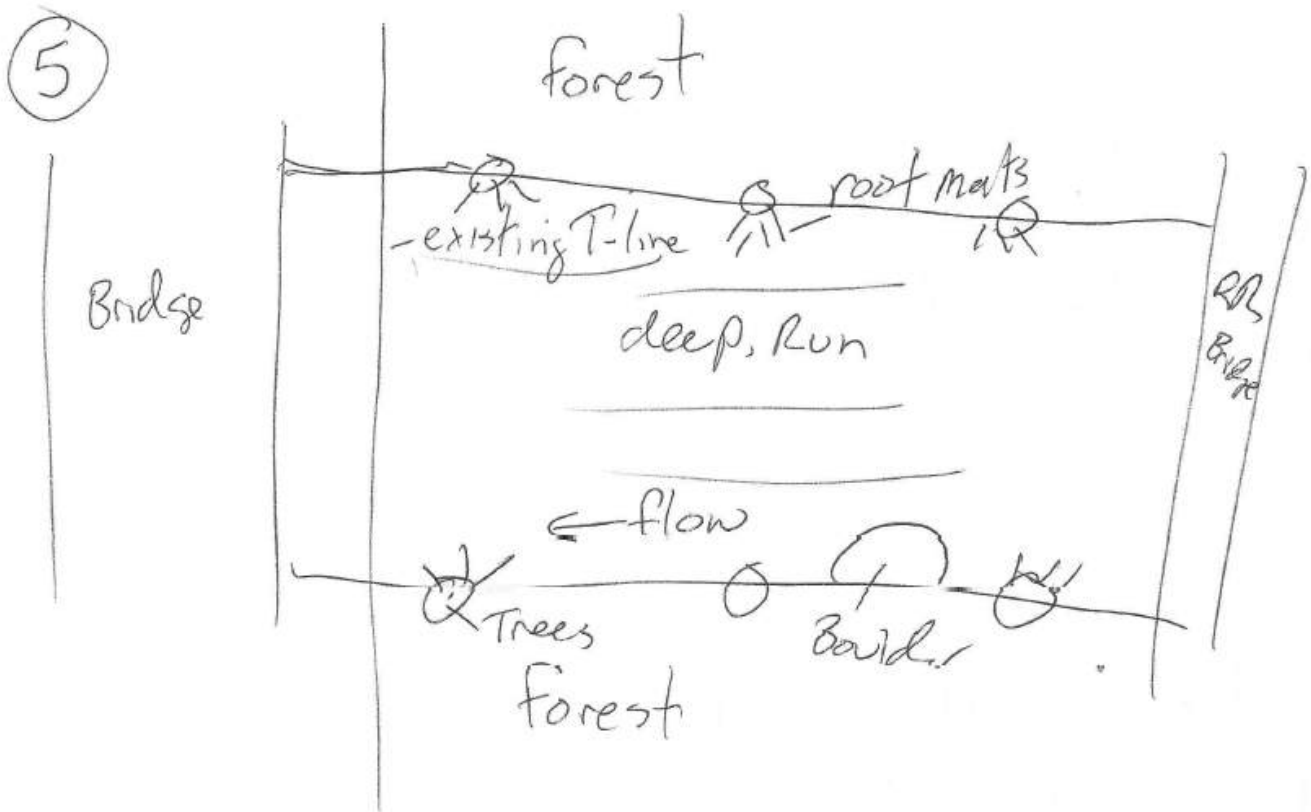
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 57.5

Stream & Location: Stream 5-00 (Stream 6) RM: ___ Date: 06/17/[redacted]15
DPL West Milton - Elder
Scorers Full Name & Affiliation: Nathan Ehlinger POWER Eng.
River Code: - - - STORET #: ___ Lat./Long.: 39.9486 / 84.3322 (NAD 83 - decimal °) Office verified location ☐

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

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	–	–	☐☐ HARDPAN [4]	–	–
☐☐ BOULDER [9]	–	–	☐☐ DETRITUS [3]	–	–
☐☒ COBBLE [8]	–	20	☐☐ MUCK [2]	–	–
☒☒ GRAVEL [7]	20	70	☐☐ SILT [2]	5	0
☒☐ SAND [6]	75	10	☐☐ ARTIFICIAL [0]	–	–
☐☐ BEDROCK [5]	–	–			

(Score natural substrates; ignore sludge from point-sources)

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

Check ONE (Or 2 & average)

ORIGIN: ☐ LIMESTONE [1] ☒ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY: SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☒ NORMAL [0] ☐ FREE [1]
EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☒ NORMAL [0] ☐ NONE [1]

Comments

Substrate: 15 (Maximum 20)

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

0 UNDERCUT BANKS [1]	0 POOLS > 70cm [2]	0 OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	0 ROOTWADS [1]	0 AQUATIC MACROPHYTES [1]
0 SHALLOWS (IN SLOW WATER) [1]	0 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
0 ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11] ☐ MODERATE 25-75% [7] ☒ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

Cover: 5 (Maximum 20)

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☒ MODERATE [3]	☐ GOOD [5]	☒ RECOVERED [4]	☒ MODERATE [2]
☐ LOW [2]	☒ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel: 12 (Maximum 20)

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

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

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

Comments

Riparian: 6.5 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6] ☐ 0.7-<1m [4] ☒ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☒ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☒ SLOW [1] ☐ INTERSTITIAL [-1] ☒ FAST [1] ☐ INTERMITTENT [-2] ☒ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current: 7 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

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

Comments

Riffle / Run: 5 (Maximum 8)

6] GRADIENT
(10 ft/mi) ☐ VERY LOW - LOW [2-4] ☒ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (4.5 mi²)

%POOL: 15 %GLIDE: 35 %RUN: 25 %RIFFLE: 25

Gradient: 7 (Maximum 10)

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☒ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

250 Feet
~~meters~~

CLARITY

1st --sample pass-- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☒ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st pass _____ cm
2nd _____ cm

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

Stream reach observed is partially in open pasture with remainder in forested area

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

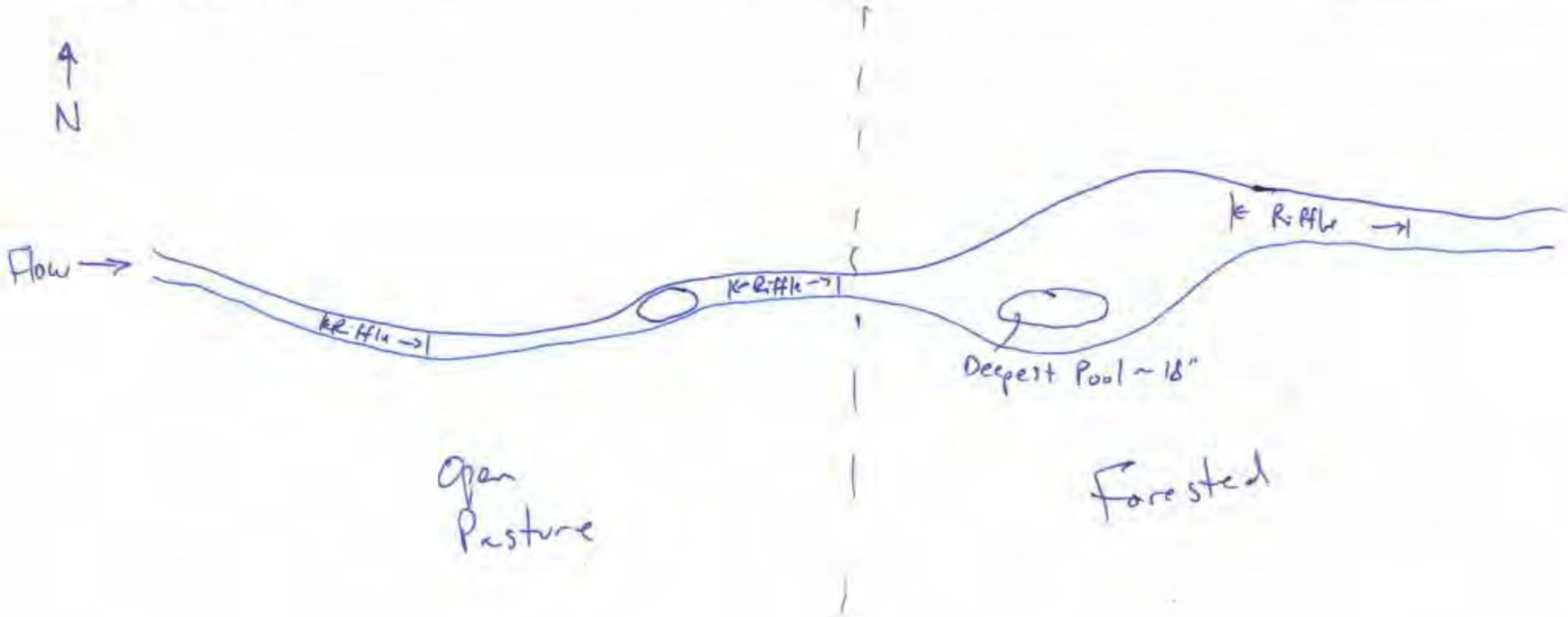
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 37

Stream & Location: Stream 5-06-A - Siegel Property **RM:** ___ **Date:** 11/19/14-11/15

Hwy: DPel - West Milton - Elton **Scorers Full Name & Affiliation:** Tyler Rook - Powell Engineering

River Code: - - - **STORET #:** ___ **Lat/Long:** 40.0621 / 84.2716 (DMD.D - decimal) Office review location ■

1] SUBSTRATE

Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☑ COBBLE [8]	15	20	☐☐ MUCK [2]		
☑☐ GRAVEL [7]	40	50	☐☑ SILT [2]	45	30
☐☐ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Comments

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☑ TILLS [1]	☐ MODERATE [-1]
☐ WETLANDS [0]	☑ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIPRAP [0]	☐ MODERATE [-1]
☐ LACUSTURINE [0]	☑ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT ..... EMBEDDEDNESS

Substrate: 10 (Maximum 20)

2] INSTREAM COVER

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

___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

AMOUNT — Check ONE (Or 2 & average)

- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover: 6 (Maximum 20)

3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☑ RECENT OR NO RECOVERY [1]	

Comments

Channel: 8 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE

Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

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

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

Comments

Riparian: 4 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH — Check ONE (ONLY!)

- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☑ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH — Check ONE (Or 2 & average)

- ☑ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY — Check ALL that apply

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	☑ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments no flow, isolated pools

Pool / Current: 1 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☑ NO RIFFLE [metric=0]

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

Comments currently no riffles flowing, riffles do exist in high water conditions

Riffle / Run: 0 (Maximum 8)

6] GRADIENT

GRADIENT (9.1 ft/mi) ☐ VERY LOW - LOW [2-4] ☑ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (11.75 mi²)

%POOL: 30 %GLIDE: - %RUN: 40 %RIFFLE: 30

Gradient: 8 (Maximum 10)

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☑ WADE
- ☐ L LINE
- ☐ OTHER

STAGE (1st sample pass / 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☑ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☑ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY (1st / sample pass / 2nd)
- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☑ > 70 cm (CTB) ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☑ 10%-<30%
- ☐ <10%- CLOSED

1st _____ cm
2nd _____ cm

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

stream is a channelized drainage feature which has continuous flow only a few months out of the year. Stream was mostly dry with a few isolated pools at time of evaluation. Agricultural drainage tiles observed along stream banks.

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION
AREA DEPTH
POOL: ☐ >1000ft² ☐ >3ft

D] MAINTENANCE
Circle some & COMMENT

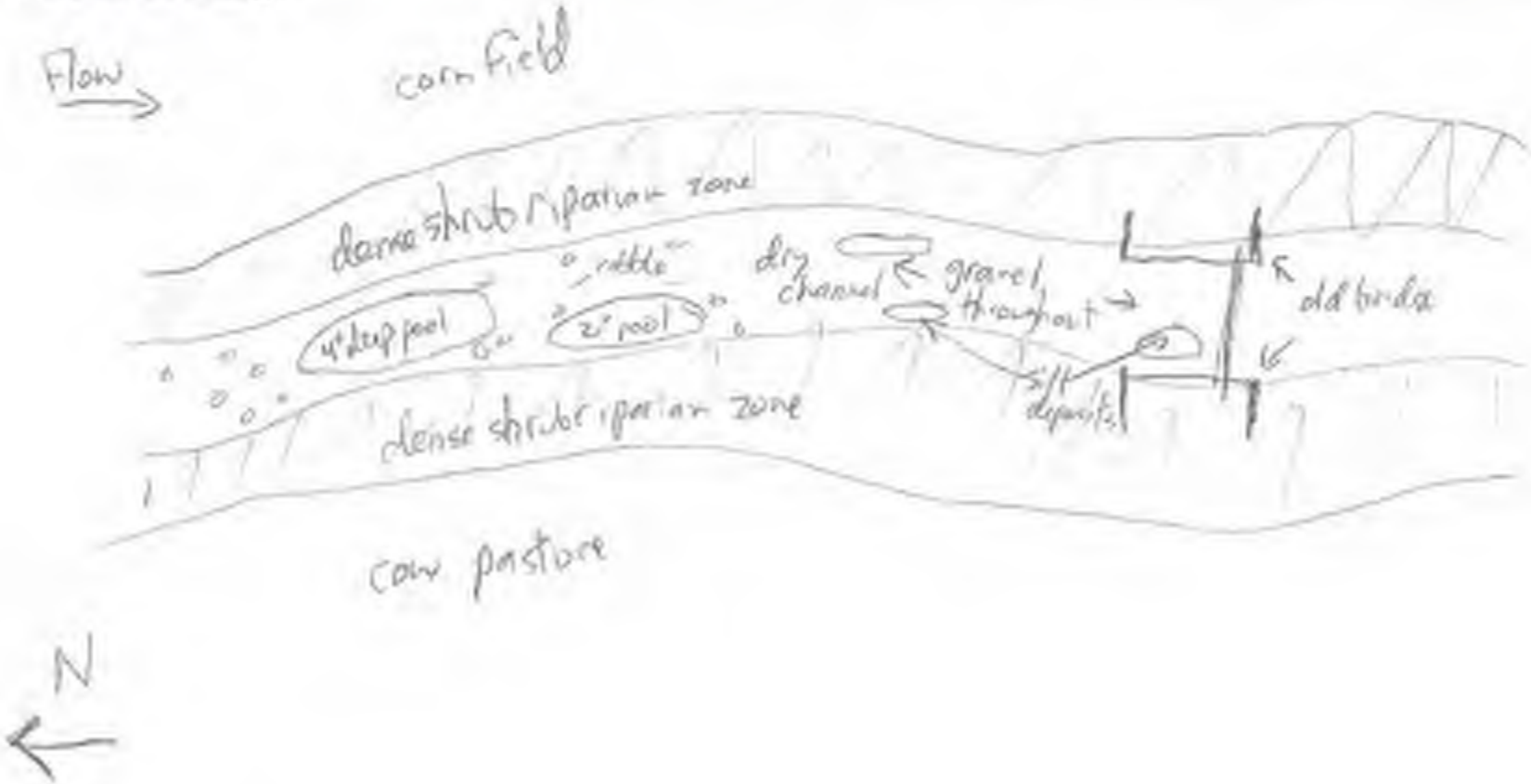
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 48.5

Stream & Location: Stream S-06-B **RM:** ___ **Date:** 10/21/15

DP&L West Milton-Eldean **Scorers Full Name & Affiliation:** Nathan Ehlinger POWER

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** 40.0819 184.2060 (NAD 83 - decimal °) Office verified location ☐

1] SUBSTRATE

Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☐ COBBLE [8]	10	15	☐☐ MUCK [2]		
☑☐ GRAVEL [7]	20	45	☐☐ SILT [2]	35	20
☐☑ SAND [6]	35	20	☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN: ☐ LIMESTONE [1] ☑ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY: SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☑ NORMAL [0] ☐ FREE [1]; EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☑ NORMAL [0] ☐ NONE [1]

Comments

Substrate: 14 (Maximum 20)

2] INSTREAM COVER

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

1 UNDERCUT BANKS [1]	0 POOLS > 70cm [2]	0 OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	1 ROOTWADS [1]	0 AQUATIC MACROPHYTES [1]
0 SHALLOWS (IN SLOW WATER) [1]	1 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
0 ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average): ☐ EXTENSIVE >75% [11] ☒ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

Cover: 11 (Maximum 20)

3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☑ LOW [2]	☒ FAIR [3]	☒ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☒ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel: 9 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE

Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	(L R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☒☒ FOREST, SWAMP [3]	☐☐ CONSERVATION TILLAGE [1]
☑☒ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]	☐☐ URBAN OR INDUSTRIAL [0]
☐☐ HEAVY / SEVERE [1]	☑☒ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐☐ MINING / CONSTRUCTION [0]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]	
	☐☐ NONE [0]	☒☒ OPEN PASTURE, ROWCROP [0]	

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

Comments

Riparian: 5.5 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!): ☐ > 1m [6] ☐ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☒ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average): ☒ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply: ☐ TORRENTIAL [-1] ☐ VERY FAST [1] ☐ FAST [1] ☐ MODERATE [1] ☐ SLOW [1] ☐ INTERSTITIAL [-1] ☒ INTERMITTENT [-2] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential: Primary Contact / Secondary Contact (circle one and comment on back)

Comments: Isolated Pools

Pool / Current: 1 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☑ NO RIFFLE [metric=0]

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

Comments: No flow in riffle locations

Riffle / Run: 0 (Maximum 8)

6] GRADIENT

(9.1 ft/mi) ☐ VERY LOW - LOW [2-4] ☑ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (1.75 mi²)

%POOL: 15 %GLIDE: 25 %RUN: 40 %RIFFLE: 20

Gradient: 8 (Maximum 10)

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE (1st -sample pass- 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 0.5 Km
- ☒ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY (1st --sample pass-- 2nd)
- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☒ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

1st _____ cm
2nd _____ cm

CANOPY
- ☐ > 85%- OPEN
- ☒ 55%-<85%
- ☐ 30%-<55%
- ☒ 10%-<30%
- ☐ <10%- CLOSED

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

Channelized stream with few isolated pools in survey area.

Drainage tile outlets observed on downstream left bank.

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION
AREA DEPTH
POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE
Circle some & *COMMENT*

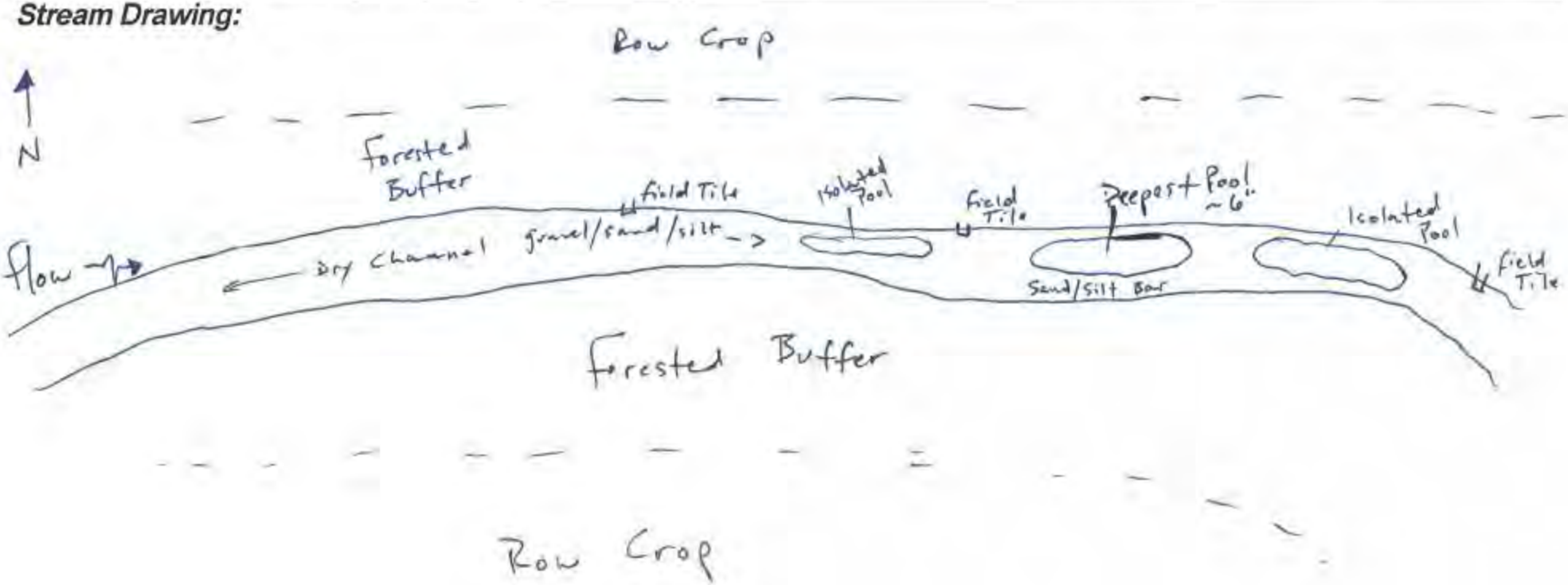
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 39

SITE NAME/LOCATION DPL West Milton-Elden n

S-002 (Stream 7) _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 0.25

LENGTH OF STREAM REACH (ft) 125 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 6/17/15 SCORER NLE COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE			PERCENT	TYPE			PERCENT
☐	☐	BLDR SLABS [16 pts]	0	☒	☐	SILT [3 pt]	47
☐	☐	BOULDER (>256 mm) [16 pts]	0	☐	☐	LEAF PACK/WOODY DEBRIS [3 pts]	3
☐	☐	BEDROCK [16 pt]	0	☐	☐	FINE DETRITUS [3 pts]	0
☐	☐	COBBLE (65-256 mm) [12 pts]	0	☐	☐	CLAY or HARDPAN [0 pt]	0
☐	☐	GRAVEL (2-64 mm) [9 pts]	5	☐	☐	MUCK [0 pts]	15
☐	☒	SAND (<2 mm) [6 pts]	30	☐	☐	ARTIFICIAL [3 pts]	0

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: (A) 9

TOTAL NUMBER OF SUBSTRATE TYPES: (B) 5

HHEI Metric Points — Substrate Max = 40: 9 (A + B)

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☒ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters):

Pool Depth Max = 30: 15

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

- ☐ > 4.0 meters (> 13') [30 pts]
- ☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☐ > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- ☒ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 4'

Bankfull Width Max=30: 15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☒	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

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

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS Intermittent

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

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☒ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

October 24, 2002 Revision

S-002

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 6/17/15 Quantity: 0.47

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 40

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

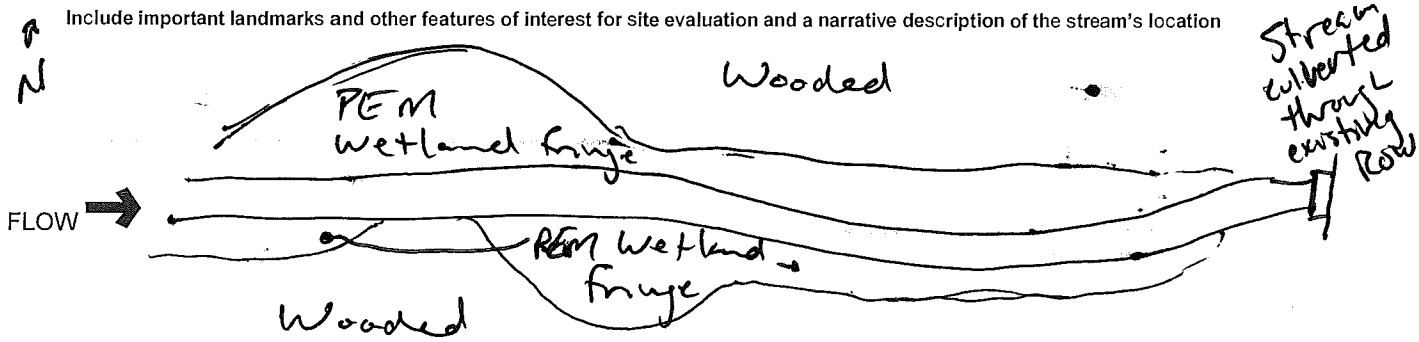
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Ohio EPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 65

SITE NAME/LOCATION DPL West Mr / Ron-Eldean

S-003 (Stream 8) UMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 1.1

LENGTH OF STREAM REACH (ft) 200 LAT. 39.950572 LONG. -84.332203 RIVER CODE _____ RIVER MILE _____

DATE 6/17/15 SCORER NLE COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	5
☐ ☐	BOULDER (>256 mm) [16 pts]	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	3
☐ ☐	BEDROCK [16 pt]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [12 pts]	21	☐ ☐	CLAY or HARDPAN [0 pt]	0
☒ ☐	GRAVEL (2-64 mm) [9 pts]	47	☐ ☐	MUCK [0 pts]	0
☐ ☒	SAND (<2 mm) [6 pts]	24	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 21

(A) 15 SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

(B) 5 TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40: 20

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☒ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 54

Pool Depth Max = 30: 25

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

- ☐ > 4.0 meters (> 13') [30 pts]
- ☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☑ > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) 8'

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☒	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

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

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS Intermittent

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

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☒ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

October 24, 2002 Revision

S-003

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 6/17/15 Quantity: 0.47

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 5

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

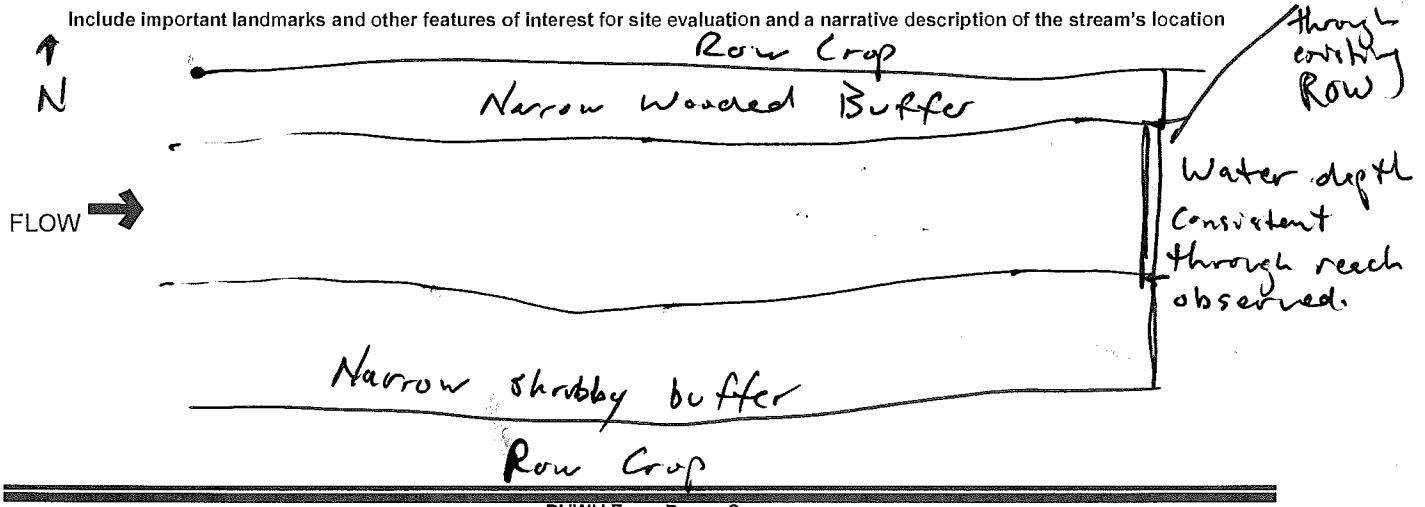
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



October 24, 2002 Revision

OhioEPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 52.5

Stream & Location: Stream 9 - Jones Run **RM:** **Date:** 6/1/15

DPL West Milton – Elder **Scorers Full Name & Affiliation:** Tyler Rankin

River Code: - - - **STORET #:** **Lat./Long.:** 39.9413 / 84.3322 (DMD to decimal) Office verified location ☐

1] SUBSTRATE

Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☑ COBBLE [8]	3	10	☐☐ MUCK [2]		
☑☐ GRAVEL [7]	32	62	☐☑ SILT [2]	50	5
☐☐ SAND [6]	15	28	☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Comments

Check ONE (Or 2 & average)

ORIGIN
- ☐ LIMESTONE [1]
- ☑ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIPRAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY
- SILT:
  - ☐ HEAVY [-2]
  - ☐ MODERATE [-1]
  - ☑ NORMAL [0]
  - ☐ FREE [1]
- EMBEDDEDNESS:
  - ☐ EXTENSIVE [-2]
  - ☐ MODERATE [-1]
  - ☑ NORMAL [0]
  - ☐ NONE [1]

Substrate: 10 (Maximum 20)

2] INSTREAM COVER

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

- ___ UNDERCUT BANKS [1]
- 2 OVERHANGING VEGETATION [1]
- 1 SHALLOWS (IN SLOW WATER) [1]
- ___ ROOTMATS [1]
- ___ POOLS > 70cm [2]
- 1 ROOTWADS [1]
- ___ BOULDERS [1]
- ___ OXBOWS, BACKWATERS [1]
- ___ AQUATIC MACROPHYTES [1]
- 1 LOGS OR WOODY DEBRIS [1]

AMOUNT Check ONE (Or 2 & average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☑ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover: 9 (Maximum 20)

3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☑ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel: 12 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE

Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

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

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

Comments

Riparian: 6.5 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☑ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☑ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☑ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current: 4 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average) ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☑ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☑ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☑ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☑ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments

Riffle / Run: 3 (Maximum 8)

6] GRADIENT

1.36 ft/mi

DRAINAGE AREA 11.35 mi²

- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☑ HIGH - VERY HIGH [10-6]

%POOL: 15 %GLIDE: 0 %RUN: 40 %RIFFLE: 45

Gradient: 8 (Maximum 10)

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☑ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE (1st –sample pass– 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☑ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☑ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY (1st –sample pass– 2nd)
- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☑ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

1st _____ cm
2nd _____ cm

CANOPY
- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☑ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

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

Reach evaluated is consistent with stream. Dredging & newly constructed drainage channels observed flowing into stream.

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION
AREA DEPTH
POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE
Circle some & COMMENT

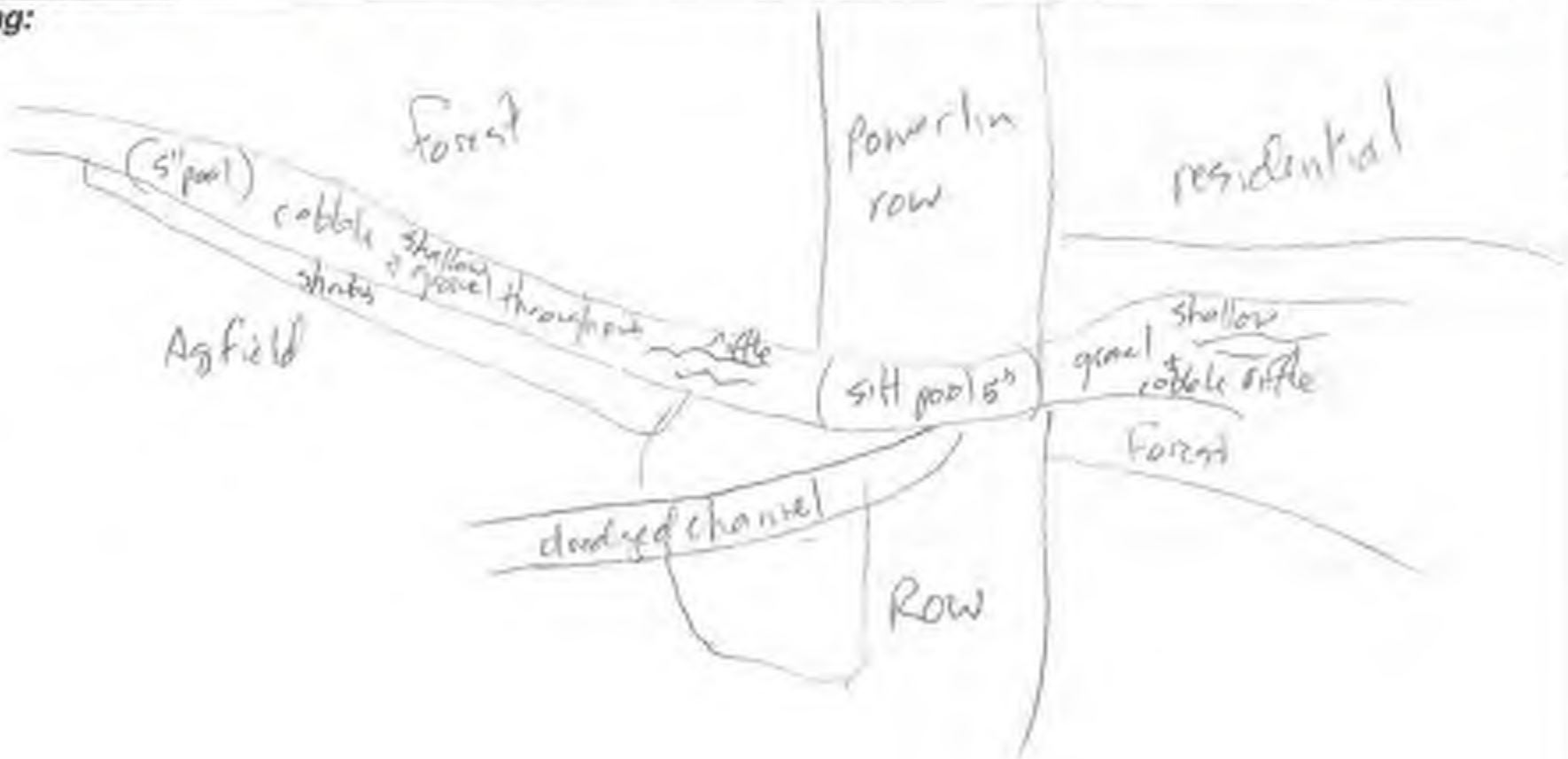
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
- x̄ width
- x̄ depth
- max. depth
- x̄ bankfull width
- bankfull x̄ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 25

SITE NAME/LOCATION: Stream 10

SITE NUMBER: ____ RIVER BASIN: Great Miami DRAINAGE AREA (mi²): 0.25

LENGTH OF STREAM REACH (ft): 200 LAT. 39.941083 LONG. -84.332412 RIVER CODE: ____ RIVER MILE: ____

DATE: 10/15/15 SCORER: TER COMMENTS: Channelized Drainage Ditch

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	.5
☐	BOULDER (>256 mm) [16 pts]	0.0	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0
☐	BEDROCK [16 pt]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [12 pts]	0.05	☐	CLAY or HARDPAN [0 pt]	0
☑	GRAVEL (2-64 mm) [9 pts]	.3	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	.15	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 0.05 (A) Substrate Percentage Check: 1 (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points

Substrate Max = 40: 25

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 17

Pool Depth Max = 30: 0

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

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

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 2.1

Bankfull Width Max=30: 0

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS: Dredged channel

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

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

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

- ☐ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Jones Run Distance from Evaluated Stream 0.00

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/3/15 Quantity: 0.1

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 0.85

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

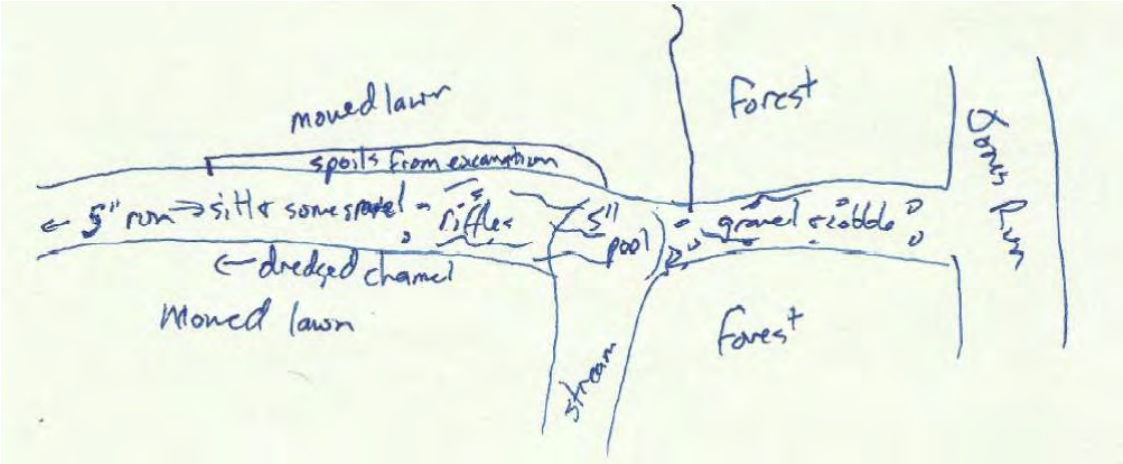
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

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

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

FLOW →



October 24, 2002 Revision

Save as pdf Reset Form

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 25

SITE NAME/LOCATION: Stream 10

SITE NUMBER: ____ RIVER BASIN: Great Miami DRAINAGE AREA (mi²): 0.25

LENGTH OF STREAM REACH (ft): 200 LAT. 39.941083 LONG. -84.332412 RIVER CODE: ____ RIVER MILE: ____

DATE: 10/15/15 SCORER: TER COMMENTS: Channelized Drainage Ditch

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	.5
☐ ☐	BOULDER (>256 mm) [16 pts]	0.0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0
☐ ☐	BEDROCK [16 pt]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.05	☐ ☐	CLAY or HARDPAN [0 pt]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	.3	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	.15	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 0.05 (A) Substrate Percentage Check 1 (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 17

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

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

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 2.1

HHEI Metric Points

Substrate Max = 40	25
A + B	
Pool Depth Max = 30	0
Bankfull Width Max=30	0

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS: Dredged channel

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

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

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

- ☐ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Jones Run Distance from Evaluated Stream 0.00

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: West Milton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Miami Township / City: Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/3/15 Quantity: 0.1

Photograph Information: See Photograph Appendix

Elevated Turbidity? (Y/N): N Canopy (% open): 0.85

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

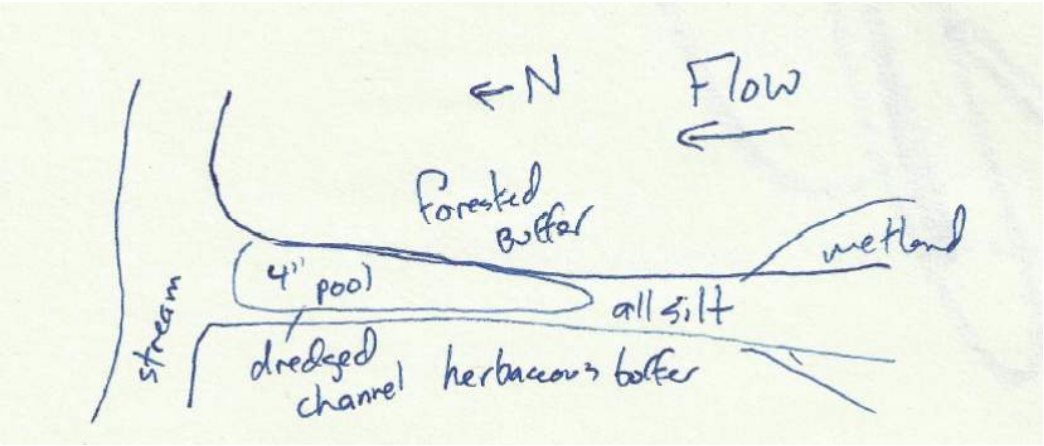
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

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

Comments Regarding Biology: _____

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

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



October 24, 2002 Revision

Save as pdf

Reset Form

APPENDIX 7-3

Wetland Data Forms - USACE Forms and Ohio Rapid Assessment Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: West Milton - Eldean Transmission Line Proje | City/County: Greentown/Howard County | Sampling Date: 10/6/14

Applicant/Owner: Dayton Power and Light | State: Ohio | Sampling Point: Wetland A - Wet In

Investigator(s): Tyler Rankin/Geoffrey Palmer | Section, Township, Range: S29/T6N/R5E

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): concave

Slope (%): 0 | Lat: 39.939671 | Long: -84.333119 | Datum: NAD 83

Soil Map Unit Name: MoA - Millsdale silty clay loam, 0 to 2 percent slopes | NWI Classification: PEM

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	Y
Hydric soil present?	Y		
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland A

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Salix nigra*	5	Y	OBL
2 *Ulmus Americana*	5	Y	FACW
3			
4			
5			
	10	= Total Cover	

Sapling/Shrub stratum (Plot size: 15')			
1 *Cornus alba*	10	Y	FACW
2			
3			
4			
5			
	10	= Total Cover	

Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	80	Y	FACW
2 *Typha angustifolia*	15	N	OBL
3 *Impatiens capensis*	5	N	FACW
4 *Apocynum cannabinum*	5	N	FAC
5			
6			
7			
8			
9			
10			
	105	= Total Cover	

Woody vine stratum (Plot size: 15')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	20	x 1 =	20
FACW species	100	x 2 =	200
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	125 (A)		235 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

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

Hydrophytic vegetation present? Y

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

SOIL

Sampling Point: Wetland A - Wet I

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

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-4	10 YR 3/2	100	None				Silt Loam	
4-18	Gley 2.5/10Y	80	10 YR 3/6	20	C	M	Silt Loam	

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

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	X	No		Depth (inches):	3
Water table present?	Yes		No	X	Depth (inches):	
Saturation present? (includes capillary fringe)	Yes	X	No		Depth (inches):	6

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: West Milton - Eldean Transmission Line Proje | City/County: Greentown/Howard County | Sampling Date: 10/6/14

Applicant/Owner: Dayton Power and Light | State: Ohio | Sampling Point: Wetland A - Wet Out

Investigator(s): Tyler Rankin/Geoffrey Palmer | Section, Township, Range: S29/T6N/R5E

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): None

Slope (%): 0 | Lat: 39.939962 | Long: -84.333436 | Datum: NAD 83

Soil Map Unit Name: MoA - Millsdale silty clay loam, 0 to 2 percent slopes | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation _____, soil _____, or hydrology _____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N	**Is the sampled area within a wetland?**	N
Hydric soil present?	N		
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Poa annua*	40	Y	FACU
2 *Viola canadensis*	20	Y	FACU
3 *Plantago lanceolata*	20	Y	FACU
4 *Trifolium repens*	20	Y	FACU
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 15')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column totals	100 (A)		400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

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

Hydrophytic vegetation present? N

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

SOIL

Sampling Point: Wetland A - Wet O

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

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-18	10 YR 4/3	90	10 YR 4/2	10	RM	M	Silt Loam	

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

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches):	___
Water table present?	Yes	___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: West Milton - Eldean Transmission Line Proje | City/County: Greentown/Howard County | Sampling Date: 10/6/14

Applicant/Owner: Dayton Power and Light | State: Ohio | Sampling Point: Wetland B - Wet In

Investigator(s): Tyler Rankin/Geoffrey Palmer | Section, Township, Range: S3/T6N/R5E

Landform (hillslope, terrace, etc.): floodplain | Local relief (concave, convex, none): concave

Slope (%): 0 | Lat: 39.997935 | Long: -84.303122 | Datum: NAD 83

Soil Map Unit Name: Ee - Eel Silt Loam | NWI Classification: PEM

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	Y
Hydric soil present?	Y		
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland A

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5')			
1 *Acorus calamus*	40	Y	OBL
2 *Scirpus atrovirens*	20	Y	OBL
3 *Eupatorium perfoliatum*	20	Y	OBL
4 *Impatiens capensis*	10	N	FACW
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 15')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	80	x 1 =	80	
FACW species	10	x 2 =	20	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	90	(A)	100	(B)

Prevalence Index = B/A = 1.11

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

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

Hydrophytic vegetation present? Y

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

SOIL

Sampling Point: Wetland B - Wet I

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

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-5	10 YR 3/1	100	None				Silt Loam	
5-18	Gley 2.5/N	70	10 YR 3/6	20	C	M	Silt Loam	
			10 YR 2/1	10	RM	M	Silt Loam	

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

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface water present?		X	
Water table present?		X	
Saturation present? (includes capillary fringe)	X		Surface

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: West Milton - Eldean Transmission Line Proje | City/County: Greentown/Howard County | Sampling Date: 10/6/14

Applicant/Owner: Dayton Power and Light | State: Ohio | Sampling Point: Wetland b - Wet Out

Investigator(s): Tyler Rankin/Geoffrey Palmer | Section, Township, Range: S3/T6N/R5E

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): None

Slope (%): 0 | Lat: 39.996765 | Long: -84.303233 | Datum: NAD 83

Soil Map Unit Name: Ee - Eel silt loam | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N	**Is the sampled area within a wetland?**	N
Hydric soil present?	N		
Indicators of wetland hydrology present?	N	f yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer rubrum*	15	Y	FAC
2 *Robinia pseudoacacia*	10	Y	FACU
3			
4			
5			
	25	= Total Cover	

Herb stratum (Plot size: 5')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Poa annua*	30	Y	FACU
2 *Viola canadensis*	25	Y	FACU
3 *Plantago lanceolata*	25	Y	FACU
4 *Trifolium repens*	20	Y	FACU
5			
6			
7			
8			
9			
10			
	100	= Total Cover	

Woody vine stratum (Plot size: 15')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 16.67% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	15	x 3 =	45	
FACU species	110	x 4 =	440	
UPL species	0	x 5 =	0	
Column totals	125	(A)	485	(B)

Prevalence Index = B/A = 3.88

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

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

Hydrophytic vegetation present? N

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

SOIL

Sampling Point: /etland b - Wet O

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

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-18	10 YR 4/4	100					Silt Loam	

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

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches):	___
Water table present?	Yes	___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland A	Rater(s): T. Rankin	Date: 10/6/14

2	2
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

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

8	10
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

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

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

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

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

17	27
max 30 pts.	subtotal

Metric 3. Hydrology.

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

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

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

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

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

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

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

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

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [x] ditch
- [ ] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

8.5	35.5
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

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

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [x] Recovering (2)
- [ ] Recent or no recovery (1)

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

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

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

- [ ] None or none apparent (9)
- [ ] Recovered (6)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [x] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [x] dredging
- [ ] farming
- [ ] nutrient enrichment

35.5
subtotal this page

last revised 1 February 2001 jjm

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland A	Rater(s): T. Rankin	Date: 10/6/14

35.5
subtotal first page

0	0
max 10 pts.	subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

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

7	42.5
max 20 pts.	subtotal

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [2] Emergent
- [2] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [✓] Moderate (3)
- [ ] Moderately low (2)
- [ ] Low (1)
- [ ] None (0)

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

- [ ] Extensive >75% cover (-5)
- [✓] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [1] Vegetated hummucks/tussucks
- [1] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [1] Amphibian breeding pools

Vegetation Community Cover Scale

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

Narrative Description of Vegetation Quality

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

Mudflat and Open Water Class Quality

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

Microtopography Cover Scale

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

42.5

End of Quantitative Rating. Complete Categorization Worksheets.

Site: Wetland B	Rater(s): T. Rankin	Date: 10/6/14

1	1
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

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

7	8
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

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

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

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

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

10	18
max 30 pts.	subtotal

Metric 3. Hydrology.

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

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [x] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

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

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

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

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

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

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

- [ ] None or none apparent (12)
- [ ] Recovered (7)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other_____

16	34
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

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

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

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

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [x] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

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

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

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

34
subtotal this page

last revised 1 February 2001 jjm

Site: wetland 6	Rater(s): T. Rankin	Date: 10/6/14

34
subtotal first page

Metric 5. Special Wetlands.

0	34
max 10 pts.	subtotal

Check all that apply and score as indicated.

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

Metric 6. Plant communities, interspersion, microtopography.

4	38
max 20 pts.	subtotal

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [2] Emergent
- [ ] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [✓] Low (1)
- [ ] None (0)

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

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [✓] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [1] Vegetated hummucks/tussucks
- [ ] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [ ] Amphibian breeding pools

Vegetation Community Cover Scale

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

Narrative Description of Vegetation Quality

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

Mudflat and Open Water Class Quality

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

Microtopography Cover Scale

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

38

End of Quantitative Rating. Complete Categorization Worksheets.

APPENDIX 7-4

Regulatory Agency Correspondence
U.S. Fish and Wildlife Service and
Ohio Department of Natural Resources

Office of Real Estate
Paul R. Baldridge, Chief
2045 Morse Road – Bldg. E-2
Columbus, OH 43229
Phone: (614) 265-6649
Fax: (614) 267-4764

March 15, 2017

Tyler Rankin
GAI Consultants
1830 Airport Exchange Blvd., Suite 220,
Erlanger, Kentucky 41018

Re: 17-146; West Milton - Eldean 138 kV Transmission Line 15-258 Comment Renewal Request

Project: The proposed project involves the construction of approximately 16.6 miles of a single 138 kV circuit line.

Location: The proposed project is located in Union and Concord Townships, Miami County, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. 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 National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do 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.

Natural Heritage Database: The Natural Heritage Database has the following records at or within a one-mile radius of the project area:

Woods-hellebore (*Melanthium woodii*), T
Indiana bat (*Myotis sodalis*), E, FE
Creek heelsplitter (*Lasmigona compressa*), SC
Waterfall (geologic feature)
Stillwater State Scenic River
Francis Easement – ODNR Scenic Rivers Program
Brukner Nature Center – Brukner Nature Center
Twin Arch Reserve – Miami Co. Park District

The review was performed on the project area you specified in your request as well as an additional one-mile radius. Records searched date from 1980. This information is provided to inform you of features present within your project area and vicinity.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that

rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

Statuses are defined as: E = state endangered; T = state threatened; P = state potentially threatened; SC = state species of concern; SI = state special interest; A = species recently added to state inventory, status not yet determined; X = presumed extirpated in Ohio; FE = federal endangered, FT = federal threatened, FSC = federal species of concern, FC = federal candidate species.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, 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.

A portion of the project is within the vicinity of one or more records for the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. Presence of the Indiana bat has been established from West McCurdy Road to the southern terminus of the project, and therefore additional summer surveys would not constitute presence/absence in the area. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31.

The remainder of the project is within the range of the Indiana bat (*Myotis sodalis*). The following species of trees have relatively high value as potential Indiana bat roost trees to include: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

The project is within the range of the club shell (*Pleurobema clava*), a state endangered and federally endangered mussel, the rayed bean (*Villosa fabalis*), a state endangered and federally endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federally endangered mussel. This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2016), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 10 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within

the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2016) can be found at:
http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf

The project is within the range of the Iowa darter *(Etheostoma exile),* a state endangered fish. The DOW recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed, this project is not likely to impact this or other aquatic species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the U.S. Fish & Wildlife Service.

Water Resources: The Division of Water Resources has the following comment.

The local floodplain administrator should be contacted concerning the possible need for any floodplain permits or approvals for this project. Your local floodplain administrator contact information can be found at the website below.

http://water.ohiodnr.gov/water-use-planning/floodplain-management#PUB

Scenic Rivers: The Ohio Scenic Rivers Program has the following comments

The ODNR Scenic Rivers Program would prefer that the existing crossing of the Route 55 bridge southeast of the Village of Ludlow Falls over the Stillwater State Scenic River be utilized. It is also recommended that every attempt be made to "overbuild" the wires vertically on an existing tower at the actual river crossing location, thus spanning the river valley. This will reduce the amount of riparian vegetation that needs to be cleared to install and maintain the transmission lines long term. Once the lines are beyond the stream channel and any existing riparian forest buffer on either side of the stream, the lines could then be installed on poles or structures running parallel to existing structures. For long term maintenance in riparian areas, the Scenic Rivers Program requests that First Energy plant low growing native shrubs and trees (underneath transmission lines) to provide some form of a riparian forest buffer at the river crossing location. Scenic Rivers Program staff can assist First Energy regarding determining which species may be most appropriate for crossing of the Stillwater State Scenic River. Melissa Clark, Southwest Regional Manager, can assist with a native plant list and any questions that First Energy may have about the Stillwater State Scenic River. Ms. Clark may be contacted at Melissa.clark@dnr.state.oh.us or (937) 408-8554.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler
ODNR Office of Real Estate

2045 Morse Road, Building E-2
Columbus, Ohio 43229-6693
John.Kessler@dnr.state.oh.us

Marc Walters

Subject: FW: Updated Review of DPL's - West Milton - Eldean 138 kV Transmission Line, Miami Co. OH

From: susan_zimmermann@fws.gov [mailto:susan_zimmermann@fws.gov] **On Behalf Of** Ohio, FW3
Sent: Wednesday, March 01, 2017 1:32 PM
To: Marc Walters <M.Walters@gaiconsultants.com>
Cc: nathan.reardon@dnr.state.oh.us; kate.parsons@dnr.state.oh.us
Subject: Updated Review of DPL's - West Milton - Eldean 138 kV Transmission Line, Miami Co. OH

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

TAILS# 03E15000-2013-TA-0631 (G121196.00)

Dear Mr. Walters,

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.

The proposed project is in the vicinity of one or more confirmed records of Indiana bats. Therefore, we recommend that trees ≥3 inches dbh be saved wherever possible. Because the project will result in a small amount of forest clearing relative to the available habitat in the immediately surrounding area, habitat removal is unlikely to result in significant impacts to these species. Since Indiana bat presence in the vicinity of the project has been confirmed, clearing of trees ≥3 inches dbh during the summer roosting season may result in direct take of individuals. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and tree removal is unavoidable, we recommend that removal of any trees ≥3 inches dbh only occur between October 1 and March 31. Following this seasonal tree clearing recommendation should ensure that any effects to Indiana bats and northern long-eared bats are insignificant or discountable. **Please note that, because Indiana bat presence has already been confirmed in the project vicinity, any additional summer surveys would not constitute presence/absence surveys for this species.**

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.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a federally listed endangered species. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of rayed bean mussels in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a federally listed endangered species. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

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
Ohio Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW

Kate Parson, ODNR-DOW

From: susan_zimmermann@fws.gov [mailto:susan_zimmermann@fws.gov] **On Behalf Of** Ohio, FW3
Sent: Monday, May 04, 2015 10:31 AM
To: Mike Frank
Subject: West Milton - Eldean 138 kV Transmission Line, Miami Co. OH

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

TAILS# 03E15000-2013-TA-0631

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 **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

The proposed project is in the vicinity of one or more confirmed records of Indiana bats. Therefore, we recommend that trees exhibiting any of the characteristics listed above, as well as any wooded areas or tree lined corridors, be saved wherever possible. Because the project will result in a small amount of

forest clearing relative to the available habitat in the immediately surrounding area, habitat removal is unlikely to result in significant impacts to this species. However, Indiana bat presence in the vicinity of the project has been confirmed, clearing of trees during the summer roosting season may result in direct take of individuals. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring surveys are warranted. If no caves or abandoned mines are present and tree removal is unavoidable, we recommend that any tree removal occur between October 1 and March 31 to avoid impacts to Indiana bats. Following these seasonal tree clearing restrictions should ensure that any effects to Indiana bats are insignificant or discountable. **Please note that, because Indiana bat presence has already been confirmed in the project vicinity, any additional summer surveys would not constitute presence/absence surveys for this species.**

All projects in the State of Ohio lie within the range of the **northern long-eared bat** (*Myotis septentrionalis*), a federally listed threatened species. Recently white-nose syndrome (WNS), a novel fungal pathogen, has caused serious declines in the northern long-eared bat population in the northeastern U.S. WNS has also been documented in Ohio, but the full extent of the impacts from WNS in Ohio is not yet known.

During winter, northern long-eared bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) Roosting habitat in dead or live trees and snags with cavities, peeling or exfoliating bark, split tree trunk and/or branches, which may be used as maternity roost areas;
(2) Foraging habitat in upland and lowland woodlots and tree lined corridors;
(3) Occasionally they may roost in structures like barns and sheds.

Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above and/or the site contains any caves or abandoned mines, we recommend that the habitat and surrounding trees be saved wherever possible. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. If no caves or abandoned mines are present and trees cannot be avoided, any unavoidable tree removal should only occur between October 1 and March to avoid impacts to northern long-eared bats. Following these seasonal tree clearing restrictions should ensure that any effects to northern long-eared bats are insignificant or discountable.

If there is a federal nexus for the project (federal funding provided, federal permits required to construct, etc.) then no tree clearing on any portion of the parcel should occur 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 to this office a determination of effects to the Indiana bat and northern long-eared bat for our review and concurrence.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a federally listed endangered species. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable

absence of rayed bean mussels in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

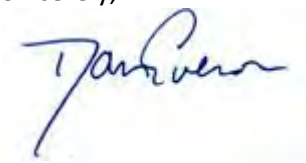
The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a federally listed endangered species. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

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 orohio@fws.gov.

Sincerely,



Dan Everson
Field Supervisor

cc: Nathan Reardon, ODNR-DOW
Jennifer Norris, ODNR-DOW

From: susan_zimmermann@fws.gov on behalf of Ohio, FW3 [ohio@fws.gov]
Sent: Monday, May 11, 2015 8:39 AM
To: Mike Frank
Subject: Re: West Milton - Eldean 138 kV Transmission Line, Miami Co. OH

TAILS# 03E15000-2013-TA-0631

Dear Mr. Frank,

In answer to your request for the OPSB, no mussel survey is necessary, if you can ensure that there will be no impacts to the Stillwater River. Specifically, stream banks would not be destabilized and there will be no increase in sedimentation.

Regards
Susan

On Thu, May 7, 2015 at 9:45 PM, Mike Frank <m.frank@gaiconsultants.com> wrote:

Ms. Zimmerman,

I ask that you please forward to staff as necessary. The Ohio Power Siting Board staff has asked that we verify that a survey for the endangered mussels mentioned below is NOT necessary for this project, based on the description of the project that I provided in my request letter. In essence, there will be no work below the Ordinary High Water Mark of the Stillwater River where the transmission line will span. The existing poles will be replaced with new poles in approximately the same location as existing.

Would the FWS please respond with a statement of no survey required if your office concurs.

Thank You,

Mike A. Frank
Project Manager, Environmental Services

GAI Consultants, Inc.

1830 Airport Exchange Blvd, Suite 220, Erlanger, KY 41018

859.647.6647 ext. 4237 | **C** 513.479.9036

transforming ideas into reality® since 1958 | gaiconsultants.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

Received 3/18/13

March 11, 2013

Mike A. Frank
GAI Consultants
1830 Airport Exchange Boulevard, Suite 220
Erlanger, KY
41018

TAILS: 03E15000-2013-TA-0631

Dear Mr. Frank:

This is in response to your February 15, 2013 letter regarding the proposed Dayton Power and Light 138 kV transmission line to connect the two existing substations (West Milton and Eldean). The following comments are being provided pursuant to the Endangered Species Act (ESA), Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Fish and Wildlife Act of 1956. This information is being provided to assist you in making informed decisions regarding wildlife issues, site selection, and project design, and to assist you with complying with the applicable Federal wildlife laws.

WATER RESOURCE COMMENTS:

The Service recommends that impacts to streams and wetlands be avoided, and buffers surrounding these systems be preserved. Streams and wetlands provide valuable habitat for fish and wildlife resources, and the filtering capacity of wetlands helps to improve water quality. Naturally vegetated buffers surrounding these systems are also important in preserving their wildlife-habitat and water quality-enhancement properties. Furthermore, forested riparian systems (wooded areas adjacent to streams) provide important stopover habitat for birds migrating through the region. The proposed activities do not constitute a water-dependent activity, as described in the Section 404(b)(1) guidelines, 40 CFR 230.10. Therefore, practicable alternatives that do not impact aquatic sites are presumed to be available, unless clearly demonstrated otherwise. Therefore, before applying for a Section 404 permit, the client should closely evaluate all project alternatives that do not affect streams or wetlands, and if possible, select an alternative that avoids impacts to the aquatic resource. If water resources will be impacted, the Louisville District of the Corps of Engineers should be contacted for possible need of a Section 404 permit.

ENDANGERED SPECIES COMMENTS:

The ESA prohibits the "take" of any listed species. Take is defined as, among other things, to harass, harm, wound, or kill. Harm and harass are further defined by regulation. Harm includes

habitat modification or degradation that results in death or injury. Harass means to cause injury by disrupting normal behavior patterns such as breeding, feeding, or sheltering. The ESA also prohibits Federal agencies from funding, authorizing, or carrying-out, in full or in part, any action that is likely to adversely modify critical habitat. This projects lies within the range of the **Indiana bat** (*Myotis sodalis*), **snuffbox mussel** (*Epioblasma triquetra*), **rayed bean mussel** (*Villosa fabalis*), which are all federally endangered species.

The proposed project lies within the range of the Indiana bat, a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid Federal permit. Please note that summer surveys must be conducted between May 15 and August 15.

The proposed project lies within the range of the snuffbox and rayed bean mussels. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

Should 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, our comments and recommendations may be reconsidered. 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 Endangered

Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. If you have questions, or if we may be of further assistance in this matter, please contact Keith Lott at extension 31 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Office of Real Estate
Paul R. Baldridge, Chief
2045 Morse Road – Bldg. E-2
Columbus, OH 43229
Phone: (614) 265-6649
Fax: (614) 267-4764

April 28, 2015

Jon Whitis
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215

Re: 15-258; OPSB Case No. 14-0469-EL-BTX West Milton Eldean 138 kV Transmission Line Project

Project: The proposed project involves the construction of approximately 16.6 miles of a single 138 kV circuit line.

Location: The project is located in Union and Concord Townships, Miami County, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. 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 National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do 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.

Natural Heritage Database: The Natural Heritage Database has the following records at or within a one mile radius of the project area:

Data was provided for this project via a data request on February 20, 2013 and the letter is included in Application Part 8, pdf page 37. Shapefiles had been provided as part of the response, but no map was made showing what data was provided in those shapefiles or where it was located. In addition, the data request response is two years old and needs to be updated. Therefore, the new information follows.

The Natural Heritage Database has data within the project area, given in the attached shapefiles. The review was based on the project area specified in the request and performed using the shapefile provided to us. Records searched date from 1980. This data is provided to inform you of features present within the project area. Data layers included are for sensitive species, managed areas, scenic rivers, and conservation sites.

Records included in the data layer may be for rare plants and animals, geologic features, high quality plant communities, and other ecological features. Fields included are scientific and

common names, state and federal statuses (when applicable), date of most recent observation, and whether the record is located within a managed area or conservation site.

Statuses are defined as: E = state endangered; T = state threatened; P = state potentially threatened; SC = state species of concern; SI = state special interest; A = species recently added to state inventory, status not yet determined; X = presumed extirpated in Ohio; FE = federal endangered, FT = federal threatened, FSC = federal species of concern, and FC = federal candidate species.

There are a few species considered as sensitive for which we do not give out an exact location. They are not within the data layer but are included in the sensitive species data layer which shows a general location.

The managed areas layer shows boundaries for state, federal, county, non-profit, private and sites under other types of ownership that are protected and managed for their natural resources. Please be aware that this layer may not be complete, and we are continually updating it as additional information becomes available to us.

The layer for scenic rivers shows the designated portions of state and national scenic rivers. If your project is located within 1000 feet of a designated river, the approval of the ODNR Director may be required in accordance with Ohio Revised Code section 1547.82. Please contact Scenic River Program Manager Bob Gable at 614-265-6814 for further information.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, 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 project is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees to include: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine

net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

The project is within the range of the rayed bean (*Villosa fabalis*), a state endangered and federally endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federally endangered mussel. Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species.

The project is within the range of the Iowa darter *(Etheostoma exile),* a state endangered fish. The DOW recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed, this project is not likely to impact this species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the US Fish & Wildlife Service.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler
ODNR Office of Real Estate
2045 Morse Road, Building E-2
Columbus, Ohio 43229-6693
John.Kessler@dnr.state.oh.us

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife
Scott Zody, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693

February 20, 2013

Mike Frank
GAI Consultants
1830 Airport Exchange Blvd., Suite 220
Erlanger, KY 41018

Dear Mr. Frank

I have reviewed the Natural Heritage Database for the Dayton Power and Light, West Milton to Eldean 138 kV Transmission Line Project area, including a one mile radius, in Concord, Newton and Union Townships, Miami County, Ohio. We have records for rare species and a scenic river in your project area. I am attaching a shape file for the rare and endangered plants and animals, geologic features, high quality plant communities and animal assemblages. Fields included are scientific and common names, state and federal statuses, as well as managed area and date of the most recent observation. State and federal statuses are defined as: E = endangered, T = threatened, P = potentially threatened, SC = species of concern, SI = special interest, A = recently added to inventory, status not yet determined, FE = federal endangered, FT = federal threatened, FPE = federal potentially endangered, FC = federal candidate and FSC = federal species of concern, F = federal listing only. This data may not be published or distributed beyond the scope of the project description on the data request form without prior written permission of the Natural Heritage Program.

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. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

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 614-265-6452 if I can be of further assistance.

Sincerely,

Greg Schneider

Greg Schneider, Administrator
Ohio Natural Heritage Program

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

5/17/2018 9:09:44 AM

in

Case No(s). 14-0469-EL-BTX

Summary: Application electronically filed by Mr. Michael F Russ on behalf of The Dayton Power and Light Company