Legal Department

American Electric Power
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Columbus, OH 43215-2373
AEP.com

November 7, 2017

Chairman Asim Z. Haque
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215

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Re: Case No. 17-1211-EL-BNR Request for Expedited Treatment: In the Matter of the Construction Notice for the Glencoe Station Expansion Part II

Dear Chairman Haque,

Pursuant to O.A.C. 4906-6-05, attached please find a copy of the Construction Notice application for the above-referenced project by AEP Ohio Transmission Company, Inc.

A copy of this filing will also be submitted to the executive director or the executive director's designee. A copy will be provided to the Board Staff via electronic message. The Company has also submitted a check in the amount of $2,000 to the Treasurer, State of Ohio, for Fund 5610 for the expedited fees.

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

Respectfully submitted,

/s/ Christen Blend
Christen Blend (0086881), Counsel of Record
Hector Garcia (0084517)
Counsel for AEP Ohio Transmission Company, Inc.

cc. John Jones, Counsel OPSB Staff
Jon Pawley, OPSB Staff

Construction Notice for the Glencoe Station Expansion Part II

PUCO Case No. 17-1211-EL-BNR

Submitted to:
The Ohio Power Siting Board
Pursuant to Ohio Administrative Code
Section 4906-6-05

Submitted by:
AEP Ohio Transmission Company, Inc.

November 7, 2017

Construction Notice

Glencoe Station Expansion Part II

4906-6-05

AEP Ohio Transmission Company, Inc. ("AEP Ohio Transco") provides this Construction Notice ("CN") to the Ohio Power Siting Board ("OPSB") in accordance with the accelerated requirements of Ohio Administrative Code ("O.A.C.") Chapter 4906-6-05.

4906-6-5(B) General Information

B(1) Project Description

The name of the project and applicant's reference number, names, and reference number(s) of resulting circuits, a brief description of the project, and why the project meets the requirements for a Construction Notice application.

This project shall be filed under Case Number 17-1211-EL-BNR. It replaces Case Number 16-2315-EL-BNR that was withdrawn on May 8, 2017. The previous construction notice (16-2315-EL-BNR) was withdrawn to allow AEP Ohio Transco to perform further studies on the station site as an abandoned mine was discovered under the proposed station site. Further studies and a modified station design that will utilize spread footers instead of drilled shaft piers have been prepared since Case Number 16-2315-EL-BNR was withdrawn.

Case Number 16-2315-EL-BNR itself was an update to Case Number 16-1609-EL-BLN (the original Letter of Notification related to the work required at Glencoe Station). In Case Number 16-1609-EL-BLN, AEP Ohio Transco proposed to expand the existing Glencoe Station to the east and southeast on a 10.5 acre parcel currently owned by Ohio Power Company, an affiliate of AEP Ohio Transco and a wholly-owned subsidiary of American Electric Power Company, Inc.. The expansion work described in Case Number 16-1609-EL-BLN, was approved by OPSB on September 30, 2016. Since that date, engineering adjustments have resulted in additional planned expansion of the station fence, which are reflected in this application (i.e., Case Number 17-1211-EL-BNR). Figure 1 the approximate location of the currently planned fenced area, as well as the location described in Case Number 16-1609-EL-BLN and approved by OPSB.

The existing station is located approximately 200 feet east of the intersection of Warnock Glencoe Road and Denham Road in Smith Township, Belmont County, Ohio. The proposed station expansion area is situated adjacent to the south of Warnock Glencoe Road and is being rebuilt to provide increased capacity and system reliability in the eastern Ohio shale gas region, as it will facilitate a future 138 kV loop in the area's transmission facilities centered at Glencoe Station.

The Project meets the requirements for a Construction Notice because it is within the types of projects defined by Item (4)(b) of *4906-1-01 Appendix A, Application Requirement Matrix for Electric Power Transmission Lines*. This item states:

(4) Constructing additions to existing electric power transmission stations or converting distribution station to transmission stations where:

(b) There is a twenty percent or less expansion of the fenced area.

B(2) Statement of Need

If the proposed project is an electric power transmission line or natural gas transmission line, a statement explaining the need for the proposedfacility.

This Project is needed to expand AEP Ohio Transmission Company's existing Glencoe Substation. The expanded substation will provide increased capacity and system reliability in the eastern Ohio shale gas region allowing for future 138 kV transmission line loops to be centered at the Glencoe substation. The substation will expand from approximately 0.45 acres (as a 69kV station) to an approximately 3 acre (as a 138kV/69kV station).

B(3) Project Location

The applicant shall provide the location of the project in relation to existing or proposed lines and substations shown on an area system map of sufficient scale and size to show existing and proposed transmission facilities in the project area.

The proposed West Bellaire-Glencoe 138kV Project is listed on page 21 of the 2016 "AEP Ohio Transmission Company Long Term Forecast report to the Public Utilities Commission of Ohio," Form FE-T9. The station expansion at Glencoe is necessary in order to accommodate the incoming 138kV transmission line and new 138-69kV power transformer, which will be submitted to the OPSB under separate cover as a separate transmission line project. Figure 1 shows the general location of the Project in relation to existing and proposed lines and substation in the vicinity.

B(4) Alternatives Considered

The applicant shall describe the alternatives considered and reasons why the proposed location or route is best suited for the proposed facility. The discussion shall include, but not be limited to, impacts associated with socioeconomic, ecological, construction, or engineering aspects of the project.

The proposed Project is an expansion to an approved transmission station project on agricultural land, so it has been determined to have minimal impacts associated with socioeconomic, ecological, construction, or engineering of the Project. This site expansion was chosen due to the suitable geography, proximity to 69 kV & 138 kV transmission lines, and presence of road access for construction and maintenance crews. AEP Ohio Transco's engineering and siting consultants concluded that the expanded Glencoe site at the recommended location for the upgraded substation is the best option for the proposed Project.

Alternative sites in the region would have had incurred considerably more socioeconomic and environmental impacts due to the need to re-route and extend various transmission lines in order to reach the new site. In addition, the alternatives considered would have been closer to the Glencoe village area, which would have affected more residents.

B(5) Public Information Program

The applicant shall describe its public information program to inform affected property owners and tenants of the nature of the project and the proposed timeframe for project construction and restoration activities.

AEP Ohio Transco informs affected property owners and tenants about the project through several different mediums. Within seven days of filing this CN, AEP Ohio Transco will issue a public notice in a newspaper of general circulation in the Project area, which complies with the requirements of O.A.C. Section 4906-6-08(A)(1)-(6). A copy of the CN will be sent to applicable public officials concurrently with submittal to OPSB.

B(6) Construction Schedule

The applicant shall provide an anticipated construction schedule and proposed in-service date of the project.

Construction of the station expansion is planned to begin in the fourth quarter of 2017. The complete in-service date for the Project is summer 2019.

B(7) Area Map

The applicant shall provide a map of at least 1:24,000 scale clearly depicting the facility with clearly marked streets, roads, and highways, and an aerial image.

Figures 2A and 2B provide the proposed Project area on a map of 1:24,000-scale. Figure 2A shows the project area on the United States Geologic Service (USGS) 7.5-minute topographic maps of the St. Clairsville (1982), Lansing (1982), Armstrong Mills (1972), and Businessburg (1976) quadrangles. Figure 2B shows the project area on recent aerial photography, as provided by Bing Maps. To access the Project location from Columbus, take I-70 East for approximately 112 miles to Exit 213 to U.S. 40/National Road. Turn right on U.S. 40 and go 0.1 mile to Airport Road. Turn right on Airport Road and go 3.2 miles. At OH-149/Belmont Warnock Road, turn left and go 2.4 miles to OH-9/Main Street. Turn right and go 0.1 mile before turning right on OH-149/Warnock Glencoe Road. After approximately 2.6 miles, Glencoe Station is on the right. The approximate address of Glencoe Station is 49876 Warnock Glencoe Road, Belmont, Ohio 43718.

(8) Property Agreements

The applicant shall provide a list of properties for which the applicant has obtained easements, options, and/or land use agreements necessary to construct and operate the facility and a list of the additional properties for which such agreements have not been obtained.

There are no easements, options, and/or land use agreements that are necessary to construct and operate the facility.

B(9) Technical Features

The applicant shall describe the following information regarding the technical features of the Project:

B(9)(a) Operating characteristics, estimated number and types of structures required, and right-of-way and/or land requirements.

The equipment and facilities described below will be installed within the fenced area of the proposed station. Figure 3 provides the proposed layout of the facility.

Breakers: There will be three 3000A, 40kA, 138kV circuit breakers and foundations installed at the switching station.

Switches: Station will contain thirteen 3000A, 100kA, 138kV disconnect switches mounted on tubular steel structures.

Bus Arrangement and Structures: The switching station will utilize a breaker-and-a-half configuration with tubular and tapered tubular steel. Two of four planned breaker and half strings shall be built initially. Equipment support steel structures will be designed using hot-rolled structural steel shapes such as wide flange, tubing, channels and angles or as folded plate tapered tubular structures. Dead-end structures will be made of tapered tubular steel. All yard structures will be ASTM A36, ASTM A500, or ASTM A572 steel hot-dip galvanized for corrosion protection.

Transformers: The Station will contain one 138/69/13 kV power transformer (either 130 MVA or 200 MVA) and two station service transformers, one at 100KVA, 70kV - 120/240V and one at 50KVA, 13kV – 120/240V.

Control Buildings: The control houses will consist of pre-engineered and factory fabricated 16 Foot by 27 (or 36) Foot metal building to contain all switch control and relay panels and miscellaneous equipment. This would include an RTU, circuit breaker controls and line protection panels, batteries, battery chargers, and other miscellaneous equipment. The control houses will include building HVAC and internal lighting. The switch facility will not be manned. Plumbing facilities are not required.

Other Major Equipment: Other equipment can include 18 surge arresters, 24 capacitor voltage transformers (CVT's), and 5 wave traps. A single 28.8 MVAR, 138kV cap bank is also planned.

Lighting systems at the switching station will be necessary for safety, security, and to comply with applicable standards. There are two different illumination levels for switch yard lighting systems. NESC Section 11, Table 111-1 recommends a two foot-candle illumination level in stations for general service lighting. The IES Lighting Handbook, Figure 2-1, recommends a 0.5 foot-candle horizontal illumination level for general security lighting. Security lighting is dusk to dawn intended to illuminate the areas inside the switching station yard that might attract vandalism or theft. Service lighting is switch controlled intended to provide additional lighting for unscheduled callouts to the switching station.

A seven-foot galvanized chain link fence with 3 strands of barbed wire above for an 8- foot approximate overall height is planned to be installed around the complete switching station installation. The station is planned to also be provided with a security system.

B(9)(b) Electric and Magnetic Fields

For electric power transmission lines that are within one hundred feet of an occupied residence or institution, the production of electric and magnetic fields during the operation of the proposed electric power transmission line.

This Project involves a station expansion; therefore, this section is not applicable.

B(9)(c) Project Costs

The estimated capital cost of the project.

The capital costs estimate for the proposed Project, comprised of applicable tangible and capital costs, is approximately $1,000,000.

B(10) Social and Economic Impacts

The applicant shall describe the social and ecological impacts of the project.

B(10)(a) Provide a brief, general description of land use within the vicinity of the proposed project, including a list of municipalities, townships, and counties affected.

As part of Case Number 16-1609-EL-BLN and on behalf of AEP Ohio Transco, AEP Ohio Transco's consultant prepared a Socioeconomic, Land Use, and Agricultural District Review Report. This report was included as Appendix A of the Case Number 16-1609-EL-BLN.

B(10)(b) Agricultural Land Information

Provide the acreage and a general description of all agricultural land, and separately all agricultural district land, existing at least sixty days prior to submission of the application within the potential disturbance area of the project.

As part of Case Number 16-1609-EL-BLN and on behalf of AEP Ohio Transco, AEP Ohio Transco's consultant prepared a Socioeconomic, Land Use, and Agricultural District Review Report. This report was included as Appendix A of the Case Number 16-1609-EL-BLN.

B(10)(c) Archaeological and Cultural Resources

Provide a description of the applicant's investigation concerning the presence or absence of significant archeological or cultural resources that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

In June of 2016, AEP Ohio Transco's consultant completed a Phase I Cultural Resource Management survey for a proposed expansion of the Glencoe Station in Smith and Richland Townships, Belmont County, Ohio. There were no cultural materials or significant resources identified relative to this project. More

recently, AEP Ohio Transco altered the overall plan of the proposed station's footprint. The changes are minimal and the survey that was completed by AEP Ohio Transco's consultant covers and accounts for the changes as they are within the area that had been surveyed and addressed in June. The recommendation for 'no further work' is still valid in consideration of the slight change to the Glencoe Station expansion.

B(10)(d) Local, State, and Federal Agency Correspondence

Provide a list of the local, state, and federal governmental agencies known to have requirements that must be met in connection with the construction of the project, and a list of documents that have been or are being filed with those agencies in connection with siting and constructing the project.

There are no local, state or federal governmental agencies known to have requirements that must be met in connection with the construction of the Project.

B(10)(e) Threatened, Endangered, and Rare Species

Provide a description of the applicant's investigation concerning the presence or absence of federal and state designated species (including endangered species, threatened species, rare species, species proposed for listing, species under review for listing, and species of special interest) that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

As part of Case Number 16-1609-EL-BLN, AEP Ohio Transco's consultant prepared a Threatened and Endangered Species Report and coordinated with the USFWS and ODNR regarding special status species in the vicinity of the Project area. No impacts to threatened or endangered species are expected. The full Threatened and Endangered Species Report for the Project is included as Appendix B of the Case Number 16-1609-EL-BLN LON.

B(10)(f) Areas of Ecological Concern

Provide a description of the applicant's investigation concerning the presence or absence of areas of ecological concern (including national and state forests and parks, floodplains, wetlands, designated or proposed wilderness areas, national and state wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries) that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

As part of Case Number 16-1609-EL-BLN, AEP Ohio Transco's consultant prepared an Areas of Ecological Concern, Wetland Delineation, and Stream Assessment Report. No impacts to wetlands or streams are anticipated. The full Areas of Ecological Concern, Wetland Delineation, and Stream Assessment Report for the Project is included as Appendix C of the Case Number 16-1609-EL-BLN.

B(10)(g) Unusual Conditions

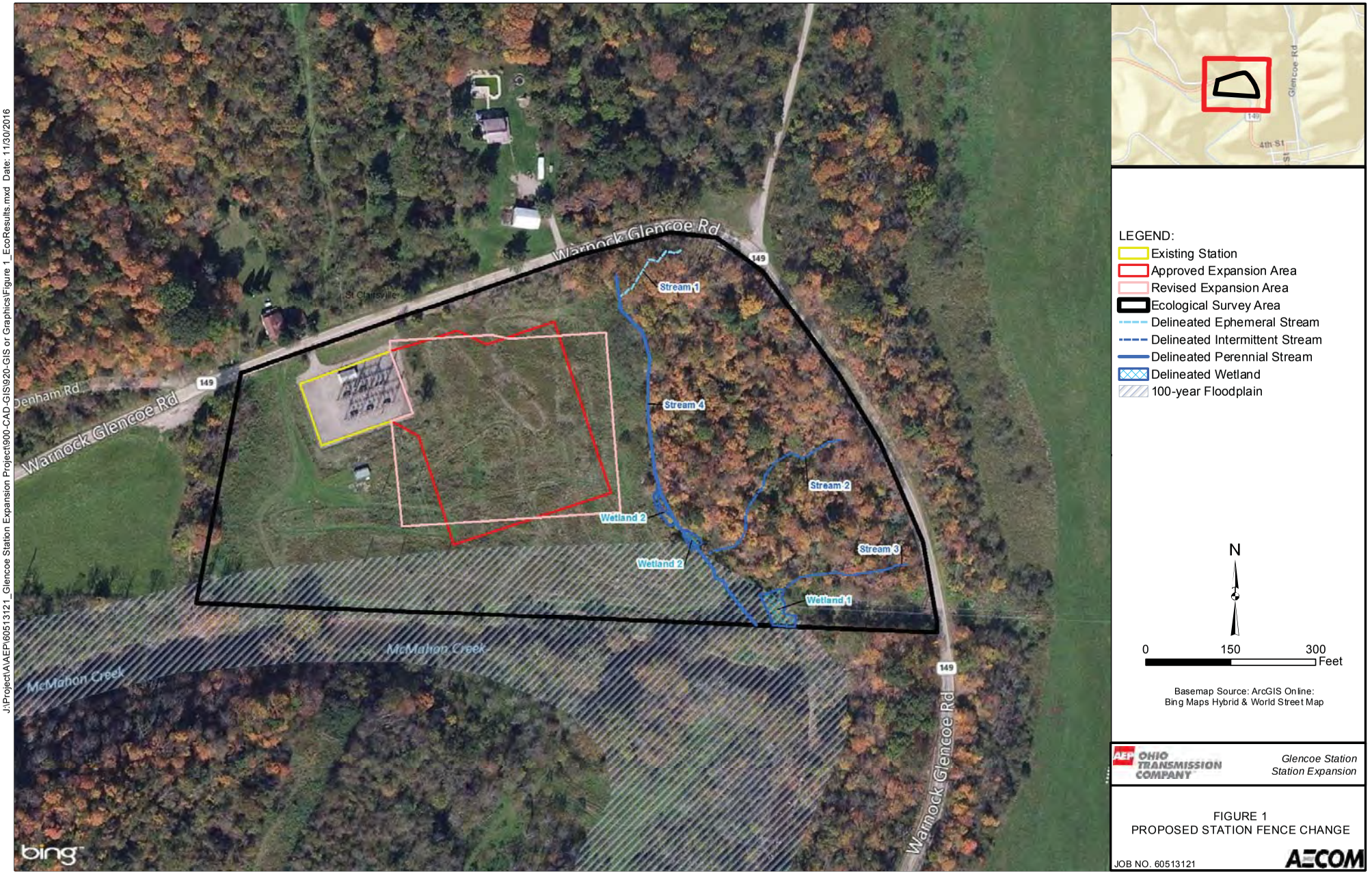
Provide any known additional information that will describe any unusual conditions resulting in significant environmental, social, health, or safety impacts.

AEP Ohio Transco's has knowledge of an unusual condition that exists under the project site. AEP Ohio Transco identified an abandoned mine that is located under the proposed station site. AEP Ohio Transco performed a total of 44 borings on the station site to characterize the extent and integrity of the abandoned mine. On March 23 and June 1, 2017, AEP Ohio Transco met with OPSB staff and staff from the Ohio Department of Natural Resources Division of Mineral Resources. These meetings provided the framework for determining the viability of continuing to build the station on the proposed site. A copy of the presentation that AEP Ohio Transco presented on June 1, 2017 is included in the appendix. Through a thorough analysis, AEP Ohio Transco made several modifications to the station design and determined that the construction of the station could proceed on the proposed site. Multiple reports and studies related to AEP Ohio Transco's analysis were completed and submitted to the OPSB Staff, including Glencoe Station Rebuild-Underground Mine Investigation (05/02/17), Glencoe Station Rebuild-Downhole Televiewer Data (05/02/17), Geotechnical Engineering Report (01/23/17), Geotechnical Addendum (05/30/17).

Normally AEP Ohio Transco designs pier foundations to support station equipment. These piers are anywhere from 10 feet to 30 feet deep with various diameters. This type of pier foundation would have penetrated several layers of limestone and potentially would have gotten close to the existing coal seams. AEP Ohio Transco redesigned the foundations to keep within the allowable soil bearing capacity of the specific site. The foundations will be changed to spread/mat foundations to keep the soil bearing capacity within the allowable bearing capacity and to stay as far away from the existing coal seams as possible. Allowable soil bearing capacity per a geotechnical report completed by Terracon is 3,000 PSF at a depth of approximately 10 feet below the finished subgrade. The foundations have been designed for a soil bearing capacity of 1,500 PSF. The deepest the spread/mat foundation is planned to reach is less than 10 feet below the finished grade. The closest depth of the coal mine is approximately 56 feet and the deepest is about 75 feet. There are multiple layers of unweathered limestone from 10-15 feet from the finished subgrade elevation. The thickness of the limestone varies from 2 feet to 24 feet.

As a precaution, AEP Ohio Transco will regularly monitor the foundation elevations to determine if there is any subsidence occurring. Also, the facilities' design includes extra slack in the conductor connections to provide for settling.

Construction and operation of the proposed Project will meet all applicable safety standards established by the Occupational Safety and Health Administration, and will be in accordance with the requirements specified in the latest revision of the National Electrical Safety Code as adopted by the Public Utilities Commission of Ohio. The Stormwater Pollution Prevention Plan (SWPPP), which will include the Access Plan, will be provided to the OPSB under separate cover, after submission of this Letter of Notification.



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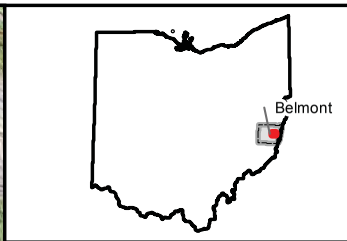

LEGEND:
- Existing Glencoe Station
- Approved Expansion Area
- Revised Expansion Area

N

0 2,000 4,000
Scale In Feet

AEP OHIO TRANSMISSION COMPANY

Glencoe Station Expansion Project

FIGURE 2A
PROJECT OVERVIEW

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LEGEND:
- Existing Glencoe Station
- Approved Expansion Area
- Revised Expansion Area
- Existing Transmission Line

N

0 2,000 4,000

Scale In Feet

AEP OHIO TRANSMISSION COMPANY

Glencoe Station Expansion Project

FIGURE 2B
AERIAL PHOTOGRAPHY OF
THE PROJECT VICINITY

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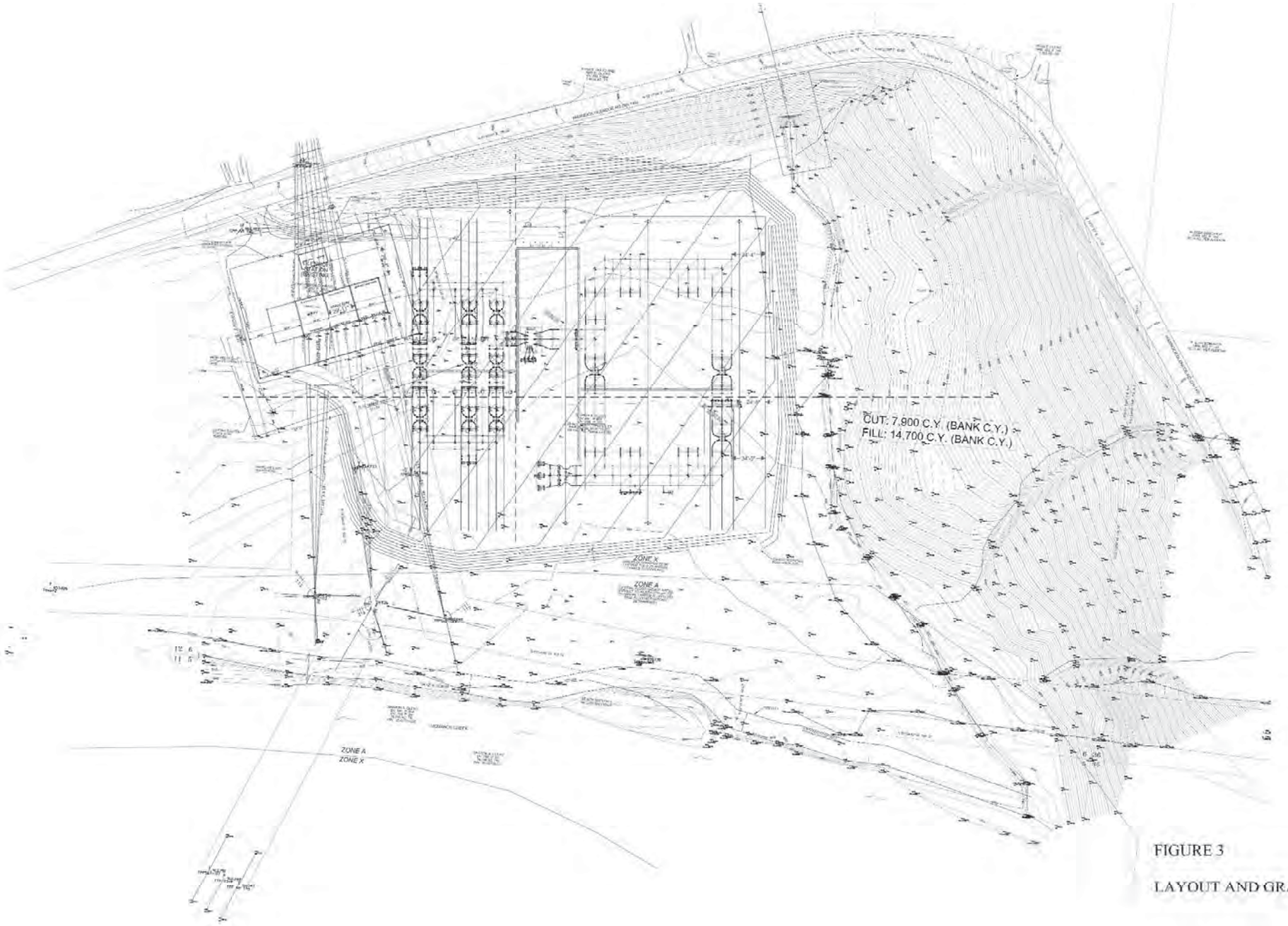

FIGURE 3

LAYOUT AND GRADING PLAN

Phase I Cultural Resource Management Investigations for the Approximately 4.3 ha (10.5 ac) Glencoe Station Project in Smith and Richland Townships, Belmont County Ohio

Ryan Weller

June 21, 2016

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Phase I Cultural Resource Management Investigations for the Approximately 4.3 ha (10.5 ac) Glencoe Station Project in Smith and Richland Townships, Belmont County Ohio

By

Ryan Weller

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Prepared For:

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Lead Agency:

Ohio Power Siting Board

Ryan Weller, P.I.

June 21, 2016

W-1963

Abstract

In June of 2016, Weller & Associates, Inc. conducted Phase I Cultural Resource Management Investigations for the Approximately 4.3 ha (10.5 ac) Glencoe Station Project in Smith and Richland Townships, Belmont County Ohio. The work was conducted under contract with American Electric Power (AEP) for submittal to the Ohio Power Siting Board. The work involved a literature review and field investigations in fallow, overgrown, and disturbed conditions. Subsurface methods of investigation and visual inspection were necessary throughout the project area. These investigations did not identify any archaeological materials and there are no buildings or structures older than 50 years within the project area or area of potential effect.

The project area is located in rugged, upland, and rural conditions in Belmont County. Residences are dispersed across this setting and the project area is nearly surrounded by steep terrain and forestation. It is located with the entrenched McMahon Creek Valley and to the northwest of the Community of Glencoe. The plans are to expand the existing station to the south and east. This includes steeply sloping terrain as well as floodplain. The floodplain area has been recently used for a dirt bike track; as a result, much of the area has been disturbed or manipulated to some degree.

A literature review conducted for this project prior to conducting the fieldwork indicated that it had not been the subject of any previous surveys. There have been several coal mine surveys conducted within the study area. These surveys identified the few archaeological sites in the study area, but none are within or adjacent to the project area.

These investigations involved visual inspection and subsurface methods of investigation. This work determined that much of the proposed substation site is severely disturbed by previous grading activities. There were no cultural materials identified and there are no buildings or structures that are older than 50 years near or within view of the project area. A finding similar to ‘no historic properties affected’ is considered for this project; no landmarks are involved in this project. No further work is deemed necessary for the proposed substation expansion area.

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Introduction

In June of 2016, Weller & Associates, Inc. conducted Phase I Cultural Resource Management Investigations for the Approximately 4.3 ha (10.5 ac) Glencoe Station Project in Smith and Richland Townships, Belmont County Ohio (Figures 1-3). The work was conducted under contract with American Electric Power (AEP) pursuant to documentary requirements for the Ohio Power Siting Board (OPSB). These investigations were conducted in a manner subject to the survey and report format established in *Archaeology Guidelines* (Ohio State Historic Preservation Office 1994 [SHPO]). The work efforts were designed to evaluate pertinent cultural resources for the National Register of Historic Places (NRHP) pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]). This report summarizes the results of the fieldwork and literature review. The work includes a literature review/background documentation, archaeological field investigations, and visual inspection of the Area of Potential Effects (APE).

Ryan Weller served as the Principal Investigator and Christopher Nelson was the Project Manager. Chad Porter conducted the literature review on June 16, 2016. The field crew included Chad Porter and Jon Walker. The textual aspect of the report was prepared by Ryan, while the figures were compiled by Jon Walker.

Project Description

The project will include an expansion of the existing Glencoe Station. The station is located along Warnock-Glencoe Road just northwest of Glencoe, Belmont County, Ohio. The project area is mostly within Smith Township; however, a small portion extends into Richland Township. All of the work will occur in the immediate vicinity of the station area. An area of approximately 4.3 ha (10.5 ac) will be included in the survey, which extends south and east of the existing station. Since this is an existing station and the lines are existing, it does not seem likely that an architectural survey is necessary and this project will be investigated only by archaeological survey.

Environmental Setting

Climate

Belmont County has cold, snowy, and cloudy winters and is fairly warm and humid in the summer. During the winter months of December, January, and February, the average low temperature is 18º (Fahrenheit). The temperature during the summer months averages 69°F. The annual precipitation of the county is approximately 43 in. The driest month is usually January, and the wettest month is usually July (Schumacher et al 1998; United States Department of Agriculture, Soil Conservation Service [USDA, SCS] 1981).

Physiography, Relief and Drainage

Belmont County is located within the unglaciated Allegheny Plateaus physiographic region of Ohio and, more specifically, the project is located on the Marietta Plateau/Little Switzerland Physiographic region. This region is characterized by "dissected, high relief plateau with mostly fine-grained rocks, red shales and red soils with elevations ranging from 515-1400 ft" (Brockman 1998). The project is drained by McMahon Creek, which flows directly into the Ohio River.

Geology

The underlying bedrock is from the Pennsylvanian- and Permian-era sedimentary rocks (USDA, SCS 1981). The geology of the project consists of bedrock associated with the Dunkard Group, a Permian System formation. The bedrock consists of shale, siltstones, sandstones, limestone, and coals (Brockman 1998).

Soils

The project is located in the Lowell-Westmoreland and Westmoreland-Lowell Associations. These are soils are characterized as being steep to very steep and positioned in rugged uplands (USDA, SCS 1981). There were three soil series types indicated within the project and these are commonly identified in the uplands of this area (Table 1), though they are from diverse topographic settings. The Chagrin series soils are formed from occasionally flooded valley floors, whereas, the Lowell-Westmoreland soils are from steeply sloped settings.

Table 1. Soils in the Project.

Soil Symbol	Soil Name	% Slope	Location
Cg	Chagrin silt loam	-0-	Upland floodplains
LoE	Lowell-Westmoreland silt loams	25-40	Steep side slopes
LoF	Lowell-Westmoreland silt loams	40-70	Steeper side slopes

Flora

There is, and continues to be, great floral diversity in Ohio. This diversity is relative to the soils and the terrain that generally includes the till plain, lake plain, terminal glacial margins, and unglaciated plateau (Forsyth 1970). Three major glacial advances, including the Kansan, Illinoisan, and Wisconsinan, have affected the landscape of Ohio. The effects of the Wisconsin glaciation are most pronounced and have affected more than half of the state (Pavey et al. 1999).

The least diverse part of Ohio extends in a belt from the northeast below the lake-affected areas through most of western Ohio (Gordon 1966). These areas are part of the late Wisconsin ground moraine and lateral end moraines. It is positioned between the lake plains region and the terminal glacial moraines. This area included broad forested areas of beech maple forests interspersed with mixed oak forests in elevated terrain or where relief is greater (Forsyth 1970; Gordon 1966). Prairie environments such as those

in Wyandot and Marion County areas would contain islands of forests, but were mostly expansive open terrain dominated by grasses.

The most biological diversity in Ohio is contained within the Allegheny Plateau, which encompasses the southeastern two-thirds of the state (Sheaffer and Rose 1998). Because this area is higher and has drier conditions, it is dominated by mixed oak forests. Some locations within the central part of this area contain beech and mixed mesophytic forests. There are large patches of oak and sugar maple forests to the south of the terminal moraine from Richland to Mahoning County (Gordon 1966).

Generally, beech forests are the most common variety through Ohio and could be found in all regions. Oak and hickory forests dominated the southeastern Ohio terrain and were found with patchy frequency across most of northern Ohio. Areas that were formerly open prairies and grasslands are in glacial areas, but are still patchy. These are in the west central part of the state. Oak and sugar maple forests occur predominantly along the glacial terminal moraine. Elm-ash swamp forests are prevalent in glaciated areas including the northern and western parts of Ohio (Gordon 1966; Pavey et al. 1999).

Eastern Belmont County, including the project area, is at the juncture of what is regarded as mixed oak and oak-maple forestation (Gordon 1966).

Fauna

The upland forest zone offered a diversity of mammals to the prehistoric diet. This food source consisted of white-tailed deer, black bear, Eastern cottontail rabbit, opossum, a variety of squirrels, as well as other less economically important mammals. Several avian species were a part of the upland prehistoric diet as well (i.e. wild turkey, quail, ruffed grouse, passenger pigeon, etc.). The lowland zone offered significant species as well. Raccoon, beaver, and muskrat were a few of the mammals, while wood duck and wild goose were the economically important birds. Fishes and shellfish were also an integral part of the prehistoric diet. Ohio muskellunge, yellow perch, white crappie, long nose gar, channel catfish, pike, and sturgeon were several of the fish, whereas, the Ohio naiad mollusc, butterfly's shell, long solid, common bullhead, knob rockshell, and cod shell were the major varieties of shellfish. Reptiles and amphibians, such as several varieties of snakes, frogs, and turtles, were also part of the prehistoric diet (Trautman 1981; Lafferty 1979; Mahr 1949).

Cultural Setting

The first inhabitants of Ohio were probably unable to enter this land until the ice sheets of the Wisconsin glacier melted around 14,000 B.C. Paleoindian sites are considered rare due to the age of the sites and the effects of land altering activities such as erosion. Such sites were mostly used temporarily and thus lack the accumulation of human occupational deposits that would have been created by frequent visitation. Paleoindian artifact assemblages are characteristic of transient hunter-gatherer foraging activity and subsistence patterns. In Ohio, major Paleoindian sites have been documented along large river systems and near flint outcrops in the Unglaciated Plateau (Cunningham

1973). Otherwise, Paleoindian sites in the glaciated portions of Ohio are encountered infrequently and are usually represented by isolated finds or open air scatters.

The Paleoindian period is characterized by tool kits and gear utilized in hunting Late Pleistocene megafauna and other herding animals including but not limited to short-faced bear, barren ground caribou, flat-headed peccary, bison, mastodon, giant beaver (Bamforth 1988; Brose 1994; McDonald 1994). Groups have been depicted as being mobile and nomadic (Tankersley 1989); artifacts include projectile points, multi-purpose unifacial tools, burins, gravers, and spokeshaves (Tankersley 1994). The most diagnostic artifacts associated with this period are fluted points that exhibit a groove or channel positioned at the base to facilitate hafting. The projectiles dating from the late Paleoindian period generally lack this trait; however, the lance form of the blade is retained and is often distinctive from the following Early Archaic period (Justice 1987).

The Archaic period has been broken down into three sub-categories, including the Early, Middle, and Late Archaic. During the Early Archaic period (ca. 10,000-8000 B.P.), the environment was becoming increasingly arid as indicated by the canopy (Shane 1987). This period of dryness allowed for the exploitation of areas that were previously inaccessible or undesirable. The Early Archaic period does not diverge greatly from the Paleoindian regarding the type of settlement. Societies still appear to be largely mobile with reliance on herding animals (Fitting 1963). For these reasons, Early Archaic artifacts can be encountered in nearly all settings throughout Ohio. Tool diversity increased at this time including hafted knives that are often re-sharpened by the process of beveling the utilized blade edge and intense basal grinding (Justice 1987). There is a basic transition from lance-shaped points to those with blades that are triangular. Notching becomes a common hafting trait. Another characteristic trait occurring almost exclusively in the Early and Middle Archaic periods is basal bifurcation and large blade serrations. Tool forms begin to vary more and may be a reflection of differential resource exploitation. Finished tools from this period can include bifacial knives, points, drills/perforators, utilized flakes, and scrapers.

The Middle Archaic period (8000-6000 B.P.) is poorly known or understood in archaeological contexts within Ohio. Some (e.g., Justice 1987) regard small bifurcate points as being indicative of this period. Ground stone artifacts become more prevalent at this time. Other hafted bifaces exhibit large side notches with squared bases, but this same trait can extend back to the Paleoindian period. The climate at this time is much like that of the modern era. Middle Archaic period subsistence tended to be associated with small patch foraging that involved a consistent need for mobility with a shift towards stream valleys (Stafford 1994). Sites encountered from this time period throughout most of Ohio tend to be lithic scatters or isolated finds. The initial appearance of regional traits may be apparent at this time.

The Late Archaic period in Ohio (ca 6000-3000 B.P.) diverges from the previous periods in many ways. Preferred locations within a regional setting appear to have been repeatedly occupied. The more intensive and repeated occupations often resulted in the creation of greater social and material culture complexity. The environment at this time is warmer and drier. Most elevated landforms in northeastern Ohio have yielded Archaic artifacts (Prufer and Long 1986: 7), and the same can be stated for the remainder of Ohio.

Various artifacts are diagnostic of the Late Archaic period. Often, burial goods provide evidence that there was some long-distance movement of materials, while lithic materials used in utilitarian assemblages are often from a local chert outcrop. There is increased variation in projectile point styles that may reflect regionalism. Slate was often used in the production of ornamental artifacts. Ground and polished stone artifacts reached a high level of development. This is evident in such artifacts as grooved axes, celts, bannerstones, and other slate artifacts.

It is during the Terminal Archaic period (ca 3500-2500 B.P.) that extensive and deep burials are encountered. Cultural regionalism within Ohio is evident in the presence of Crab Orchard (southwest), Glacial Kame (northern), and Meadowood (central to Northeastern). Along the Ohio River, intensive occupations have been placed within the Riverton phase. Pottery makes its first appearance during the Terminal Late Archaic.

The Early Woodland period (ca 3000-2100 B.P.) in Ohio is often associated with the Adena culture and the early mound builders (Dragoo 1976). Early and comparably simple geometric earthworks first appear with mounds more spread across the landscape. Pottery at this time is thick and tempered with grit, grog, or limestone; however, it becomes noticeably thinner towards the end of the period. There is increased emphasis on gathered plant resources, including maygrass, chenopodium, sunflower, and squash. Habitation sites have been documented that include structural evidence. Houses that were constructed during this period were circular, having a diameter of up to 18.3 m (Webb and Baby 1963) and often with paired posts (Cramer 1989). Artifacts dating from this period include leaf-shaped blades with parallel to lobate hafting elements, drilled slate pieces, ground stone, thick pottery, and increased use of copper. Early Woodland artifacts can be recovered from every region of Ohio.

The Middle Woodland period (ca 2200-1600 B.P.) is often considered to be equivalent with the Hopewell culture. The largest earthworks in Ohio date from this period. There is dramatic increase in the appearance of exotic materials that appear most often in association with earthworks and burials. Artifacts representative of this period include thinner, grit-tempered pottery, dart-sized projectile points (Lowe Flared, Steuben, Snyders, and Chesser) [Justice 1987], exotic materials (mica, obsidian, and marine shell, etc.). The points are often thin, bifacially beveled, and have flat cross sections. There seems to have been a marked increase in the population as well as increased levels of social organization. Middle Woodland sites seem to reflect a seasonal exploitation of the environment. There is a notable increase in the amount of Eastern Agricultural Complex plant cultigens, including chenopodium, knotweed, sumpweed, and little barley. This seasonal exploitation may have followed a scheduled resource extraction year in which the populations moved camp several times per year, stopping at known resource extraction loci. Middle Woodland land use appears to center on the regions surrounding earthworks (Dancey 1992; Pacheco 1996); however, there is evidence of repeated occupation away from earthworks (Weller 2005a). Household structures at this time vary with many of them being squares with rounded corners (Weller 2005a). Exotic goods are often attributed to funerary activities associated with mounds and earthworks. Utilitarian items are more frequently encountered outside of funerary/ritual contexts. The artifact most diagnostic of this period is the bladelet, a prismatic and thin razor-like tool, and

bladelet cores. Middle Woodland remains are more commonly recovered from central Ohio south and lacking from most areas in the northern and southeastern part of the state.

The Late Woodland period (ca A.D. 400-900) is distinct from the previous period in several ways. There appears to be a population increase and a more noticeable aggregation of groups into formative villages. The villages are often positioned along large streams, on terraces, and were likely seasonally occupied (Cowan 1987). This increased sedentism was due in part to a greater reliance on horticultural garden plots, much more so than in the preceding Middle Woodland period. The early Late Woodland groups were growing a wide variety of crop plants that are collectively referred to as the Eastern Agricultural Complex. These crops included maygrass, sunflower, and domesticated forms of goosefoot and sumpweed. This starch and protein diet was supplemented with wild plants and animals. Circa A.D. 800 to 1000, populations adopted maize agriculture, and around this same time, shell-tempered ceramics appear. Other technological innovations and changes during this period included the bow and arrow and changes in ceramic vessel forms.

The Late Prehistoric period (ca A.D. 1000-1550) is distinctive from former periods. The Cole complex (ca A.D. 1000-1300) has been identified in central and south central Ohio. Sites that have been used to define the Cole complex include the W.S. Cole (33DL11), Ufferman (33DL12), and Decco (33DL28) sites along the Olentangy; the Zencor Village site, located along the Scioto River in southern Franklin County; and the Voss Mound site (33FR52), located along the Big Darby Creek in southwestern Franklin County. It has been suggested that this cultural manifestation developed out of the local Middle Woodland cultures and may have lasted to be contemporaneous with the Late Prehistoric period (Barkes 1982; Baby and Potter 1965; Potter 1966). Cole is a poorly defined cultural complex as its attributes are a piecemeal collection gathered from various sites. Some have suggested that it may be associated with the Fort Ancient period (Pratt and Bush 1981). Artifacts recovered from sites considered as Cole include plain and cordmarked pottery, triangular points, Raccoon Notched points, chipped slate discs, rectangular gorgets, and chipped stone celts. The vessels often have a globular form with highly variable attributes and rim treatment. There have been few structures encountered from this period, but those that have are typically rounded or circular (Pratt and Bush 1981; Weller 2005b).

Monongahela phase sites date to the Late Prehistoric to Contact period in eastern Ohio. Monongahela sites are typically located on high bottomlands near major streams, on saddles between hills, and on hilltops, sometimes a considerable distance from water sources. Most of these sites possessed an oval palisade, which surrounded circular house patterns. Burials of adults are usually flexed and burial goods are typically ornamental. A large variety of stone and bone tools are found associated with Monongahela sites. Monongahela pottery typically is plain or cordmarked with a rounded base and a gradually in-sloping shoulder area. Few Euro-American trade items have been found at Monongahela sites (Drooker 1997).

Protohistoric to Settlement

By the mid-1600s, French explorers traveled through the Ohio country as

trappers, traders, and missionaries. They kept journals about their encounters and details of their travels. These journals are often the only resource historians have regarding the early occupants of seventeenth century Ohio. The earliest village encountered by the explorers in 1652 was a Tionontati village located along the banks of Lake Erie and the Maumee River. Around 1670, it is known that three Shawnee villages were located along the confluence of the Ohio River and. the Little Miami River. Because of the Iroquois Wars, which continued from 1641-1701, explorers did not spend much time in the Ohio region, and little else is known about the natives of Ohio during the 1600s. Although the Native American tribes of Ohio may have been affected by the outcome of the Iroquois Wars, no battles occurred in Ohio (Tanner 1987).

French explorers traveled extensively through the Ohio region from 1720-1761. During these expeditions, the locations of many Native American villages were documented. In 1751, a Delaware village known as Maguck existed near present-day Chillicothe. In 1758, a Shawnee town known as 'Lower Shawnee 2' existed at the same location. The French also documented the locations of trading posts and forts, which were typically established along the banks of Lake Erie or the Ohio River (Tanner 1987).

While the French were establishing a claim to the Ohio country, many Native Americans were also entering new claims to the region. The Shawnee were being forced out of Pennsylvania because of English settlement along the eastern coast. The Shawnee created a new headquarters at Shawnee Town, which was located at the mouth of the Scioto River. This headquarters served as a way to pull together many of the tribes which had been dispersed because of the Iroquois Wars (Tanner 1987).

Warfare was bound to break out as the British also began to stake claims in the Ohio region by the mid-1700s. The French and Indian War (1754-1760) affected many Ohio Native Americans; however, no battles were recorded in Ohio (Tanner 1987). Although the French and Indian War ended in 1760, the Native Americans continued to fight against the British explorers. In 1764, Colonel Henry Bouquet led a British troop from Fort Pitt, Pennsylvania to near Zanesville, Ohio.

In 1763, the Seven Years' War fought between France and Britain, also known as the French and Indian War ended with The Treaty of Paris. In this Peace of Paris, the French ceded their claims in the entire Ohio region to the British. When the American Revolution ended with the Second Treaty of Paris in 1783, the Americans gained the entire Ohio region from the British; however, they designated Ohio as Indian Territory. Native Americans were not to move south of the Ohio River but Americans were encouraged to head west into the newly acquired land to occupy and govern it (Tanner 1987).

By 1783, Native Americans had established fairly distinct boundaries throughout Ohio. The Shawnee tribes generally occupied southwest Ohio, while the Delaware tribes stayed in the eastern half of the state. Wyandot tribes were located in north-central Ohio, and Ottawa tribes were restricted to northeast Ohio. There was also a small band of Mingo tribes in eastern Ohio along the Ohio River, and there was a band of Mississauga tribes in northeastern Ohio along Lake Erie. The Shawnee people had several villages within Ross County along the Scioto River (Tanner 1987). Although warfare between

tribes continued, it was not as intense as it had been in previous years. Conflicts were contained because boundaries and provisions had been created by earlier treaties.

In 1795, the Treaty of Greenville was signed as a result of the American forces defeat of the Native American forces at the Battle of Fallen Timbers. This allocated the northern portion of Ohio to the Native Americans, while the southern portion was opened for Euro-American settlement. Although most of the battles which led up to this treaty did not occur in Ohio, the outcome resulted in dramatic fluctuations in the Ohio region. The Greenville Treaty line was established, confining all Ohio Native Americans to northern Ohio, west of the Tuscarawas River (Tanner 1987).

Ohio Native Americans were again involved with the Americans and the British in the War of 1812. Unlike the previous wars, many battles were fought in the Ohio country during the War of 1812. By 1815, peace treaties began to be established between the Americans, British, and Native Americans. The Native Americans lost more and more of their territory in Ohio. By 1830, the Shawnee, Ottawa, Wyandot, and Seneca were the only tribes remaining in Ohio. These tribes were contained on reservations in northwest Ohio. By the middle 1800s, the last of the Ohio Native Americans signed treaties and were removed from the Ohio region.

Belmont County History

Squatters from the east were the first whites to settle Belmont County between 1780 and 1785. They built a settlement at Martin's Ferry, along the Ohio River. Another squatter settlement developed ca. 1785 at Concord. In 1789, the first legal claim in the county went to Capt. Kirkwood who founded the community which bears his name (Jones 1985). These are some of the earliest sustained settlements in Ohio.

The county as it stands today was formed on June 10, 1807 (Poorman 1890). However, Belmont as a parcel of local government is much older. Belmont County was the last of the counties created under the government of the Northwest Territory. General St. Clair ordered its formation September 7, 1801 two years before statehood. At that time, Pultney was the county seat, but it made way for St. Clairsville to honor the first governor in 1804 (Caldwell 1880; Poorman 1890; Flanagan 1988).

In 1825, the National Road (now US 40) was completed and this new ease of transportation led to a population increase. Over 50 percent of the immigrants coming into Belmont County were from Virginia. After 1825, St. Clairsville became the largest city in the county. The early economy of the county was hunting and agriculture. Both wheat and corn were the main exports. In 1813, ginseng became an important export. By 1817, the first tobacco crop grew in Warren Township and by the late 1800s, this crop became a major export as important as the staple grains (Caldwell 1880; Jones 1985; Flanagan 1988; McKelvey 1903).

The first railroads appeared in Belmont County in the 1850s and 1860s. The first line built was the Central Ohio Railroad that ran from Columbus to Bridgeport (Caldwell 1880). The Cleveland and Pittsburgh Railroad and Cleveland, Lorain and Wheeling Railroads came to the county soon after. Early on, the Ohio River was a source of

transportation to and from Belmont and for small amounts of exported goods; it was the railroad however that would have the greatest influence on the county's industrial growth (Jones 1985).

The greatest economical growth in the county occurred in the late 1800s and the first half of the twentieth century. During the 1880s, Belmont saw its glass manufacturing become one of the most important in the state. The county was at the top of coal mining and export during the coal era. Bellaire and Martin's Ferry became the county's largest commercial and industrial centers during this period. Because of the recessions and new innovative forms of energy as well as larger foreign sources of energy, the years of the middle 1900s saw significant declines in the county's economy leading to a decreased population. However, strip mining of coal has continued to grow as an industry (Jones 1985; Flanagan 1988). Belmont County is the all-time coal production leader in Ohio. Since 1816, there has been over 797 million tons of coal recovered. In 2000, Belmont County led the state in coal production, as it has in most years, mining nearly six million tons (Crowell 2001; Flanagan 1988).

Smith Township History

Smith Township is located in Belmont County, Ohio. The Township was named after William Smith who is considered the first Euro American settler to the area. It was established in 1805. Smith is credited with having the highest elevation point in Belmont County at 1350 feet above sea level. The first to establish a community settled near Warnock's station building schools, churches, and homes. The first frame built was for a hotel to invite travelers westward to stay there (McKelvey 1903). Before the arrival of European influence, Smith Township was populated by dense forests of elm, oak and hickory. These were later cleared during early settlement for agricultural and construction purposes. The timber was used for building homes, barns, schools, etc (Howe 1888).

Smith Township includes two villages Jacobsburg and Centreville. Jacobsburg was named after its founder Jacob Calvert who established himself there in 1815. Centreville logically named due to its location in the center of Smith Township. These villages were prosperous through agricultural means. Important crops were corn and wheat as well as other grains which were easily processed throughout the Townships many mills (McKelvey 1903).

Religion played a vital role within the culture of Smith Township. Gatherings at the church allowed the residents to discuss local issues, organize community events and seek spiritual solace. The doctrine of the church was implemented into the creation of public policy and taught in classrooms as well (Howe 1888).

Richland Township History

When Richard Hardesty came to Round Bottom on Wheeling Creek in 1795, he was the only white man to occupy the territory that would become Richland Township within the next seven years. William Boggs came the same year and began a coalmine as Hardesty and Isaac Cowgill came in 1797 and built the first framed log cabin in the county. David Newell came in 1796 and began his settlement called Newellstown soon

changed to St. Clairsville in honor of the present governor of the Northwest Territory. St. Clairsville became the county seat in 1804, two years after Richland Township organized out of Kirkwood and Pultney townships. After its original bounds were defined in 1802, Richland donated portions of its territory to its neighbors Pease, Colerain, Wheeling, and Smith at the time of their respective organization (Poorman 1890; Caldwell 1880; McKelvey 1903).

The earliest religious expression here was in the line of the Baptists and Presbyterians beginning in 1798. The two small congregations each built a small log structure in that year. Schools began in St. Clairsville in 1802. In 1807, St. Clairsville gained incorporation as a town. At that time, the town, situated along the Zane Road (later the National Road, US 40) with its direct access to the Ohio River, became a thriving, successful shipping and trading town. The county trustees built the town's "Old Court House" in 1813 (Caldwell 1880; McKelvey 1903).

Joshua Loyd laid out Loydsville in 1831. Glencoe is another of the township's villages. John B. G. Fulton drew this town in 1855. Stewartsville bears the name of its founder John Stewart. He platted his village in 1868. East Richland is the only other village of the township. The Baltimore and Ohio Railroad passes through the township having first traveled its line in the 1850s. Coal is a major export around Glencoe (Caldwell 1880; McKelvey 1903).

At the turn of the twentieth century, the township controlled 20 schools with the crowning edifice being St. Clairsville's three-story brick facility, the largest school of the county built in 1869 (Caldwell 1880; McKelvey 1903).

Research Design

The purpose of a Phase I survey is to locate and identify cultural resources that will be affected by the planned Glencoe Station Expansion. This includes archaeological deposits as well as architectural properties that are older than 50 years. The plans are for the expansion of an existing substation, which will include above ground structures. Once these resources are identified and sampled, they are evaluated for their eligibility or potential eligibility to the NRHP. These investigations are directed to answer or address the following questions:

1) Did the literature review reveal anything that suggests the project had been previously surveyed and what is the relationship of previously recorded properties to the project?
2) Are cultural resources likely to be identified in the project?

Archaeological Field Methods

The survey conducted within the project used three methods of sampling/verification and testing to identify and evaluate cultural resources. These included shovel test unit excavation, shovel probe excavation, and visual inspection.

Shovel test unit excavation. Shovel test units were placed at 15-m intervals. Shovel test units measure 50 cm on a side and are excavated to 5 cm below the topsoil/subsoil interface. Individual shovel test units were documented regarding their depth, content and color (Munsell). Wherever sites are identified, Munsell color readings are taken per shovel test unit. The undisturbed soil matrices from shovel test units are screened using .6 cm hardware mesh. When sites are identified, additional shovel test units will be excavated at 7.5 m intervals extending on grid and in the two cardinal directions within the corridor from the positive locations.

Shovel probe excavation. The excavation of shovel probes is reserved for locations where severe disturbance was prevalent, but not obvious on the surface. These will be initially excavated in a manner similar to a shovel test unit and to a depth that was usually to the subsoil or about 20 cm below the ground surface. This will be accomplished to better understand the nature of the disturbance and verify that intact deposits are lacking. These are spaced at no further than 30 m intervals. If intact soils are identified, the shovel probe will be treated as a shovel test unit.

Visual inspection. Locations where cultural resources were not expected, such as disturbed areas and steeply sloped locations were walked over and visually inspected. This method was used to verify the absence or likelihood of any cultural resources being located in these areas. This method was also utilized to document the general terrain and the surrounding area.

The application of the resulting field survey methods was documented in field notes, field maps, and project plan maps.

Curation

There were no cultural remains identified during these investigations. Notes and maps affiliated with this project will be maintained at Weller & Associates, Inc. files.

Literature Review

The literature review study area is defined as a 1.6 km (1.0 mile) radius from the center of the project (Figure 2). In conducting the literature review, the following resources were consulted at SHPO and the State Library of Ohio:

1) *Archeological Atlas of Ohio* (Mills 1914);
2) SHPO United States Geological Survey (USGS) 7.5' series topographic maps;
3) Ohio Archaeological Inventory (OAI) files;
4) Ohio Historic Inventory (OHI) files;
5) National Register of Historic Places (NRHP) files;
6) Determinations of Eligibility (DOE) files;
7) SHPO CRM/contract archaeology files; and
8) Belmont County atlases, histories, historic USGS 15'series topographic map(s), and current USGS 7.5' series topographic map(s).

A review of the *Archeological Atlas of Ohio* (Mills 1914) was conducted. There were no resources situated within or adjacent the project.

The SHPO topographic maps did not indicate any previously recorded archaeological sites in the project area. There were two sites recorded within the study radius including 33BL0121 and 33BL0138. These both date from the non-aboriginal historic period.

The OHI files did not indicate any previously recorded OHIs within the project or its study area.

A review of the NRHP files and SHPO consensus determination of eligibility files was conducted. There were no NRHP properties or DOE resources located within the project or its study area.

A review of the CRM surveys was conducted for this project. There have been five surveys conducted in the study area no previous surveys conducted within the study radius of this project (Graham 1985; Clarke and Lepper 1986; White 1987a and 1987b; Murphy 1990). These surveys were conducted for transportation and coal mine-related projects. None of these surveys directly or tangently involve the current project area.

Cartographic/atlas resources were reviewed for the project. The *Atlas of Belmont County, Ohio* (Mead & Co. 1888) indicated the landowner as being Henry Wiley. There were no residences associated with this parcel that are affiliated with this project. The USGS *1905 St. Clairsville, Ohio Quadrangle 15 Minute Series (Topographic)* map does not indicate any structures located within the project (Figure 4). The USGS *1960 Saint Clairsville, Ohio Quadrangle 7.5 Minute Series (Topographic)* map does not indicate any structures within the project (Figure 2).

Evaluation of Research Questions 1 and 2

There were two questions presented in the research design that will be addressed at this point. These are:

1) Did the literature review reveal anything that suggests the project had been previously surveyed and what is the relationship of previously recorded properties to the project?
2) Are cultural resources likely to be identified in the project?

The literature review for this project did not indicate that there had been any previous CRM investigations or cultural resources that involve the project area. Atlas review does not indicate any buildings or structures exist or had been located within the project area. The soils survey indicates that the eastern part of this area is steeply sloped and the remainder is on floodplain formed from modern alluvium. Inspection of aerial images further indicates that the floodplain has been used for recreational purposes. Based on the aforementioned information and the author's knowledge and experience in this region, little is anticipated from the project area.

Fieldwork Results

The field investigations for this project were conducted on June 18, 2016 (Figures 5-10). The weather at this time was sunny, humid, and hot; it was not a factor in the completion of this work as the project area is small and the conditions did not require extensive amounts of effort. These investigations involved a subsurface testing of the suitable locations and visual inspection of the entire area (Figures 5-10). Severe disturbance and sloping conditions limited the field investigations. The terrain and topography within the project area is rugged and steeply sloped or disturbed upland side slopes and occasionally flooded floodplain. There were no archaeological sites identified during these investigations.

The project plans include expanding the existing Glencoe Station to the south and east. The project is located to the south and west of Warnock-Glencoe Road and is north of McMahon Creek. This is an entrenched stream valley with narrow and spatially limited floodplains; occasionally, there are terraces present, but none are present in the project area. The terraces along this stream are slightly more elevated and appear to be more inhabitable as they are elevated above the floodplains. The eastern part of the project area is wooded and is steeply sloped. The flatter aspect of the area is in the central and southern part; however, it is not fully intact as it has been disturbed. Visual inspection and shovel probing was conducted as necessary and relative to the presence of suitable conditions.

Visual inspection of the project area indicated that the testing would likely be limited. Prior to initiation of the fieldwork, soil survey mapping was reviewed. The eastern part of the project area contains soils that have slope percentages that range from 25-70 percent. This area was inspected to verify that there were no rockshelters and to further confirm the steepness. There were no rockshelters identified and the entire wooded area is contained on slope that is greater than 15 percent. There was no physical testing conducted in the eastern, wooded aspect of the project area. Pre-fieldwork inspection of aerial images indicated that the floodplain part of the project area had been manipulated and used as an off-road dirt-bike track. Grading or bulldozing the soils throughout much of this area was evident upon on-site inspection. The disturbed nature of the soils was further documented during subsurface testing.

Shovel probes (n=65) were excavated within the western part of the project area (Figure 5). This is an area that is currently overgrown/fallow with patches of briars and riddled with a dirt-bike track. The track does not appear to have been used for a while, but the ramps and soil borrow piles/pits are still visually evident. These were excavated to a depth of at least 30 cm to verify that there were no buried deposits. These subsurface investigations identified mottled, disturbed soils. The southcentral part of the project was demarcated as a wetland. The soils that were identified during the shovel probing are irregular and do not conform to what would be anticipated from a plowed location (Figure 10). Instead, they are severely mottled with fragments of coal and bedrock scattered throughout. The soil hues include dark grayish brown (10YR4/2) silt loam, dark yellowish brown (10YR4/4) clay, and dark brown (10YR3/3) silt loam.

The archaeological field investigations for the proposed Glencoe Station expansion encountered steeply sloping and severely disturbed conditions. These conditions were confirmed through the excavation of shovel probes and through visual inspection. The fieldwork did not result in the identification of any cultural materials. The project area did not contain any terraces or elevations within the valley; these would have been more apt locations to identify cultural materials.

APE Definition and NRHP Determination

The APE is a term that must be applied on an individual project basis. The nature of the project or undertaking is considered in determining the APE. This may include areas that are off the property or outside of the actual project's boundaries to account for possible visual impacts. When construction is limited to underground activity, the APE may be contained within the footprint of the project. The APE includes the footprint of the proposed substation site. The proposed work is being conducted in a rural part of east central Belmont County. This is in an area that is remote and contains deciduous forestation. Additionally, it has been largely graded and possibly used for soil borrow. There are no recorded resources that are within view of the project area.

The project area is located to the south and west of Warnock-Glencoe Road and in a very rural setting that is northwest of Glencoe. The APE for this undertaking is limited by the setting and type of construction. There is an existing electric substation and the planned work is to expand this facility. This facility is set within a very winding and entrenched part of the McMahon Creek Valley. There are no significant residences or buildings that are older than 50 years within view of this area; there are few residences in the area, anyway. The proposed substation's construction will not be aberrant to this setting. The majority of the construction area was being used as a dirt bike track and the eastern part is wooded side slope. The ruggedness of the landscape and the remote location of the proposed construction activity basically shield it from the surroundings, thus limiting its possible impact to important cultural resources that might be in the vicinity.

There is a residence that is older than 50 years located opposite (north) of extant Glencoe Station. This does not appear to be a significant resource and the expansion of an existing electric station is not considered to be aberrant to the current setting (Figures 14-15). The overall APE for this undertaking is limited by the line-of-sight perspective, forestation, and the nature of the rolling terrain. There were no cultural resources identified within the project area; it is mostly disturbed or in steeply sloping conditions. These investigations did not identify any cultural deposits and a finding of no historic properties affected is deemed appropriate; no landmarks were identified or exist in the area.

Recommendations

In June of 2016, Weller & Associates, Inc. conducted Phase I Cultural Resource Management Investigations for the Approximately 4.3 ha (10.5 ac) Glencoe Station Project in Smith and Richland Townships, Belmont County Ohio. The fieldwork involved subsurface methods of investigation and visual inspection. The work did not

result in the identification of any cultural materials. It is considered that this will not affect any historic properties or landmarks. No further cultural resource management work is deemed necessary.

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Figures

Figure 1. Political map of Ohio showing the approximate location of the project.

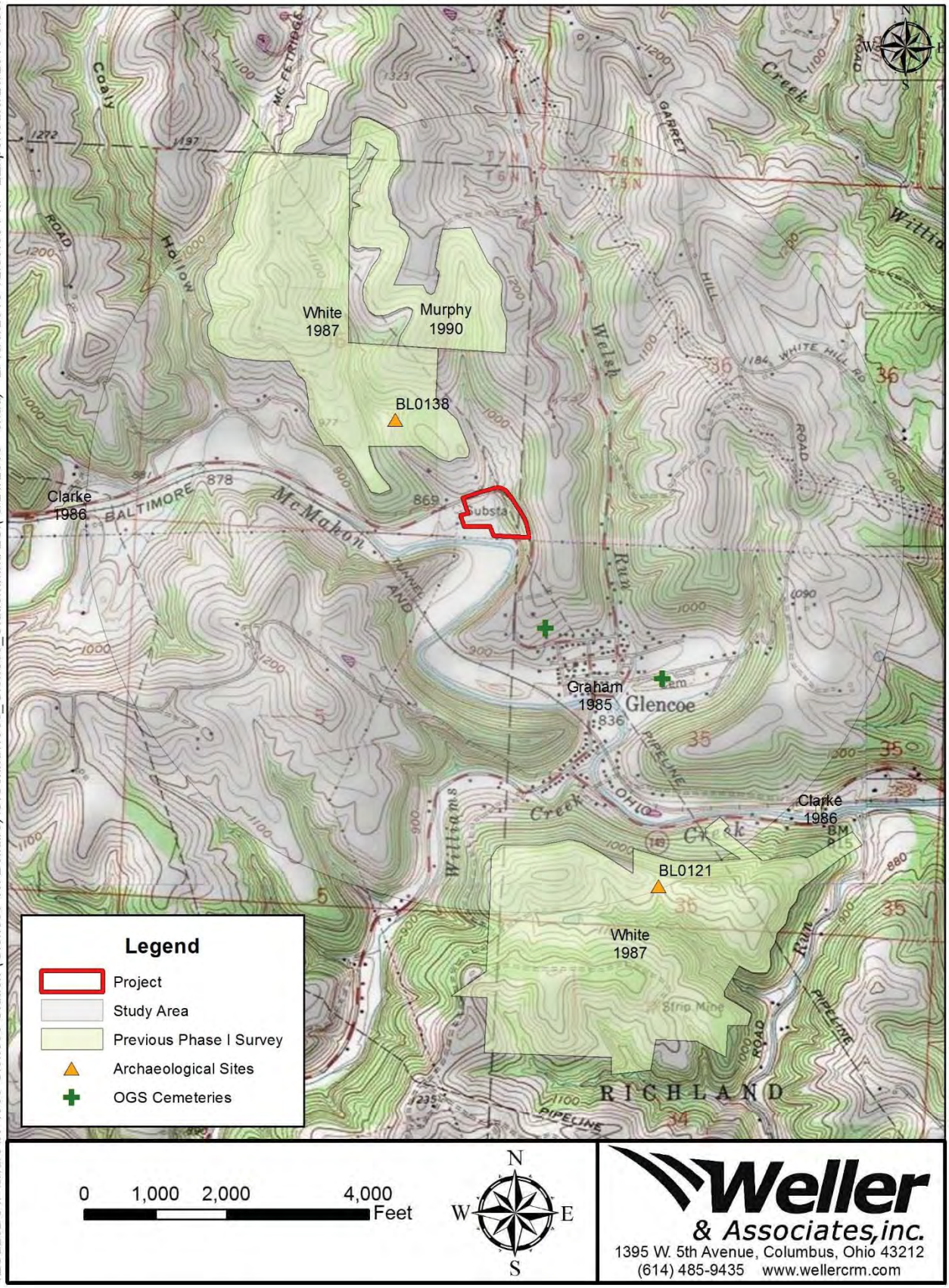


Figure 2. Portion of the USGS *1960 Saint Clairsville, Ohio 7.5 Minute Series (Topographic)* map indicating the location of the project and previously recorded resources in the study area.

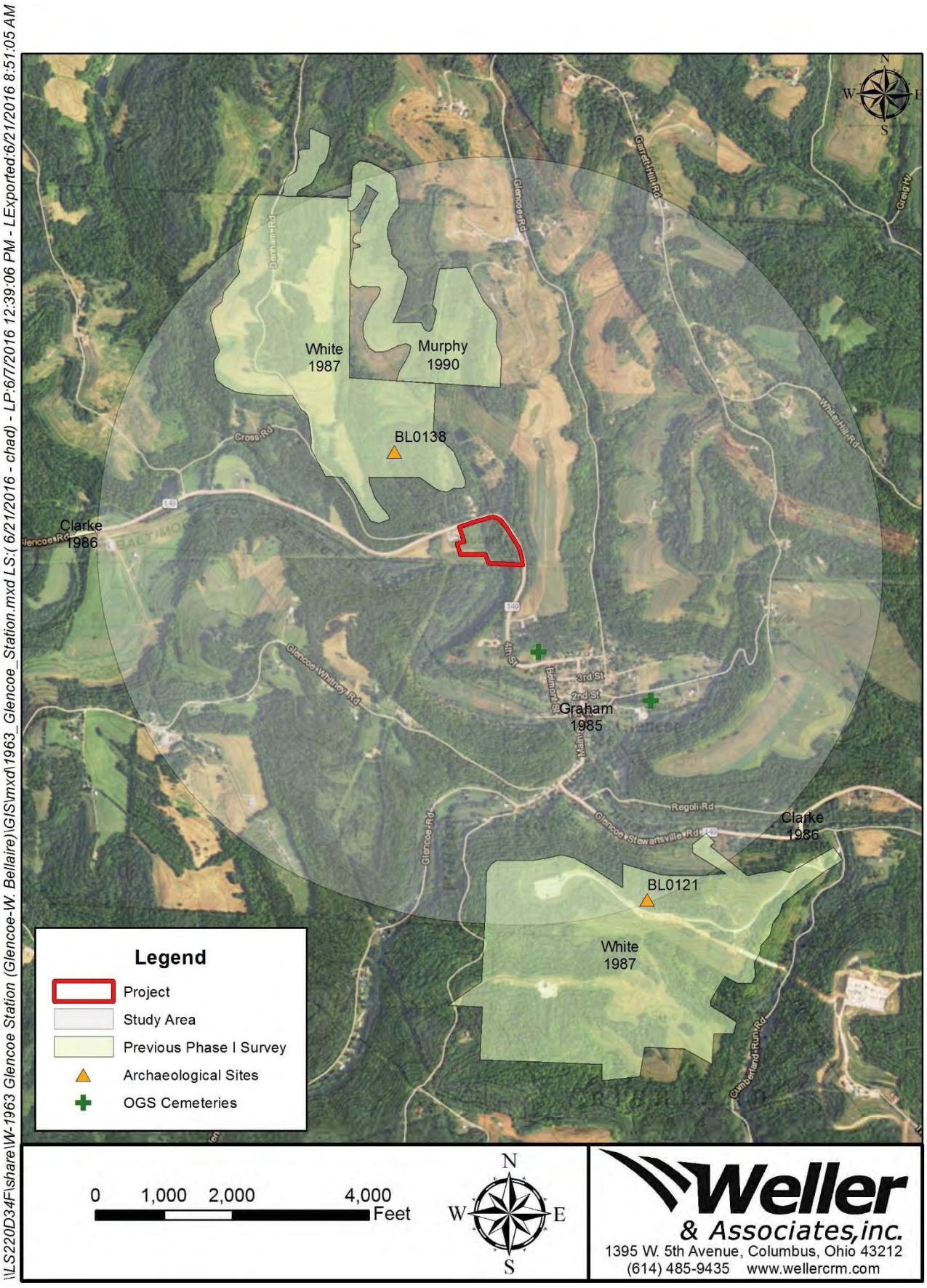


Figure 3. Aerial map indicating the location of the project and previously recorded resources in the study area.

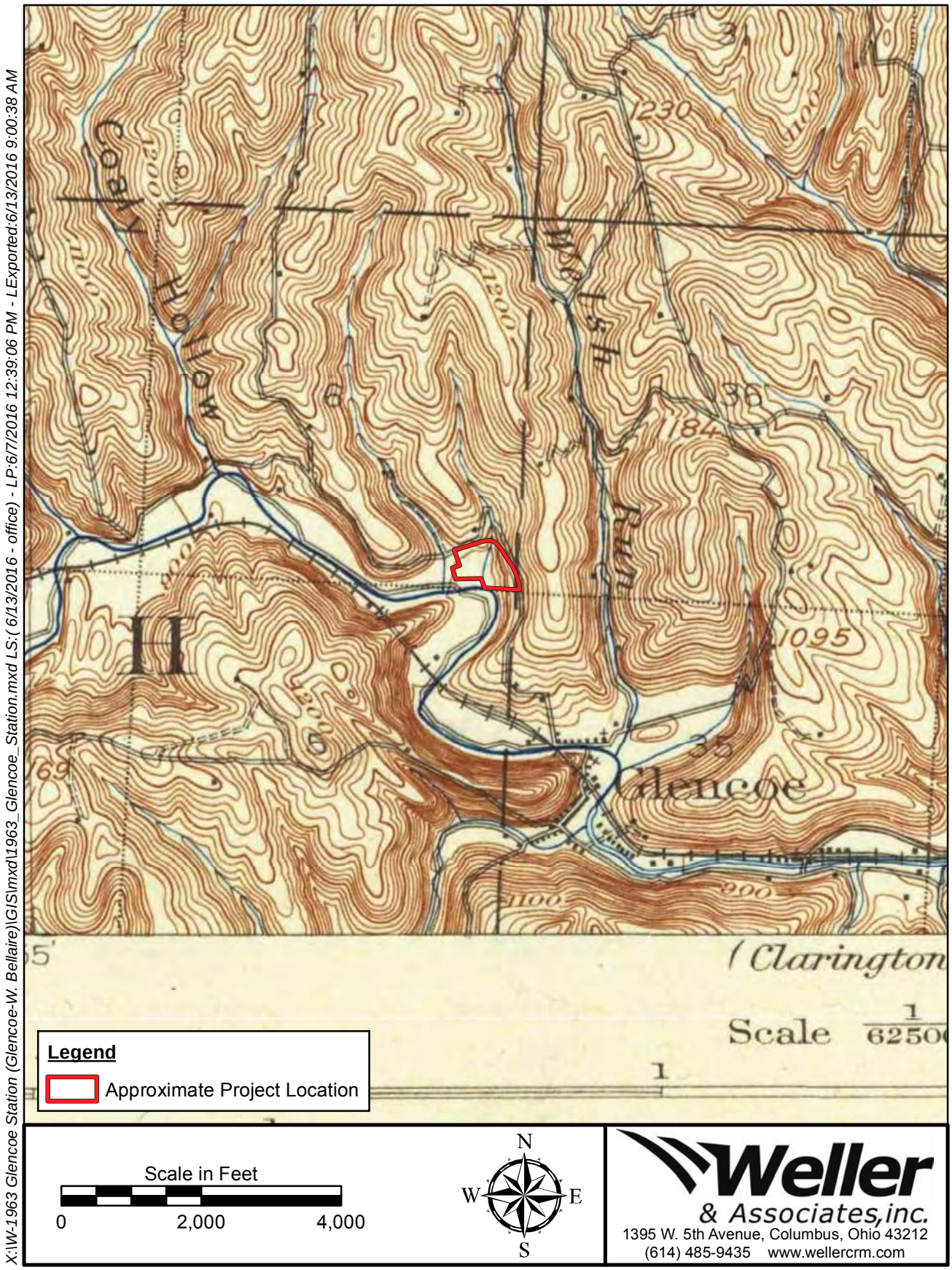


Figure 4. Portion of the USGS *1905 Saint Clairsville, Ohio 15 Minute Series (Topographic)* map indicating the approximate location of the project.

Figure 5. Fieldwork results and photo orientation map.

Figure 6. View of the conditions within the northwestern portion of the project.

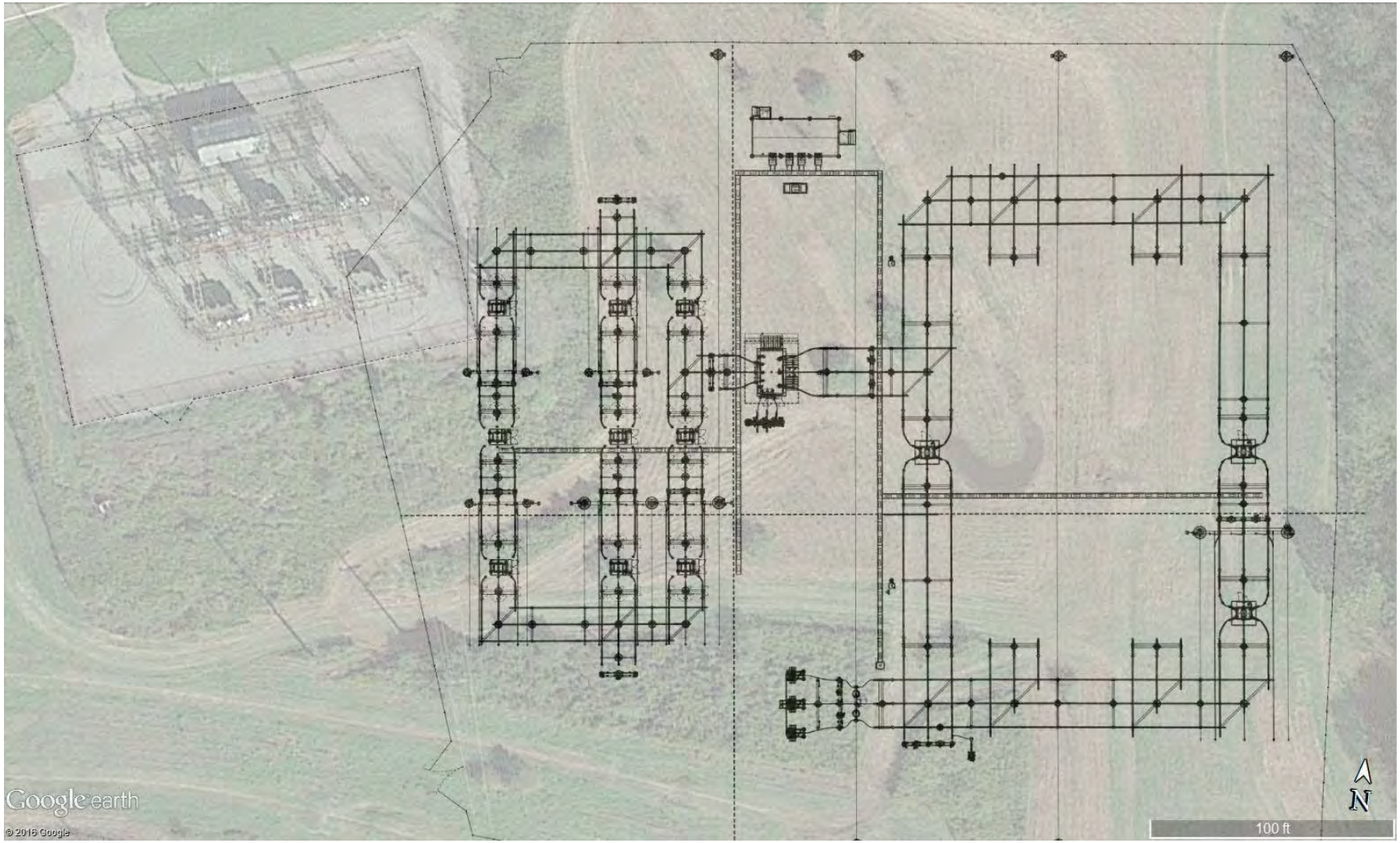
Figure 7. View of the disturbed conditions within the central portion of the project.

Figure 8. View of the conditions within the southern portion of the project.

Figure 9. Some of the sloped conditions in the project.

Figure 10. A typical disturbed shovel probe from the project.

Glencoe Station Rebuild


Google earth
© 2016 Google
N
100 ft

Field Exploration

- Structural/Grading Borings: 19 Borings (7.6 to 100 feet)
- Retaining Wall Borings: 7 Borings (19 to 38.7 feet)
- Underground Mine Investigation Borings: 10 Borings (49 to 55.3 feet)
- Transmission Line Borings: 8 Borings (24.5 to 35 feet)

44 Borings


B-8-TL
B-3
B-2
B-1
B-6
B-7
B-4
B-5
C-2
C-1
B-1
B-1-UM
B-2-UM
B-2
B-3-UM
B-3
B-13
B-6
B-5
B-12
B-4
B-4-UM
B-5-UM
B-6-UM
B-10-UM
B-7
B-8
B-9
B-10
B-11
B-7-UM
B-8-UM
B-9-UM
F-1
B-15
F-2
B-5-TL
B-7-TL
B-3-TL
B-6-TL
B-4-TL
B-1-TL
B-2-TL
Google earth
© 2016 Google
N
100 ft


McMAHONS CREEK
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

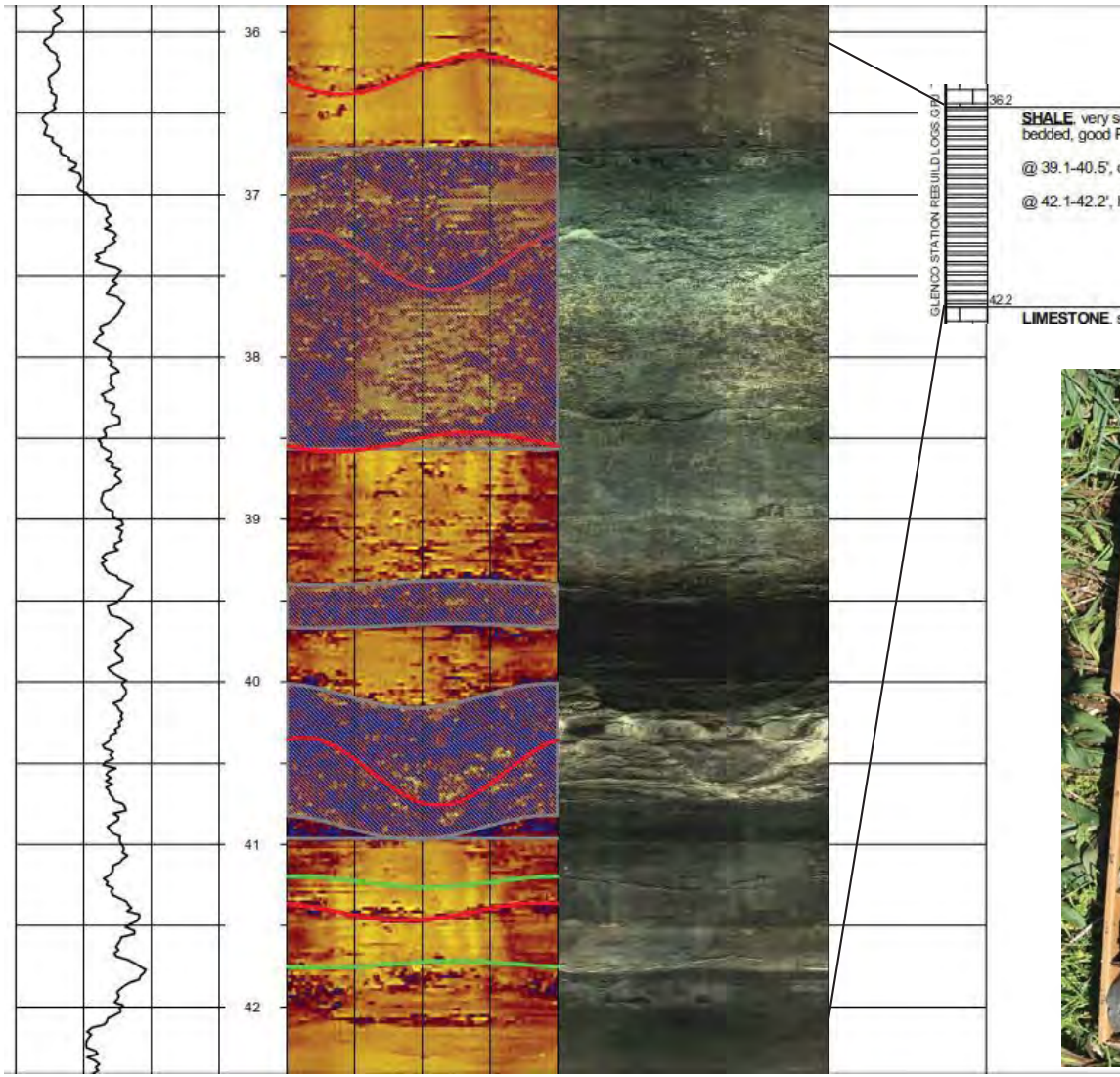
Summary – Initial Study

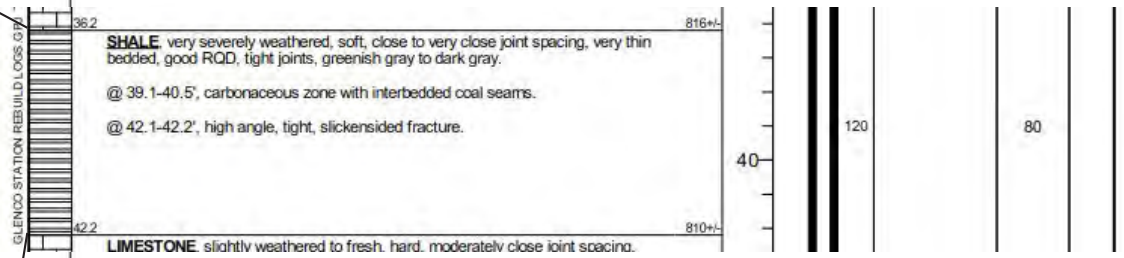
- Native cohesive soils of very soft to stiff consistency and native granular soils of very loose to dense relative density to underlain by lime stone and shale bedrock
- Underground Mine – Pittsburg No. 8 Coal – Elevation 780 feet (ODNR)
- B-6 – 5 feet coal seam @ 70.4 feet (~787.5 feet); B-10 – 6 feet mine void @ 63 feet (~792 feet); methane noted in boring B-10
- High angle fracture noted in boring B-6 @ 23 feet; likely to be mechanical in nature
- Short term pillar stability appears adequate (stability factor 3)
- Roof failure in production panels – tangible risk
- Precautionary Measures – Foundation slack, elevation survey, slabjacking
- 7 feet cut, 9 feet fill
- 33 feet sidehill embankment supporting S R 149, retention system recommended
- Mat/slab and drilled shafts.
- No obvious signs of subsidence observed at the existing station

Additional Mine Investigation Study Summary

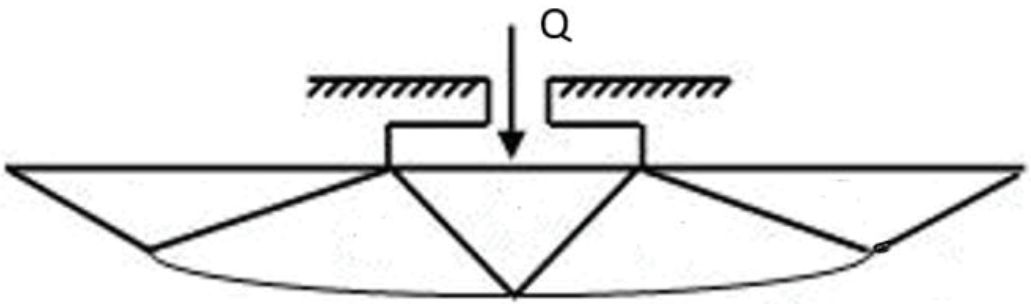
- Alternating layers of soft, weathered shale and relatively unweathered, limestone
- Optical, acoustic televiewer surveys and gamma ray log
- B-8 encountered a mine at 55.3 feet (~794 feet); methane discharge noted; boring plugged
- Minimal high angle fractures noted – All mechanical in origin except B-5-UM @ 39.7 feet
- No notable vertical anomalies based on cross sectional drawing
- Low angle fractures noted in televiewer logs – attributed to weathered shale
- In conclusion, subsidence risk is relatively low.
- Precautionary measures recommended

B-7-UM

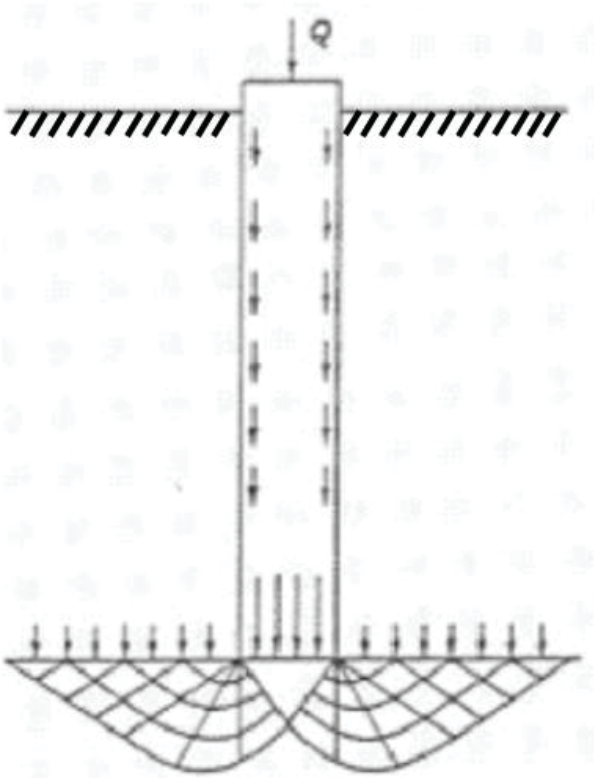




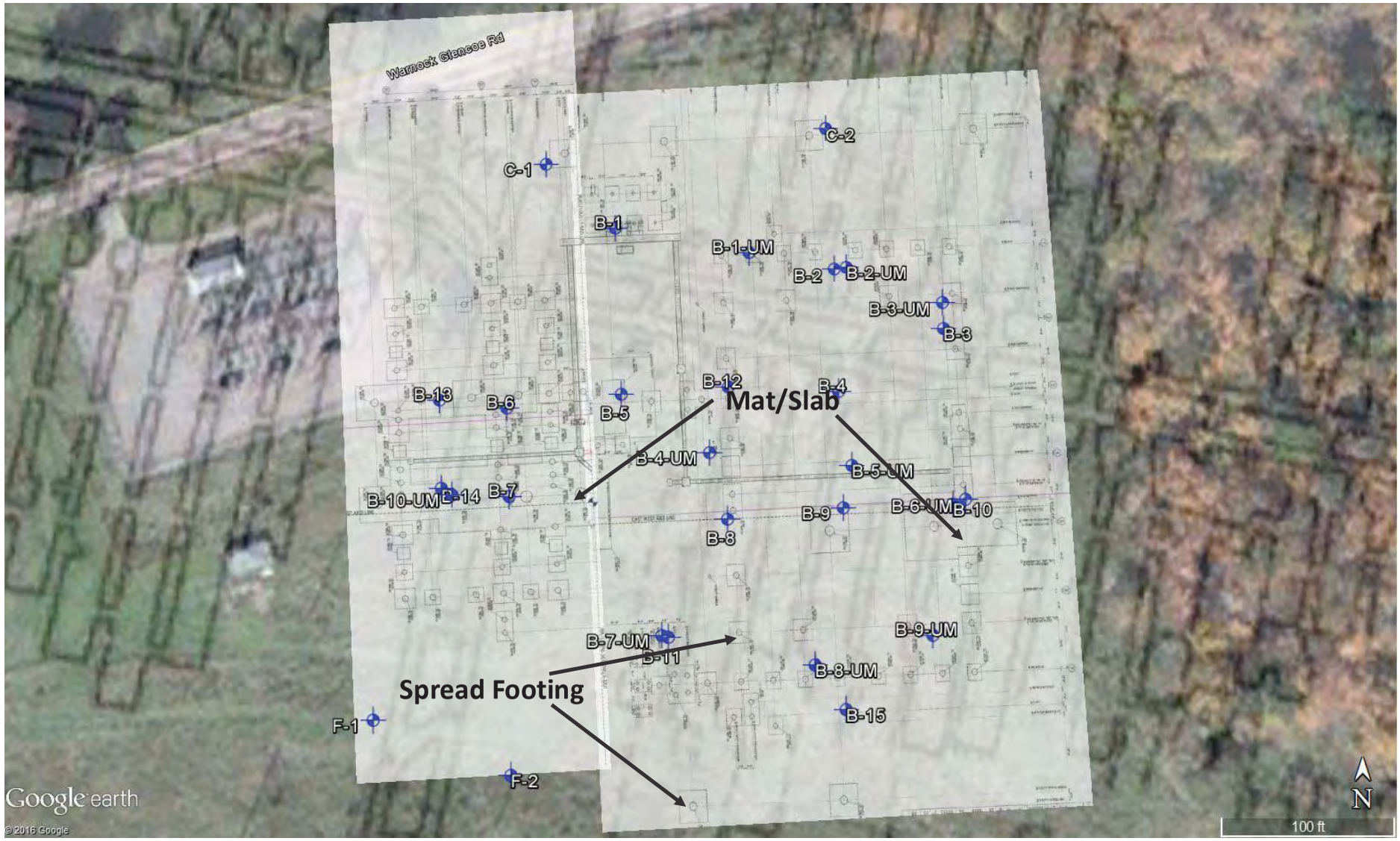
GAMMA LOG ACOUSTIC LOG OPTICAL LOG

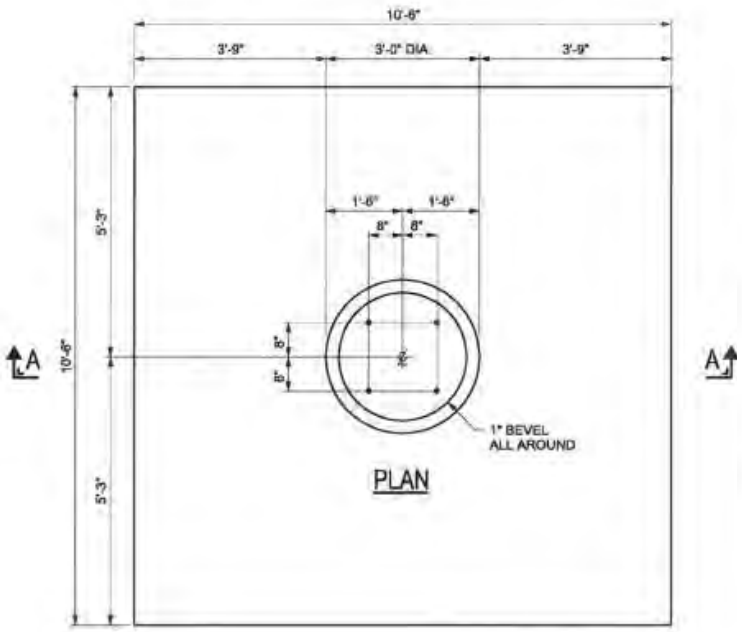


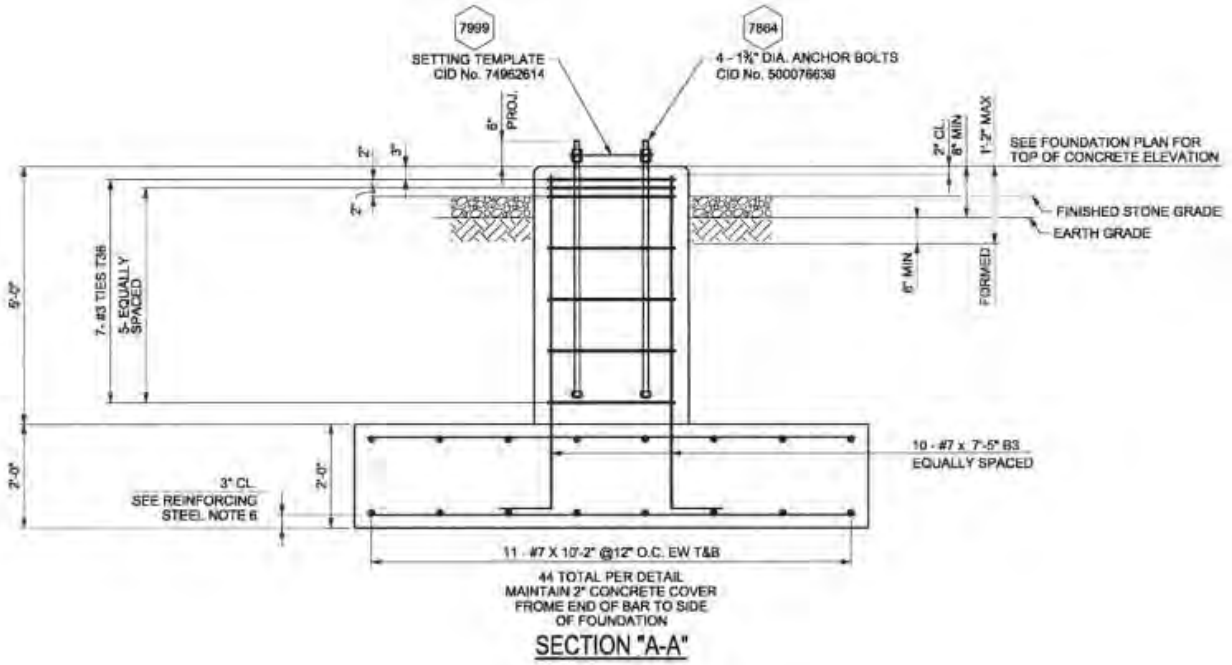
Spread Footing

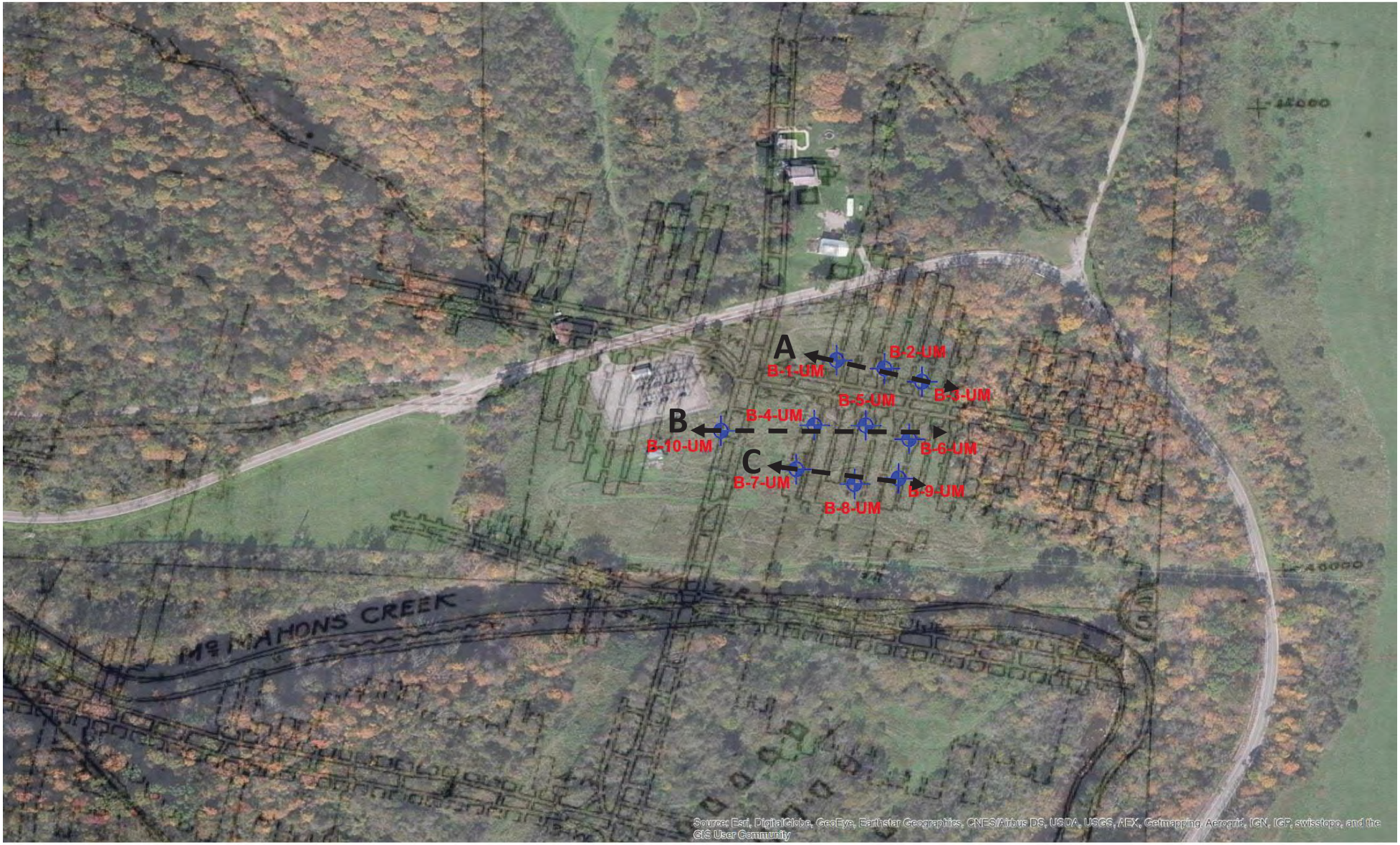


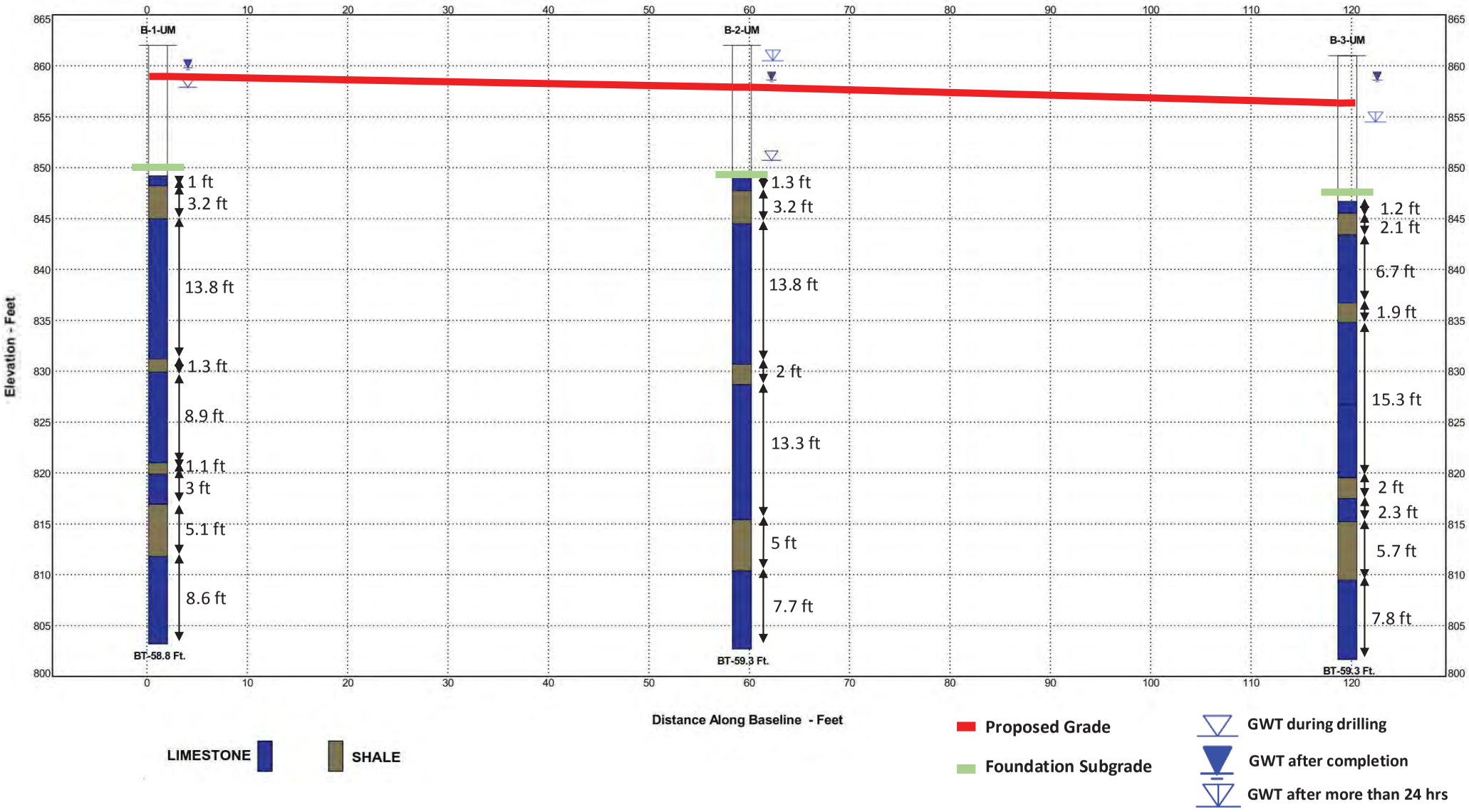
Drilled Shaft

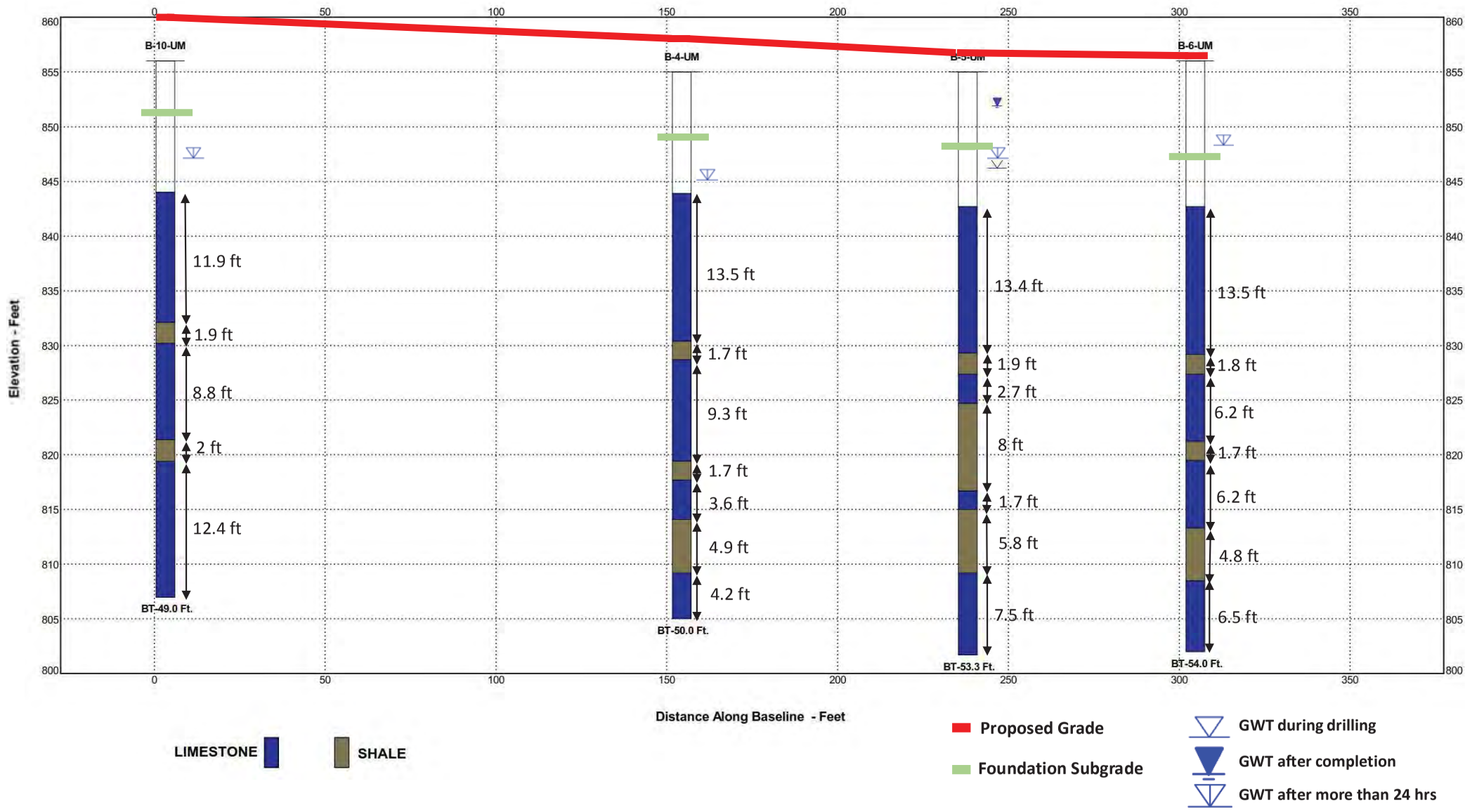

Warnock Glencoe Rd
C-1
C-2
B-1
B-1-UM
B-2
B-2-UM
B-3-UM
B-3
B-12
B-4
B-13
B-6
B-5
Mat/Slab
B-4-UM
B-5-UM
B-10-UM
B-14
B-7
B-9
B-6-UM
B-10
B-8
B-9-UM
B-7-UM
B-11
B-8-UM
Spread Footing
B-15
F-1
F-2
Google earth
© 2016 Google
N
100 ft


10'-6"
3'-9"
3'-0" DIA.
3'-9"
5'-3"
10'-6"
5'-3"
1'-6"
1'-6"
8"
8"
8"
8"
A
A
1" BEVEL
ALL AROUND
PLAN


7999
SETTING TEMPLATE
CID No. 74962614
7864
4 - 1¾" DIA. ANCHOR BOLTS
CID No. 500076639
8" PROJ.
2" CL.
6" MIN
1'-2" MAX
SEE FOUNDATION PLAN FOR
TOP OF CONCRETE ELEVATION
FINISHED STONE GRADE
EARTH GRADE
6" MIN
FORMED
7- #3 TIES T36
5- EQUALLY
SPACED
6'-0"
2'-0"
2'-0"
3" CL.
SEE REINFORCING
STEEL NOTE 6
10 - #7 x 7'-5" B3
EQUALLY SPACED
11 - #7 X 10'-2" @12" O.C. EW T&B
44 TOTAL PER DETAIL
MAINTAIN 2" CONCRETE COVER
FROME END OF BAR TO SIDE
OF FOUNDATION
SECTION "A-A"


A
B-1-UM
B-2-UM
B-3-UM
B-5-UM
B
B-4-UM
B-10-UM
B-6-UM
C
B-7-UM
B-8-UM
B-9-UM
McMAHONS CREEK
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


B-1-UM
B-2-UM
B-3-UM
1 ft
3.2 ft
13.8 ft
1.3 ft
8.9 ft
1.1 ft
3 ft
5.1 ft
8.6 ft
BT-58.8 Ft.
1.3 ft
3.2 ft
13.8 ft
2 ft
13.3 ft
5 ft
7.7 ft
BT-59.3 Ft.
1.2 ft
2.1 ft
6.7 ft
1.9 ft
15.3 ft
2 ft
2.3 ft
5.7 ft
7.8 ft
BT-59.3 Ft.
Elevation - Feet
Distance Along Baseline - Feet
LIMESTONE
SHALE
Proposed Grade
Foundation Subgrade
GWT during drilling
GWT after completion
GWT after more than 24 hrs


B-10-UM
B-4-UM
B-5-UM
B-6-UM
11.9 ft
1.9 ft
8.8 ft
2 ft
12.4 ft
BT-49.0 Ft.
13.5 ft
1.7 ft
9.3 ft
1.7 ft
3.6 ft
4.9 ft
4.2 ft
BT-50.0 Ft.
13.4 ft
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8 ft
1.7 ft
5.8 ft
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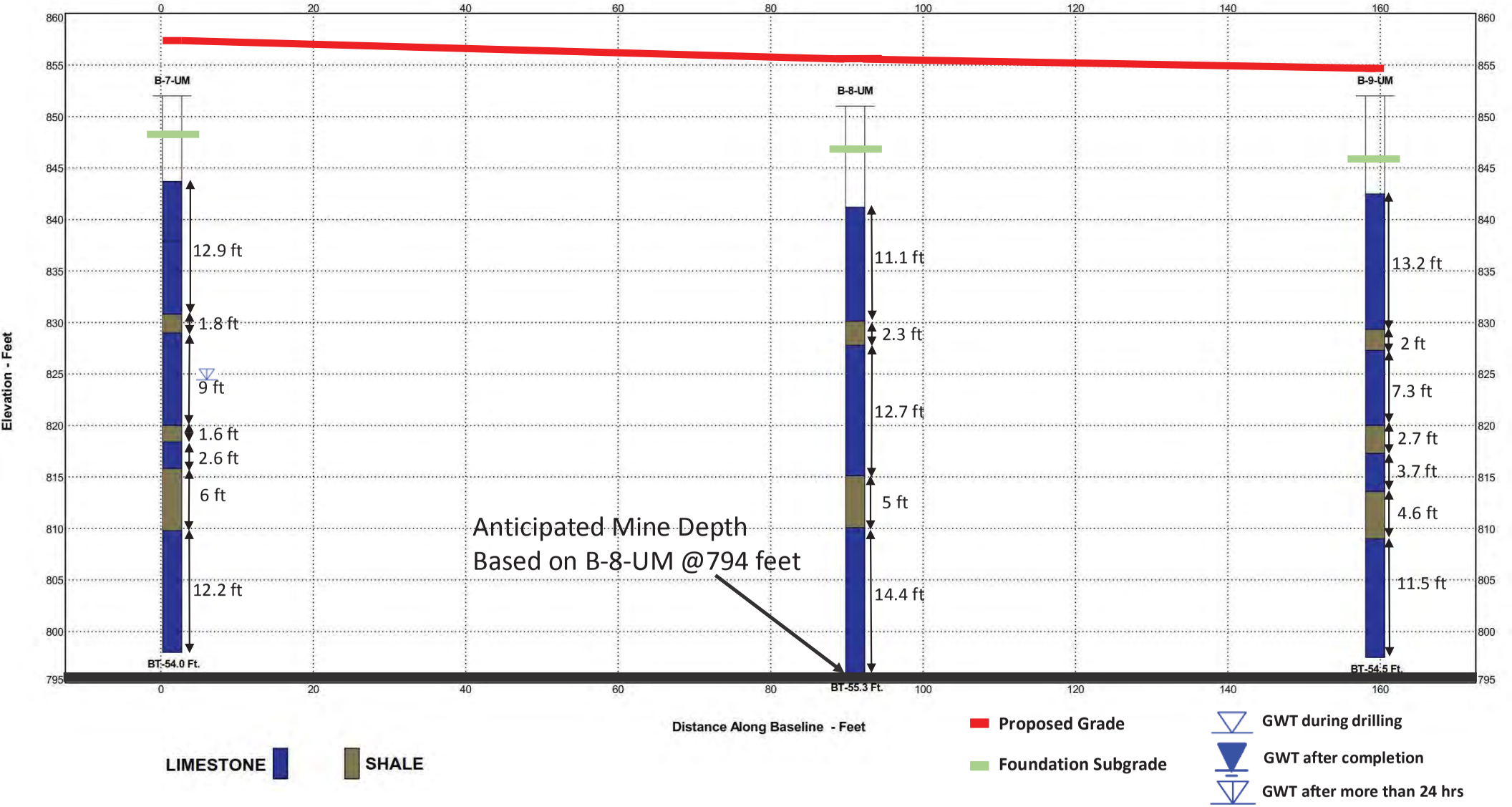
6.5 ft
BT-54.0 Ft.
Elevation - Feet
Distance Along Baseline - Feet
LIMESTONE
SHALE
Proposed Grade
Foundation Subgrade
GWT during drilling
GWT after completion
GWT after more than 24 hrs


B-7-UM
B-8-UM
B-9-UM
12.9 ft
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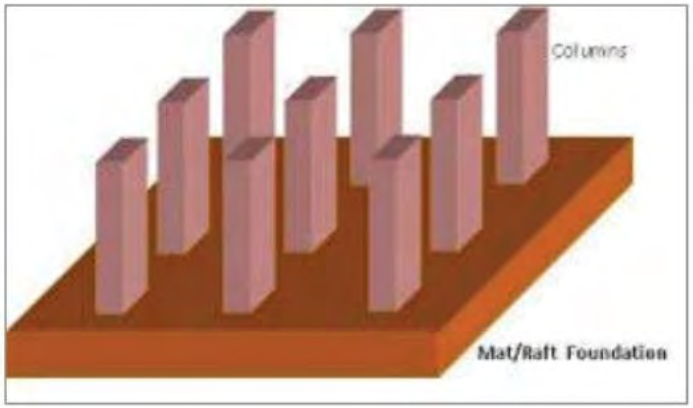
5 ft
14.4 ft
13.2 ft
2 ft
7.3 ft
2.7 ft
3.7 ft
4.6 ft
11.5 ft
Anticipated Mine Depth
Based on B-8-UM @794 feet
BT-54.0 Ft.
BT-55.3 Ft.
BT-54.5 Ft.
Elevation - Feet
Distance Along Baseline - Feet
LIMESTONE
SHALE
Proposed Grade
Foundation Subgrade
GWT during drilling
GWT after completion
GWT after more than 24 hrs

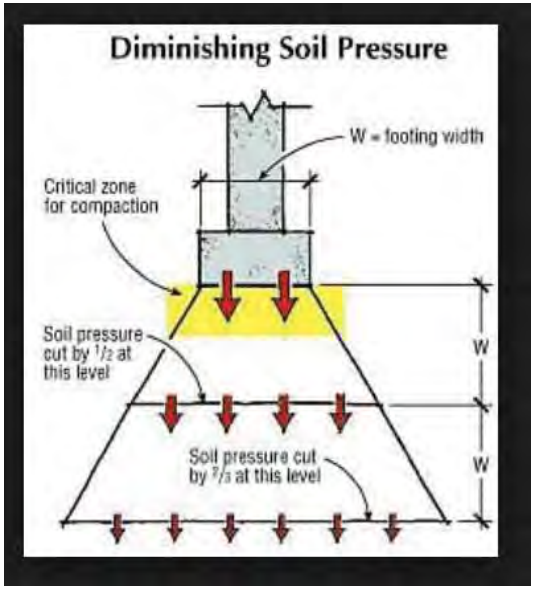
SHALLOW FOUNDATION

Foundation is shallow if its depth is equal to or less than its width.

Types of shallow foundation

1. Spread footings
2. Combined footings
3. Strap or cantilever footings
4. Mat or raft foundation





4. Mat or raft foundation

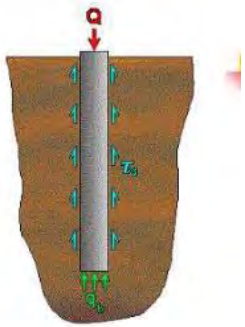
- It is a combined footing that covers the entire area beneath a structure and supports all the walls and columns.
- Used on soft or loose soils with low bearing capacity as they can spread loads over larger area.

THE FOUNDATIONS ARE DESIGNED FOR AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 PSF

ALLOWABLE SOIL BEARING CAPACITY OF THE SOIL IS =3000 PSF

Pile Foundation

- Piles are long and slender members which transfer the load to deeper
  soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity



DEAD END STRUCTURE VERTICAL LOAD 40.7 KIPD ULTIMATE
LOAD ALLOWABLE LOAD = 24.66 KIPS
END BEARING PRESSURE = 24.66 / 28.26 =0.88 KSF

DE-9CW
DIA OF THE FIUNDATION 6’-0” FT
BEARING PRESSURE ON THE SOIL = 8000 PSF

Mine Grouting Estimates

- ENTIRE FOOTPRINT
  - Total void space beneath station = 102,138 cubic yards
  - Estimate ~ $ 12.7 Million

- STRUCTURAL FOOTPRINT
  - Total void space beneath station = 25,624 cubic yards
  - Estimate ~ $ 3.2 Million