SUBSURFACE INVESTIGATION &
GEOTECHNICAL RECOMMENDATIONS

PIKE COUNTY EDC 340 ACRE SITE CERTIFIED
PETERSBURG, INDIANA
A&W PROJECT NO.: 16IN0271

PREPARED FOR:
PIKE COUNTY ECONOMIC DEVELOPMENT CORPORATION
PETERSBURG, INDIANA

PREPARED BY:
ALT & WITZIG ENGINEERING, INC.
GEOTECHNICAL DIVISION

AUGUST 12, 2016

Alt & Witzig Engineering, Inc.
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August 12, 2016

Pike County Economic Development Corporation
1592 Indiana 61
Petersburg, Indiana 47567
Attn: Ms. Ashley P. Willis

Report of Subsurface Investigation and Geotechnical Recommendations

RE: Pike County EDC 340 Acre Site Certified
Petersburg, Indiana
Alt & Witzig File: 16IN0271

Dear Ms. Willis:

In compliance with your request, we have conducted a subsurface investigation and geotechnical evaluation for the above referenced project. It is our pleasure to transmit one (1) electronic copy of the report.

The results of our test borings and laboratory tests completed to date are presented in the appendix of the report. Our recommendations for the project are presented in the "Geotechnical Analysis and Recommendations" section of the report.

Often, because of design and construction details that occur on a project, questions arise concerning the soil conditions. If we can give further service in these matters, please contact us at your convenience.

Very truly yours,
Alt & Witzig Engineering, Inc.

Brian A. Wirt, P.E.

David C. Harness, P.E.

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EXECUTIVE SUMMARY

Alt & Witzig Engineering, Inc. has performed a subsurface investigation and geotechnical analysis for the 340 Acre Site Certified located on the east side of Interstate 69 and southwest of Indiana Route 61 in Petersburg, Indiana (Site) in conformance with the scope and limitations of our proposal dated February 25, 2016 (*A&W Proposal 1602G061*). This investigation was performed for Pike County Economic Development Corporation. Authorization to perform this investigation was in the form of an Alt & Witzig Engineering, Inc. proposal that was accepted by the Pike County Economic Development Corporation.

In compliance with your request, we have completed a total of thirty-four (34) soil borings at the above referenced Site Certified site. As you know, the borings were widely spaced and the design loads, building sizes, utility and pond depths, and building elevations are unknown at this time. Therefore, these recommendations must be considered preliminary in nature. Structure specific borings and recommendations should be prepared as design progresses.

Findings and Conclusions

From 1984 to 1995, the southwestern portion of the site was surface mined for coal. Additionally, a majority of the remainder of the site was disturbed, but not mined. The former surface mined land was reclaimed in 1995, however, remaining portions of the site were reclaimed as recently as 2013. Almost all of the borings encountered mine spoils or disturbed soils. Boring B-19 encountered mine spoils to a depth of seventy-five (75) feet, the deepest of which any borings encountered the spoils. Most of the borings were terminated within the spoils/disturbed soils at a depth of twenty (20) feet, the predetermined termination depth.

Much of the mined land consists of filled land in the form of deep deposits of mining soils produced by the mining operation. For mine spoils, the amount of settlement will depend on a variety of factors, including fill depth, age of the deposit, moisture content, method of placement, and groundwater conditions after placement.

Structures suffer minimal damage from uniform settlement. For filled land, however, a large proportion of ground settlement is of the uneven, differential settlement type, which is dictated by the depth of fill. In order to minimize the effects of differential settlement, buildings should be placed where spoil depth is relatively uniform. Ideally, buildings will also be placed where underlying spoil depth is relatively shallow. If spoil depths under a building site are even and uniform, ground settlement is more likely to be even and uniform.

INTRODUCTION

This report presents the results of a subsurface investigation for the Site Certified site located on the east side Interstate 69 in Petersburg, Indiana. This investigation was conducted for Pike County Economic Development Corporation of Petersburg, Indiana. Authorization to perform this investigation was in the form of a proposal prepared by Alt & Witzig that was signed by Ms. Ashley Willis with the Pike County Economic Development Corporation.

The purpose of this subsurface investigation was to determine the soil profile and the engineering characteristics of the subsurface materials in order to provide criteria for use by design engineers and architects for site evaluation.

The scope of this investigation included a review of geological maps of the area; a review of geologic and related literature; a reconnaissance of the immediate sites; a subsurface exploration; field and laboratory testing; and an engineering analysis and evaluation of the encountered materials.

Our subsurface investigation was conducted in accordance with guidelines set forth in the scope of services and applicable industry standards.

The scope or purpose of this geotechnical investigation did not, either specifically or by implication, provide any environmental assessment of the site. A Phase I Environmental Site Assessment and Wetland Delineation are presented under separate cover.

DESCRIPTION OF SITE

The 340 acre Site Certified site is located on the east side of Interstate 69 in Petersburg, Indiana. The site may be located using the Petersburg, Indiana 7-½ minute topographic map in Section 2, Townships 1 South, Range 8 West. The general vicinity of the site is shown on the enclosed *Site Location Map* (Appendix A). An aerial photograph of the site taken in 2016 is provided in *Exhibit 1* below.

Exhibit 1 – 2016 Aerial Photograph of Site

The surface of the site is sloping with an estimated relief of approximately fifty (50) feet. Drainage on the site is primarily along the ground surface into low lying areas, ditches, ponds, and Prides Creek, which runs in an east/west direction through the center of the site. The site currently consists of agricultural parcels and wooded areas surrounded by agricultural land and a few residential structures.

Site History

According to the historical sources reviewed during this investigation, the site consisted of unimproved farmland and a homestead located on the northeast portion from at least 1939 to 1984. From 1984 to 1995, the southwestern portion of the site was surface mined for coal. Additionally, a majority of the remainder of the site was disturbed, but not mined. Around 2000, the homestead on the northeast portion of the Site was removed. Based on observations from the 1998, 2005, and 2010 historical aerial photographs, the site has undergone extensive surface mining and clearing operations. The former surface mined land was reclaimed in 1995, however, remaining portions of the site were reclaimed as recently as 2013.

FIELD INVESTIGATION

Boring Locations

Alt & Witzig Engineering, Inc. staked the locations of the borings using the provided site location. The provided location was projected onto aerials provided by the Google Earth website allowing for the correlation of the approximate latitude and longitude coordinates with each boring location. These coordinates were then assigned as waypoints and uploaded into a handheld GPS unit. Utilizing the handheld GPS unit, the locations referred to on our boring logs and presented on the *Boring Location Plan* (Appendix A), were drilled in the field.

Drilling and Sampling Procedures

The soil borings were drilled using a track-mounted drilling rig equipped with a rotary head. Hollow-stem augers were used to advance the holes. The advancement of the borings was temporarily stopped at regular intervals in order to perform standard penetration tests in accordance with ASTM Procedure D-1586 to obtain the standard penetration value of the soil.

The standard penetration value is defined as the number of blows a 140 lb hammer, falling 30 inches, required to advance the split-spoon sampler 12 inches into the soil. The results of the standard penetration tests indicate the relative density and comparative consistency of the soils, and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

The soil samples retained in the split-spoon sampling device as a result of the penetration tests were obtained, classified, and labeled for further laboratory investigation. Unless notified to the contrary, all samples will be disposed of two (2) months after the drilling date.

Water Level Measurements

Groundwater depths, during drilling operations, were estimated based on where water was observed on the sampling rods. Upon completion and up to twenty-four (24) hours after completion of drilling activities, the depth to water was measured using a 100-foot tape measure with a weighted end. It shall be noted that in granular soils, borings often experience caving or 'plugging' of the

borehole opening due to sloughing of the granular soils after removal of the augers. The depth of cave/plug is also recorded on the Boring Logs. The depths presented on the Boring Logs are accurate only for the day on which they were recorded. The exact location of the water table shall be anticipated to fluctuate depending upon normal seasonal variations in preparation and surface runoff.

Ground Surface Elevation

Ground surface elevations were interpolated from a five-foot interval contour map provided by the Pike Count EDC. All depths and elevations referred to in this report are assumed to be accurate to within +/- five (5) feet.

LABORATORY INVESTIGATION

A laboratory investigation was conducted to ascertain additional pertinent engineering characteristics of the subsurface materials at the site of the Site Certified site. All phases of the laboratory investigation were conducted in general accordance with applicable ASTM Specifications. The laboratory testing program included:

- Visual classification of soils in accordance with ASTM D-2488.
- Moisture content determination in accordance with ASTM D-2216.
- Samples of the cohesive soil were frequently tested in unconfined compression by use of a calibrated spring testing machine.
- A pocket penetrometer was used as an aid in determining the strength of the soil.

The values of the unconfined compressive strength as determined on soil samples from the split-spoon sampling must be considered approximate recognizing the manner in which they were obtained since the split-spoon sampling techniques provide a representative but somewhat disturbed soil sample.

SUBSURFACE CONDITIONS

Regional Setting

The 340 Acre Site Certified site is located within the Southern Hills and Lowlands of Indiana at an approximate elevation of 450 to 500 feet. According to the Indiana Geological Survey, bedrock is located at elevation ranging from 400 to 450 feet consisting of mostly shale and sandstone of Pennsylvanian Age. Per a review of geologic maps, no Karst activity is located on or near the site. According to the *Custom Soil Resource Report for Pike County, Indiana* published by the United States Department of Agriculture Soil Conservation Service (USDS SCS), the majority of the soils covering this site are classified as Fairpoint Silt Loam, Reclaimed (FaB). The remaining soils are classified as Alford Silt Loam (AdB2, AdC2), Belknap Silt Loam (Bg), Bonnie Silt Loam (Bo), Chetwynd Silt Loam (ClF), Dumps (Du), Fairpoint-Bethesda Complex (FbG), Hosmer Silt Loam (HoB2, HoC3, HoD3), Wakeland Silt Loam (Wa), Wellston Silt Loam (WeE), and Zanesville Silt Loam (ZaD3). The *Custom Soil Resource Report for Pike County, Indiana* has been included in Appendix B of this report.

Site-Specific Geologic Results

The types of foundation materials encountered have been visually classified and are described in detail on the *Boring Log* included in Appendix A of this report. The results of the field penetration tests, strength tests, water level observations and laboratory water contents are also presented on the *Boring Logs* in numerical form.

As previously mentioned, a portion of the site was previously surface mined. The soils encountered in a majority of the borings are characterized as mine spoils. The mine spoils are most likely native to the site or vicinity and have physical properties that are comparable to native soils, thus the exact depths of the mine spoils were difficult to determine.

At the ground surface, the borings encountered two (2) to nine (9) inches of topsoil. Almost all of the borings encountered mine spoils or disturbed soils. Boring B-19 encountered mine spoils to a depth of seventy-five (75) feet, the deepest of which any borings encountered the spoils. Most of the borings were terminated within the spoils/disturbed soils at a depth of twenty (20) feet, the

predetermined termination depth. The mine spoils consisted of both cohesive and non-cohesive soils of varying layer thicknesses and depths. Per information provided by Solar Sources, the owner of the site, the *Boring Location Plan* in the appendix provides an outline of areas that were surface mined as well as areas that were disturbed.

Site-Specific Groundwater Elevations

The *Custom Soil Resource Report for Pike County, Indiana* indicates a seasonal high groundwater as shallow as the ground surface. However, the mining history of the site may have influenced the natural groundwater table.

Groundwater level measurements taken during and upon completion of the drilling operations indicate groundwater ranging from eleven (11) to fifty-nine (59) feet below the ground surface when encountered. However, a majority of the borings did not encounter groundwater. The exact location of the water table should be anticipated to fluctuate somewhat depending upon normal seasonal variations in precipitation and surface runoff. It should be noted that the groundwater level measurements recorded on the individual *Boring Logs* included in Appendix A of this report, are accurate only for the dates on which the measurements were performed.

Seismic Parameters

Based on the field and laboratory tests performed on the encountered subsurface materials and an assumption of similar soils conditions present at depths below the boring termination depth, this site should be considered a Site Class D in accordance with the 2012 International Building Code.

Maximum spectral response acceleration values of S_S=0.436 g and S_1=0.160 g are indicated for seismic design.

Soil liquefaction during a seismic event is not anticipated. Additionally, no known faults are located near the site.

GEOTECHNICAL ANALYSIS & RECOMMENDATIONS

Project Description

In order to satisfy the requirements for a Site Certified site, one boring was conducted for every 10 acres. As such, the following recommendations are general in nature and intended solely for site evaluation purposes.

For our preliminary analysis, it is assumed that structures will be lightly to moderately loaded and founded on medium stiff cohesive mine spoil material. It is expected that these structural loads will be transferred to the soils by conventional spread footings or continuous wall footings, if possible. Once building layouts and design loads have been developed, it is recommended that structure specific borings be conducted in order to provide building specific recommendations.

Grading plans were not available at the time of this report. Due to the size of the site, it is anticipated that cuts and fills will be necessary to prepare building pads. Therefore, the foundation soils will vary with the elevation changes across the site, making our recommendations general in nature.

Concerns of Developing Reclaimed Mine Lands

As previously stated, it is known that a portion of the site was used a surface coal mine from 1984 to 1995 and that a majority of the remainder of the site was disturbed. It is understood that in the disturbed areas that the underlying bedrock remained intact, however the overburden soils were disturbed to a depth of +/- twenty-five (25) feet. The former surface mined land was reclaimed in 1995, however, remaining portions of the site were reclaimed as recently as 2013.

Much of the mined land consists of filled land in the form of deep deposits of mining soils produced by the mining operation. Additionally, it is understood that a majority of the site consists of disturbed soils up to twenty-five (25) feet in depth. Even when carefully placed with compaction, such fills continue to settle under their own weight for many years. In general, most mine spoils are merely dumped and that no compaction effort is provided. For a particular fill, the amount of settlement will depend on a variety of factors, including fill depth, moisture, compaction conditions during placement, and groundwater conditions after placement.

Structures suffer minimal damage from uniform settlement. For filled land, however, a large proportion of ground settlement is of the uneven, differential settlement type, which is dictated by the depth of fill. In order to minimize the effects of differential settlement, buildings should be placed where spoil depth is relatively uniform. Ideally, buildings will also be placed where underlying spoil depth is relatively shallow. If spoil depths under a building site are even and uniform, ground settlement is more likely to be even and uniform.

Pre-construction precautions can be made in an effort to minimize the effects of total and differential settlement. ***Unless one of the recommended pre-construction items are implemented, it is not recommended that the site be developed within ten (10) years of final closure of the mine. It is understood that approximately 317 acres, including the mined area, are beyond 10 years as they were reclaimed in 1995. However, approximately 23 acres were reclaimed in 2013.***

These items are outlined below.

Settlement Monitoring

It is understood that approximately 317 acres, including the mined areas, were reclaimed over ten (10) years ago. However, the remaining 23 acres of the site contain disturbed soils reclaimed in 2013. As such, it is anticipated the spoils are continuing to settle under their own weight, especially in the areas of the deepest fills. In order to determine the rate and magnitude in which these fills are settling, it is recommended to establish a settlement monitoring program. Grade stakes consisting of six (6) foot long, #8 rebar should be driven four (4) feet into the soil in locations indentified to consist of mine spoils. The tops of the stakes should be monitored monthly by a surveyor. This data should be provided to Alt & Witzig Engineering, Inc. for review. The criteria required to begin construction should be when the settlements between stakes are less than 0.12”/week for a minimum of five consecutive weeks.

Surcharge and Monitoring

Additionally, the use of subsurface drainage and a surcharge load may be considered for the site if the construction schedule can allow for the necessary timeframe. Placing a surcharge load atop the

mine spoils creates an additional loading condition that will speed the consolidation rate of the underlying spoil soils. Contractors must be able to place the required fill materials at optimum moisture content such that the fills are placed with the maximum possible density with little compactive effort. The fill compaction percentage should increase as the design grade is achieved. Once design grade is achieved, a surcharge material may be placed. Compaction of the surcharge material need not exceed a certain limit, nor be of select material. However, the density of the surcharge material will determine the required thickness. Once the surcharge material is applied, settlement stakes should be installed to observe the movement.

The surcharge fill material should be placed over the entire area and a minimum of ten (10) feet beyond the limits of the spoil soils within the building area and other areas as deemed necessary. Thus, the initial building pad, at a minimum, must be enlarged horizontally in this area to accommodate for the placement of the surcharge.

The surcharge fill material may be comprised of various consistencies due to the fact that the function is to consolidate the underlying soils and then to be removed. The height of the fill and time of the fill is left in place will depend on several factors. One of the major factors will be the amount of time that the surcharge fill material may be left in place. To monitor the rate and quantity of settlement, settlement plates, or grade stakes at the least, must be installed prior to the placement of the surcharge material. Elevations on each of the stakes should be obtained on a monthly basis by a licensed surveyor. The elevations should be provided to Alt & Witzig Engineering, Inc.

Ground Modification

Alternatively, ground modification using dynamic compaction appears to be feasible at this site as well as low risk. Dynamic compaction consists of using a crane to drop a weight multiple times within the area of a structure to compact and soils. A ground modification specialist may be consulted to evaluate the site conditions and approximate costs of modification. Additionally, the ground modification specialist will be able to determine if additional subsurface information is necessary.

The specialty contractor should provide the drop location layout, drop height, and number of drops per location, as well as the design bearing capacity for foundations.

Site Preparation

Excessively organic topsoil and loose dumped fill material on the site generally undergo high volume changes, which are detrimental to the behavior of shallow foundations, floor slabs, pavement, and fill material. Therefore, it is recommended that topsoil and loose materials be stripped from the construction areas and wasted or stockpiled for later use.

It is estimated that stripping on the order of two (2) to nine (9) inches across the site may be required. The topsoil depths on our boring logs are not exact and may not represent variations between boring locations. Therefore, the topsoil thickness should be used for estimating purposes only. The amount of stripping will also be dependent on the condition of the subgrade during earthmoving operations.

After stripping has been performed, and prior to the placement of fill material, it is recommended that the exposed subgrade be proofrolled with approved equipment to identify soft or yielding soils. It is further recommended that a representative of Alt & Witzig Engineering, Inc. be present to witness the proofroll evaluation. Any areas failing proofrolling should be remediated as determined by the owner after consultation with Alt & Witzig Engineering.

After completion of the proofroll and any necessary remediation has been completed, it is recommended that proper control of subgrade compaction and fill, and structural fill replacement be maintained by a representative of Alt & Witzig Engineering, Inc. as per the *Recommended Specifications for Compacted Fills and Backfills*, presented in Appendix A of this report; thus minimizing volume changes and differential settlements which are detrimental to behavior of shallow foundations, floor slabs and pavements.

Foundation Recommendations

Provided settlement monitoring, surcharge loading, or dynamic compaction is performed prior to construction, the general soil conditions would be favorable for shallow spread and continuous footings supporting future lightly to moderately loaded structures of the Site Certified site.

However, in the areas where mine spoils were encountered the potential of excessive settlement exists. In addition to the structures themselves, fill material used to elevate and level the site may induce settlement.

Preliminary Foundation Recommendations – Overall Site

Based on the anticipated lightly to medium loaded structures, net allowable soil bearing pressures ranging from 1,500 to 3,500 psf may be possible for design of conventional foundations founded on firm natural soil or properly compacted fill. It is recommended that additional subsurface investigations be conducted once structure sizes and locations are determined across the site.

It is anticipated total and differential settlements exceeding the allowable industry standards may be seen in areas of the mine spoils.

In order to alleviate the effects of seasonal variation in moisture content on the behavior of the footings and eliminate the effects of frost action, all exterior foundations should be founded a minimum of two (2) feet below the final grade.

Due to the size of the site and the limited investigation conducted, it is recommended that each structure proposed for construction at this site have a structure specific geotechnical investigation conducted.

Ground Level Floor Slab Recommendations

In the areas where the existing grade is above the final floor elevation, the building area should be undercut and a granular material placed beneath the slab. In those areas where the existing grade is below the final floor elevation, a well-compacted structural fill will be necessary to raise the site to the desired grade. With the exception of topsoil and the organic soils encountered, all fill materials may consist of onsite materials or other approved borrow materials if proper moisture content and compaction procedures are maintained.

After the building area has been leveled to the proper elevation, a minimum six (6) inch layer of granular material should be placed below the floor slab. Provided a minimum of six (6) inches of granular material is present, a modulus of subgrade reaction (k) of 125 pci may be used for

design. It is recommended that all material placed with the intent of supporting the floor slab be compacted to 93 percent of the maximum dry density as determined by ASTM D-1557. Recommendations for proper filling procedures are presented in the Appendix.

Pavement Recommendations

The strength of the subgrade soils at this site will depend upon several variables including drainage and compaction. It is extremely important that all paved areas be designed to prevent water from collecting or ponding immediately beneath the pavement. This can be accomplished by sheet draining the parking area and sloping the subgrade soils and outletting them to a drain or a ditch to allow for subgrade drainage. It is recommended that underdrains be installed at the transitions from concrete to asphalt as well. Due to the potential for excessive total and differential settlement in the mine spoil areas it is recommended that rigid pavements not be used.

For these soils to provide adequate support for pavement, it will also be necessary that the earthmoving contractor follow proper site work techniques. The exposed subgrade should be proof-rolled with equipment approved by a representative of Alt & Witzig Engineering, Inc. This proof-rolling will assist in identifying pockets of soft unstable materials beneath exposed subgrades.

A design CBR value of 3 is recommended for pavement design on a properly prepared subgrade.

CONSTRUCTION CONSIDERATIONS

Site Preparation

Excessively organic topsoil and loose dumped fill materials will generally undergo high volume changes which are detrimental to the behavior of pavements, floor slabs, structural fills, and foundations placed upon them. Therefore, it is recommended that all topsoil and loose materials be stripped from the construction areas and wasted or stockpiled for later use.

Borings indicate that the topsoil at this site is two (2) to nine (9) inches in thickness. It is recommended that the topsoil be stripped from the structural areas. The condition of the subgrade and the methods used by the contractor will also influence the amount of stripping. It is recommended that the final depth of stripping should be determined by a representative of Alt & Witzig Engineering, Inc. in the field, at the time of the stripping operations.

It is recommended that after the above-mentioned stripping has been performed, the exposed subgrade be proof-rolled with approved equipment. This proof-rolling will assist in identifying areas where soft soil exist. It is recommended that a representative of Alt & Witzig Engineering, Inc. be present for this phase of this project.

After the existing subgrade soils are excavated to design grade, proper control of subgrade compaction and fill, and structural fill replacement should be maintained by a representative of the soils engineer as per the *Recommended Specifications for Compacted Fills and Backfills* presented in the Appendix. This will minimize volume changes and differential settlements which are detrimental to the behavior of shallow foundations, floor slabs and pavements.

Groundwater

Groundwater level measurements taken during and upon completion of the drilling operations indicate groundwater ranging from eleven (11) to fifty-nine (59) feet below the ground surface when encountered. However, a majority of the borings did not encounter groundwater. The *Custom Soil Resource Report for Pike County, Indiana* indicates a seasonal high groundwater level as shallow as the existing grade. However, the mining past of the site will have likely influenced the

natural groundwater levels. The exact location of the water table will fluctuate depending upon normal seasonal variations in precipitation and surface runoff.

Depending upon the time of the year and the weather conditions when the excavations are made, seepage from surface runoff may occur into shallow excavations or soften the subgrade soils. Since these foundation materials tend to loosen when exposed to free water, every effort should be made to keep the excavations dry should water be encountered. In cohesive soil, sump pumps or other conventional dewatering procedures should be sufficient for this purpose. It is further recommended that all concrete for footings be poured the same day as the excavation is made in order to prevent the softening of foundation soils from groundwater infiltration.

STATEMENT OF LIMITATIONS

This report is solely for the use of Pike County Economic Development Corporation and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties for other uses. This report shall only be presented in full and may not be used to support any other objectives than those set out in the scope of work, except where written approval and consent are provided by or Pike County Economic Development Corporation and Alt & Witzig Engineering, Inc.

An inherent limitation of any geotechnical engineering study is that conclusions must be drawn on the basis of data collected at a limited number of discrete locations. The geotechnical parameters provided in this report were developed from the information obtained from the test borings that depict subsurface conditions only at these specific locations and on the particular date indicated on the boring logs. Soil conditions at other locations may differ from conditions encountered at these boring locations and groundwater levels shall be expected to vary with time. The nature and extent of variations between the borings may not become evident until the course of construction.

The exploration and analysis reported herein is considered in sufficient detail and scope to form a reasonable basis for site evaluation. The recommendations submitted are based on the available soil information and assumed design details enumerated in this report. If actual design details differ from those specified in this report, this information should be brought to the attention of Alt & Witzig Engineering, Inc. so that it may be determined if changes in the foundation recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of Alt & Witzig Engineering, Inc.

APPENDIX A

Recommended Specifications for Compacted Fills and Backfills
Site Location Map
Boring Location Plan
Boring Logs
General Notes
Stratigraphic Profiles

RECOMMENDED SPECIFICATIONS FOR COMPACTED FILLS AND BACKFILLS

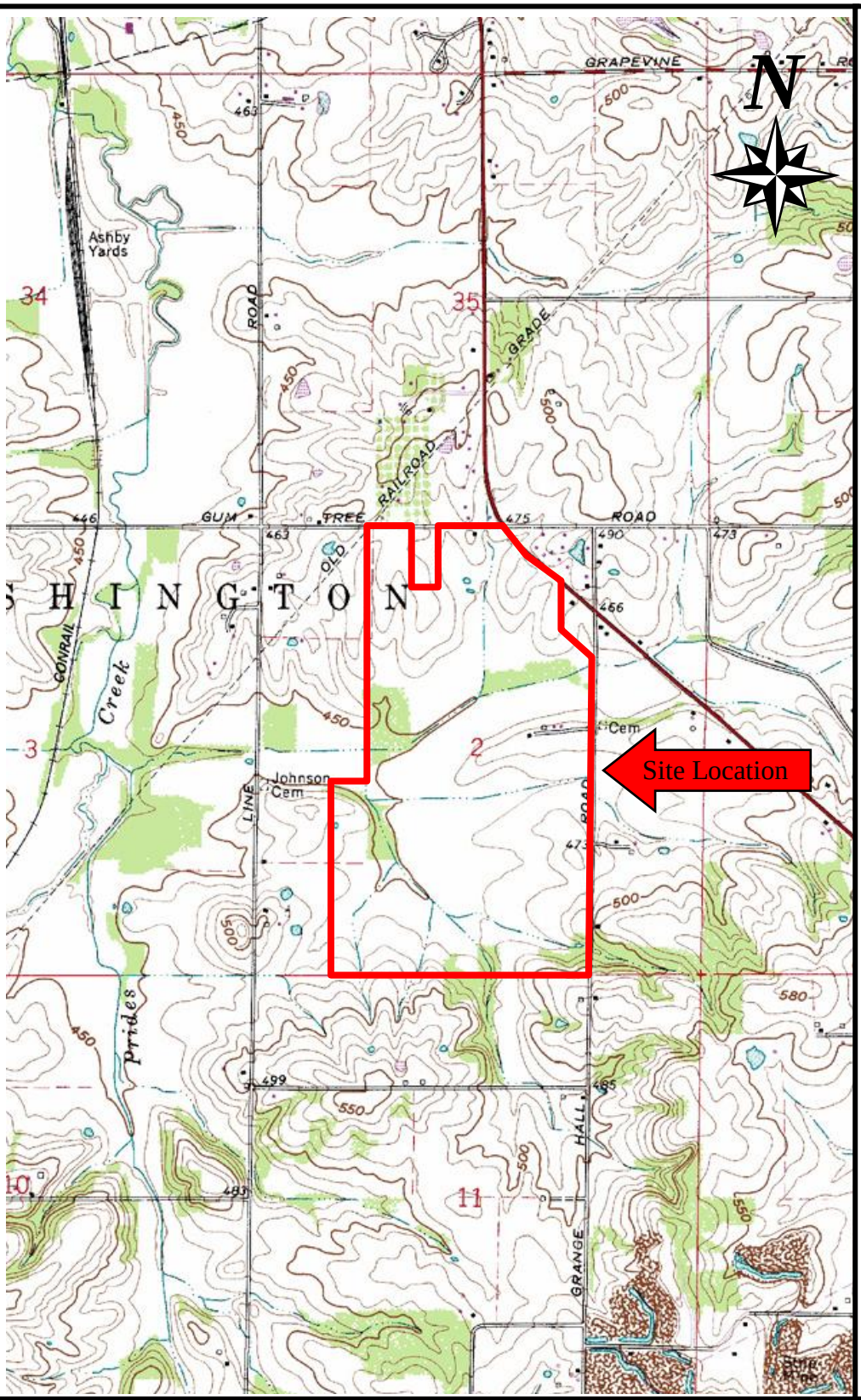
All fill shall be formed from material free of vegetable matter, rubbish, large rock, and other deleterious material. Prior to placement of fill, a sample of the proposed fill material should be submitted to Alt & Witzig Engineering, Inc. for approval.

The surface of each layer will be approximately horizontal but will be provided with sufficient longitudinal and transverse slope to provide for runoff of surface water from every point. The fill material should be placed in layers not to exceed eight (8) inches in loose thickness and should be sprinkled with water as required to secure specified compactions. Each layer should be uniformly compacted by means of suitable equipment of the type required by the materials composing the fill.

Under no circumstances should a bulldozer or similar tracked vehicles be used as compacting equipment. Material containing an excess of water so the specified compaction limits cannot be attained should be spread and dried to a moisture content that will permit proper compaction.

All fill should be compacted to the specified percent of the maximum density obtained in accordance with ASTM density Test D-1557 (95% of maximum dry density beneath foundations and 93% below floor slabs and pavements). Should the results of the in-place density tests indicate that the specified compaction limits are not obtained; the areas represented by such tests should be reworked and retested as required until the specified limits are reached.

SITE LOCATION MAP



USGS Topographic Map:
Petersburg Quadrangle

Township: T 1 S.
Range: R 8 W.
Section: 2

PROJECT: Pike County EDC 340 Acre Site Certified
LOCATION: Petersburg, Indiana
CLIENT: Pike County Economic Development Corporation
A&W File No.: 16IN0271

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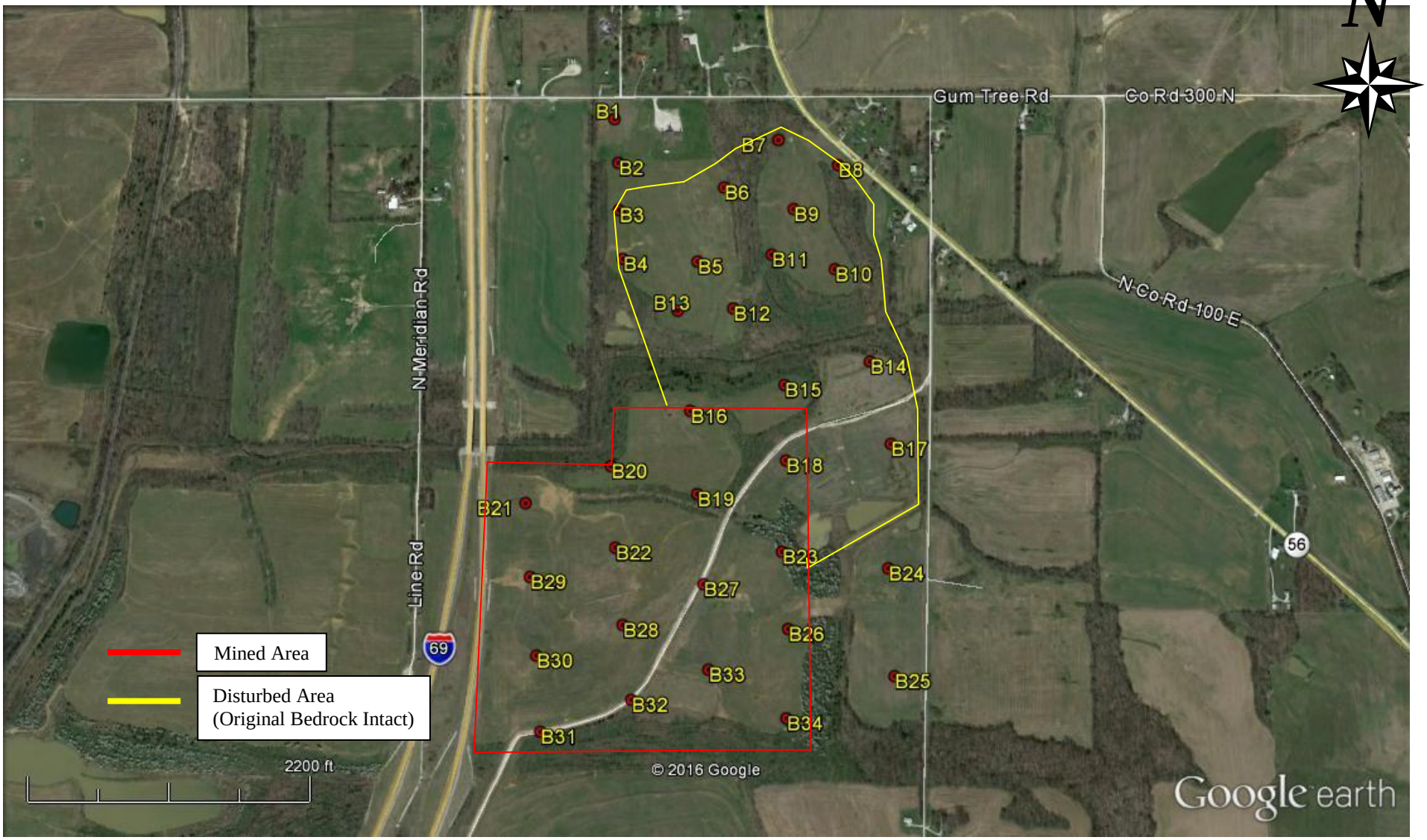
BORING LOCATION PLAN



Prepared For: Pike County Economic Development Corporation	A&W	**Prepared By:** Alt & Witzig Engineering, Inc.	
Project Name: Pike County EDC 340 Acre Site Certified		**Project No:** 16IN0271	**Date:** 05/16

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-01**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/24/16**
Date Completed **5/24/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
474.7	TOPSOIL	0.3										
				1	SS			2		3.0	23.0	
	Brown SILT with a Trace of Clay		5	2	SS			4	1.6	1.5	20.7	
467.5		7.5		3	SS			7		3.5	21.7	
			10	4	SS			8	2.1	3.0	27.2	
	Brown and Gray Silty CLAY											
460.0		15.0	15	5	SS			11		2.0	23.6	
	Brown, Moist SILT											
			20	6	SS			21		2.0	20.3	
454.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-02**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/24/16**
Date Completed **5/24/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
479.5	TOPSOIL	0.5										
	Gray SILT *(FILL)*			1	SS			14		3.0	14.1	
475.0		5.0	5	2	SS			14	3.0	1.5	19.7	
				3	SS			7	1.6	2.5	18.8	
	Brown SILT with Clay *(Possible Fill)*		10	4	SS			9		3.5	22.3	
465.0		15.0	15	5	SS			7		2.5	20.7	
	Brown and Gray SILT with Clay											
460.5		19.5										
459.0	Brown SILT	21.0	20	6	SS			5	1.7	2.5	28.5	
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-03**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/24/16**
Date Completed **5/24/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 470.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
469.9	TOPSOIL	0.1										
				1	SS			8	1.5	1.5	23.1	
			5	2	SS			8	2.4	2.0	17.6	
	Brown and Gray SILT with Some Clay *(Possible Fill)*			3	SS			10		1.5	28.3	
			10	4	SS			9		2.0	27.1	
455.0		15.0										
	Brown and Gray Silty CLAY		15	5	SS			4			33.8	
450.5		19.5										
			20	6	SS			5	2.3	1.0	29.7	
449.0	Gray Silty CLAY	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
BORING # **B-04**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
ALT & WITZIG FILE # **16IN0271**
PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/24/16** Hammer Wt. **140** lbs.
Date Completed **5/24/16** Hammer Drop **30** in.
Boring Method **HSA** Spoon Sampler OD **2** in.
Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 465.0	Strata Depth	Depth Scale	Sample No.	TEST DATA: Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % *Dry Unit Weight (pcf)*	Remarks
464.6	TOPSOIL	0.4										
	Brown SILT *(Possible Fill)*			1	SS			8				
460.0		5.0	5	2	SS			13				
458.0	Gray SILT *(Possible Fill)*	7.0		3	SS			11				
	Brown SILT with Clay *(Possible Fill)*		10	4	SS			14				
449.5		15.5	15	5	SS			8				
	Brown and Gray Silty CLAY											
445.0		20.0	20	6	SS			5				
444.0	Brown and Gray SILT with Some Clay	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-05**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
479.7	TOPSOIL	0.3										
	Brown SILT *(FILL)*			1	SS			14		3.5	15.9	
			5	2	SS			10	2.4	2.5	19.0	
472.5		7.5		3	SS			13		2.0	18.5	
	Gray SILT *(FILL)*		10	4	SS			18		3.5	16.4	
465.5		14.5										
	Brown SILT		15	5	SS			12		4.0	15.0	
			20	6	SS			12	2.0	2.5	23.3	
459.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
BORING # **B-06**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
ALT & WITZIG FILE # **16IN0271**
PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/24/16** Hammer Wt. **140** lbs.
Date Completed **5/24/16** Hammer Drop **30** in.
Boring Method **HSA** Spoon Sampler OD **2** in.
Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	TEST DATA: Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
479.9	TOPSOIL	0.1										
	Brown SILT with Shale Fragments *(FILL)*			1	SS			30				
475.0		5.0	5	2	SS			26				
	Gray SILT with Shale Fragments *(FILL)*			3	SS			7				
472.0		8.0										
	Gray Sandy Silty CLAY with Rock Fragments *(FILL)*		10	4	SS			15				
469.5		10.5										
	Gray SILT and Gravel *(FILL)*		15	5	SS			7				
			20	6	SS			14				
459.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-07**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 465.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
464.3	TOPSOIL	0.7										
	Brown Silty CLAY *(Possible Fill)*			1	SS			12		3.5	18.0	
459.5		5.5	5	2	SS			6		3.5	20.5	
	Gray SILT *(Possible Fill)*			3	SS			3		0.5	29.1	
455.0		10.0	10	4	SS		▽ ○	5		2.5	22.2	
	Brown Sandy Silty CLAY *(Possible Fill)*											
450.0		15.0	15	5	SS			14		4.0	14.7	
	Brown and Gray SILT											
445.5		19.5										
	Gray SHALE		20	6	SS			50/5"				
444.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *11.5 ft.*
▽ At Completion *11.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
BORING # **B-08**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
ALT & WITZIG FILE # **16IN0271**
PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**
Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 470.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
469.3	TOPSOIL	0.7										
				1	SS			6	1.6	1.5	24.6	
	Brown Silty CLAY *(Possible Fill)*		5	2	SS			8	1.0	2.0	24.0	
				3	SS			12		4.0	18.5	
460.0		10.0	10	4	SS			9	1.9	3.0	24.9	
	Brown and Gray Silty CLAY *(Possible Fill)*											
455.0		15.0	15	5	SS			4		0.5	23.2	
	Brown Silty CLAY											
449.5		20.5	20	6	SS			50/5"		4.0	16.1	
449.0	Brown and Gray SILT End of Boring at 21 feet	21.0										

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-09**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 485.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
484.7	TOPSOIL	0.3										
	Brown SILT *(FILL)*			1	SS			12		4.0	16.5	
479.3		5.7	5	2	SS			20		4.0	15.3	
477.0	Gray SHALE Fragments *(FILL)*	8.0		3	SS			8				
475.0	Gray SHALE Fragments *(FILL)*	10.0	10	4	SS			4		3.5	11.1	
	Gray Sandy Silty CLAY *(FILL)*											
469.5		15.5	15	5	SS			6				
	Gray SHALE Fragments *(FILL)*											
465.0		20.0	20	6	SS			7		1.5	20.2	
464.0	Gray Silty Sandy CLAY *(FILL)*	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-10**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 485.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
484.8	TOPSOIL	0.2										
	Brown and Gray SILT with Clay *(FILL)*			1	SS			11		3.5	15.7	
480.0		5.0	5	2	SS			10		2.0	17.6	
	Brown and Gray SILT *(FILL)*											
477.5		7.5		3	SS			11		3.0	18.8	
			10	4	SS			8		3.5	16.2	
	Brown and Gray Silty CLAY *(FILL)*											
470.0		15.0	15	5	SS			6		2.5	26.5	
	Gray SILT											
465.0		20.0	20	6	SS			33				
464.0	Gray SHALE	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-11**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
474.9	TOPSOIL	0.1		1	SS			12		4.0	17.4	
	Brown SAND with Clay *(FILL)*		5	2	SS			8		4.0	17.7	
467.0		8.0		3	SS			13		3.5	10.2	
465.0	Gray SILT with Shale *(FILL)*	10.0	10	4	SS			67				Driving on a Rock
	Gray SHALE Fragments *(FILL)*											
459.5		15.5	15	5	SS			5		3.5	13.2	
	Gray Sandy Silty CLAY with Shale *(FILL)*											
455.0		20.0	20	6	SS			74				
454.0	Gray SHALE Fragments *(Possible Fill)*	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-12**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 470.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
469.7	TOPSOIL	0.3										
	Brown SILT with Shale *(FILL)*			1	SS			17		4.5	9.1	
464.5		5.5	5	2	SS			50				
462.5	Gray SHALE with Silt *(FILL)*	7.5		3	SS			21				
	Dark Gray Silty CLAY with Shale *(FILL)*		10	4	SS			9		3.5	8.6	
455.0		15.0	15	5	SS			8		1.5	11.6	
	Gray SHALE Fragments *(Possible Fill)*						○					
			20	6	SS			13		0.5	14.5	
449.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *19.0 ft.*
▽ At Completion *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-13**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/23/16**
Date Completed **5/23/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
479.8	TOPSOIL	0.2										
	Gray CLAY with Rock Gragments *(FILL)*			1	SS			21				
474.5		5.5	5	2	SS			10				
472.0	Dark Gray Silty CLAY with Rock Fragments *(FILL)*	8.0		3	SS			28				
470.0	Black SHALE with Rock Fragemnts *(FILL)*	10.0	10	4	SS			8				
			15	5	SS			8				
	Gray SHALE with Silt *(FILL)*		20	6	SS			50/3"				Driving on a Rock, No Recovery
			25	7	SS			6				2 Attempts, No Recovery
450.0		30.0	30	8	SS			15				
	Brown SILT with Some Clay *(Possible Fill)*		35	9	SS			8				
439.4		40.6	40	10	SS			9				
439.0	Gray Silty CLAY	41.0										
	End of Boring at 41 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-14**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/5/16**
Date Completed **5/5/16**
Boring Method **HSA**
Driller **M. Loveday**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **D-50 Track ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 470.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
469.7	TOPSOIL	0.3										
	Brown Silty CLAY *(FILL)*			1	SS			6		4.0	18.4	
			5	2	SS			5		1.5	20.0	
462.5		7.5		3	SS			18				
	Gray SHALE *(FILL)*		10	4	SS			9				
			15	5	SS			50/1"				
			20	6	SS			9				
449.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-15**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/5/16**
Date Completed **5/5/16**
Boring Method **HSA**
Driller **M. Loveday**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **D-50 Track ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 485.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
484.7	TOPSOIL	0.3										
	Brown Silty CLAY *(FILL)*			1	SS			15		4.0	19.4	
480.0		5.0	5	2	SS			33				
				3	SS			36				
	Gray SHALE *(FILL)*		10	4	SS			10				
470.0		15.0	15	5	SS			24				
	Black SHALE *(Possible Fill)*											
467.0		18.0										
	Auger Refusal @ 18.0 feet. End of Boring at 18 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling _____ *ft.*
▽ At Completion _____ *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-16**
ALT & WITZIG FILE # **16IN0271**

Northing 2000 Easting 0

DRILLING and SAMPLING INFORMATION

Date Started **5/5/16**
Date Completed **5/5/16**
Boring Method **HSA**
Driller **M. Loveday**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **D-50 Track ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 485.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
484.7	TOPSOIL	0.3										
				1	SS			26				
	Gray SHALE *(FILL)*		5	2	SS			43				
				3	SS			18				
475.5		9.5										
	Auger Refusal @ 9.5 feet. End of Boring at 9.5 feet			4	SS			50/0"				

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling ft.
▽ At Completion ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-17**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/16/16**
Date Completed **5/16/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 455.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
454.7	TOPSOIL	0.3										
	Brown SILT with Clay *(FILL)*			1	SS			7		1.5	23.1	
450.0		5.0	5	2	SS			6	1.2	2.0	16.8	
448.0	Brown Silty CLAY with Sand *(FILL)*	7.0		3	SS			6	1.6	1.5	28.4	
	Brown Silty CLAY *(FILL)*		10	4	SS			5		3.0	24.1	
439.5		15.5	15	5	SS		▽	7		2.5	24.0	
	Brown SILT *(FILL)*		20	6	SS			1			42.4	
430.5		24.5	25	7	SS			4			45.7	
	Gray CLAY with Silt *(FILL)*		30	8	SS			3		0.5	43.1	
420.0		35.0	35	9	SS			29				
	Gray Silty CLAY *(Possible Fill)*											
414.5		40.5	40	10	SS			50/2"				
414.0	Gray SHALE End of Boring at 41 feet	41.0										

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *18.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-18**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/16/16**
Date Completed **5/16/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	TEST DATA: Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
474.9	TOPSOIL	0.1										
				1	SS			10		3.5	16.9	
	Brown and Gray SILT with Clay *(FILL)*		5	2	SS			6		3.5	22.0	
467.5		7.5		3	SS			32				
	Gray SHALE with Sand and Clay *(FILL)*											
465.0		10.0	10	4	SS			20				
	Gray SHALE Fragments *(FILL)*											
459.5		15.5	15	5	SS			4			17.3	
	Gray and Black Silty CLAY with Sand *(FILL)*						○					
455.0		20.0	20	6	SS			15				
454.0	Gray SHALE	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *19.0 ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-19**
ALT & WITZIG FILE # **16IN0271**

Northing 1400 Easting 0

DRILLING and SAMPLING INFORMATION

Date Started **5/20/16**
Date Completed **5/20/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % Dry Unit Weight (pcf)	Remarks
	Brown SILT with Clay *(FILL)*			1	SS			8		3.5	16.5	
469.5		5.5	5	2	SS			15		4.5	13.2	
467.5	Gray Silty CLAY with Sand *(FILL)*	7.5		3	SS			21				
464.5	Brown and Gray SAND *(FILL)*	10.5	10	4	SS			5				
460.0	Brown and Gray SAND with a Trace of Clay *(FILL)*	15.0	15	5	SS			4	0.8		24.4	
455.0	Brown and Gray Silty CLAY *(FILL)*	20.0	20	6	SS			35				
	Gray Sandy CLAY with Shale *(Possible Fill)*		25	7	SS			11				
444.5		30.5	30	8	SS			50/0"				
	Gray Sandy CLAY with Stone *(Possible Fill)*		35	9	SS		○	32				2 Attempts, No Recovery
434.5		40.5	40	10	SS			25				
429.5	Gray SHALE with Clay *(Possible Fill)*	45.5	45	11	SS			51				
425.5	Gray SHALE *(Possible Fill)*	49.5	50	12	SS			16		2.5	20.8	

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *38.0 ft.*
▽ At Completion *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-19**
ALT & WITZIG FILE # **16IN0271**

Northing 1400 Easting 0

DRILLING and SAMPLING INFORMATION

Date Started **5/20/16**
Date Completed **5/20/16**
Boring Method **HSA**
Driller **S. Gray**
Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % Dry Unit Weight (pcf)	Remarks
420.0	Gray SILT *(Possible Fill)*	55.0	55	13	SS			7			44.4	
	Gray Silty CLAY *(Possible Fill)*		60	14	SS			6		0.5	43.8	
410.5		64.5	65	15	SS			5		1.5	26.1	
	Gray SILT *(Possible Fill)*		70	16	SS			20		4.5	24.4	
400.0		75.0	75	17	SS			50/0"		4.5	15.5	
			80	18	SS			50/3"				
			85	19	SS			50/2"				
	Gray SHALE		90	20	SS			50/1"				
			95	21	SS			50/1"				No Recovery
374.0		101.0	100	22	SS			50/0"				
	End of Boring at 101 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *38.0 ft.*
▽ At Completion *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation** BORING # **B-20**

PROJECT NAME **Pike County EDC 340 Acre Site Certified** ALT & WITZIG FILE # **16IN0271**

PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/5/16** Hammer Wt. **140** lbs.

Date Completed **5/5/16** Hammer Drop **30** in.

Boring Method **HSA** Spoon Sampler OD **2** in.

Driller **M. Loveday** Rig Type **D-50 Track ATV**

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
	SURFACE ELEVATION 480.0											
479.7	TOPSOIL	0.3										
				1	SS			10				
			5	2	SS			8				
				3	SS			43				
	Gray SHALE Fragments *(FILL)*		10	4	SS			22				
			15	5	SS			9				
			20	6	SS			15				
459.0		21.0										
	End of Boring at 21 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-21**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16**
Date Completed **5/19/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	TEST DATA: Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
474.3	TOPSOIL	0.7										
	Brown Silty CLAY *(FILL)*			1	SS			9		4.5	16.4	
470.0		5.0	5	2	SS			9		2.5		
	Brown and Gray Silty CLAY *(FILL)*			3	SS			13		2.0	19.5	
465.0		10.0	10	4	SS			9		4.0		
	Gray SILT with Some Clay *(FILL)*											
459.5		15.5	15	5	SS			7		1.0	26.9	
	Brown Silty CLAY *(FILL)*											
455.0		20.0	20	6	SS			5		2.5	17.9	
454.0	Gray SILT	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation** BORING # **B-22**

PROJECT NAME **Pike County EDC 340 Acre Site Certified** ALT & WITZIG FILE # **16IN0271**

PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16** Hammer Wt. **140** lbs.

Date Completed **5/19/16** Hammer Drop **30** in.

Boring Method **HSA** Spoon Sampler OD **2** in.

Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
474.9	TOPSOIL	0.1										
				1	SS			7		4.0	16.1	
	Brown SILT with Clay *(FILL)*		5	2	SS			8		4.0	18.4	
467.5		7.5		3	SS			67				
	Gray SHALE *(FILL)*											
465.0		10.0	10	4	SS			18		2.5	9.6	
	Gray Silty CLAY with Shale *(FILL)*		15	5	SS			7				
455.0		20.0	20	6	SS			13				
454.0	Gray SHALE with Silty Clay and Stone	21.0										
	End of Boring at 21 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling _____ *ft.*
▽ At Completion _____ *ft.*

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-23**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
479.2	TOPSOIL	0.8										
	Brown Silty CLAY with Sand *(Possible Fill)*			1	SS			12		4.5	14.2	
			5	2	SS			5		1.0	19.3	
472.0		8.0		3	SS			11		2.0	13.2	
	Gray SHALE *(Possible Fill)*											
469.5		10.5	10	4	SS			11		2.0	14.5	
	Brown Silty Sandy CLAY *(Possible Fill)*											
465.0		15.0	15	5	SS			50/0"				Driving on a Rock, No Recovery
	Auger Refusal @ 15.0 feet. End of Boring at 15 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-24**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 465.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
464.5	TOPSOIL	0.5										
	Brown Silty CLAY *(Possible Fill)*			1	SS			6	2.2	2.0	20.1	
			5	2	SS			10	3.1	3.0	22.6	
457.5		7.5		3	SS			10	2.6	3.0	24.8	
	Brown and Gray Silty CLAY *(Possible Fill)*		10	4	SS		▽ ○	7		4.0	25.7	
450.5		14.5										
	Brown Silty CLAY *(Possible Fill)*		15	5	SS			3		0.5	25.9	
			20	6	SS			27		4.5	23.8	
444.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *14.0 ft.*
▽ At Completion *13.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
BORING # **B-25**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
ALT & WITZIG FILE # **16IN0271**
PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16** Hammer Wt. **140** lbs.
Date Completed **5/18/16** Hammer Drop **30** in.
Boring Method **HSA** Spoon Sampler OD **2** in.
Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 475.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
474.5	TOPSOIL	0.5										
	Brown and Gray Silty CLAY			1	SS			7	2.6	2.0	19.2	
470.0		5.0	5	2	SS			7	2.3	1.5	19.9	
	Brown Silty CLAY			3	SS			8		1.5	21.7	
465.0		10.0	10	4	SS			15	4.3	4.5	18.5	
	Brown and Gray Silty CLAY with Sand		15	5	SS			8	1.5	1.0	20.5	
455.5		19.5										
454.0	Brown SILT	21.0	20	6	SS			63		4.5	13.8	
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-26**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 490.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
489.6	TOPSOIL	0.4										
	Brown Silty CLAY *(FILL)*			1	SS			9		3.5	17.3	
			5	2	SS			9		2.5	18.2	
482.5		7.5		3	SS			45				
	Brown SAND and GRAVEL with Clay *(FILL)*		10	4	SS			16				
474.5		15.5	15	5	SS			10				
	Gray SAND and GRAVEL with Clay *(FILL)*											
469.5		20.5	20	6	SS			4		2.0	28.7	
	Brown and Gray Silty CLAY *(Possible Fill)*											
465.0		25.0	25	7	SS		▽	6		2.0	19.6	
	Brown Silty Sandy CLAY *(Possible Fill)*											
460.0		30.0	30	8	SS			28				
	SAND with Rock Fragments *(Possible Fill)*						○					
454.5		35.5	35	9	SS			8				
	Gray SAND and GRAVEL *(Possible Fill)*											
449.0		41.0	40	10	SS			6				2 Attempts, No Recovery
	End of Boring at 41 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *34.0 ft.*
▽ At Completion *26.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-27**
ALT & WITZIG FILE # **16IN0271**

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DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
479.9	TOPSOIL	0.1										
	Gray SHALE *(FILL)*			1	SS			50				
474.2		5.8	5	2	SS			19				
474.0	Gray Silty CLAY with Sand *(FILL)*	6.0										
472.5	SHALE with Sand *(FILL)*	7.5		3	SS			50/5"				
470.0	Gray SHALE *(FILL)*	10.0	10	4	SS			21				
	Gray SAND and GRAVEL with Clay *(FILL)*											
464.3		15.7	15	5	SS			50/3"				
	Gray SHALE *(FILL)*											
459.0		21.0	20	6	SS			50/4"				
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-28**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16**
Date Completed **5/19/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 490.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
489.5	TOPSOIL	0.5										
	Brown SILT with Clay *(FILL)*			1	SS			4		2.5	21.7	
			5	2	SS			7	3.1		18.9	
482.5		7.5		3	SS			26				
	Brown Sandy CLAY *(FILL)*		10	4	SS			8				
475.0		15.0	15	5	SS			7				
	Gray SHALE with Clay *(FILL)*		20	6	SS			50/4"				Driving on a Rock, No Recovery
			25	7	SS			15				
460.0		30.0	30	8	SS			11				
	Gray SHALE *(Possible Fill)*		35	9	SS			14				2 Attempts, No Recovery
450.0		40.0	40	10	SS			8		0.5	25.6	
	Gray SILT with Clay *(Possible Fill)*											
445.5		44.5	45	11	SS			10		1.0	21.3	
	Brown Silty CLAY *(Possible Fill)*											
439.5		50.5	50	12	SS			50/4"				

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *59.0 ft.*
▽ At Completion *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation** BORING # **B-28**

PROJECT NAME **Pike County EDC 340 Acre Site Certified** ALT & WITZIG FILE # **16IN0271**

PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16** Hammer Wt. **140** lbs.

Date Completed **5/19/16** Hammer Drop **30** in.

Boring Method **HSA** Spoon Sampler OD **2** in.

Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % Dry Unit Weight (pcf)	Remarks
435.0	Gray Silty CLAY *(Possible Fill)*	55.0	55	13	SS			13				
	Gray SHALE						○					
430.0		60.0	60	14	SS			22				
			65	15	SS			40				
	Black SHALE		70	16	SS			50/0"				No Recovery
414.2		75.8	75	17	SS			15				
	Gray Sandy CLAY											
410.0		80.0	80	18	SS			37				
	Black SHALE		85	19	SS			92				
399.2		90.8	90	20	SS			50/2"				
	Gray SILT with Shale											
394.5		95.5	95	21	SS			20		2.5	14.4	
	Gray LEAN CLAY with Gravel											
390.0		100.0	100	22	SS			50/0"				
389.0	Gray SHALE	101.0										
	End of Boring at 101 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling *59.0 ft.*
▽ At Completion *ft.*

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-29**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16**
Date Completed **5/19/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 480.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
479.8	TOPSOIL	0.2										
	Brown Silty CLAY *(FILL)*			1	SS			7		3.0	22.2	
474.2		5.8	5	2	SS			18				
472.0	Gray SHALE *(FILL)*	8.0		3	SS			13				
	Gray SHALE with Sand *(FILL)*		10	4	SS			8				
465.0		15.0	15	5	SS			23				
	Gray SHALE with Silt *(FILL)*		20	6	SS			17				
455.0		25.0	25	7	SS			14				
	Gray SHALE *(FILL)*		30	8	SS			9				2 Attempts, No Recovery
			35	9	SS			69				
439.0		41.0	40	10	SS			20				
	End of Boring at 41 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-30**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16**
Date Completed **5/19/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 495.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
494.7	TOPSOIL	0.3										
				1	SS			9			15.7	
	Brown Silty CLAY *(FILL)*		5	2	SS			12		3.5	18.9	
487.0		8.0		3	SS			21				
485.0	Gray SHALE *(FILL)*	10.0	10	4	SS			25				
	SAND and Rock Fragments *(FILL)*											
480.0		15.0	15	5	SS			28				
	Gray SHALE *(FILL)*											
475.0		20.0	20	6	SS			16		3.5	12.5	
474.0	Gray Sandy Silty CLAY with Shale *(FILL)*	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-31**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/19/16**
Date Completed **5/19/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 495.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
	White SAND and GRAVEL with Clay *(FILL)*			1	SS			17				
489.5		5.5	5	2	SS			15				
487.0	Brown SAND with Gravel *(FILL)*	8.0		3	SS			7				
			10	4	SS			8				2 Attempts, No Recovery
	SAND and GRAVEL with Clay *(FILL)*		15	5	SS			3				
475.0		20.0	20	6	SS			7	1.5	2.5	19.8	
	Gray SILT with Clay *(FILL)*											
469.2		25.8	25	7	SS			11		2.5		
	Brown SILT with Some Clay *(FILL)*											
464.5		30.5	30	8	SS			22				
	SAND and GRAVEL with Rock Fragments *(FILL)*		35	9	SS			39				
454.0		41.0	40	10	SS			27				
	End of Boring at 41 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation** BORING # **B-32**

PROJECT NAME **Pike County EDC 340 Acre Site Certified** ALT & WITZIG FILE # **16IN0271**

PROJECT LOCATION **Petersburg, Indiana**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16** Hammer Wt. **140** lbs.

Date Completed **5/18/16** Hammer Drop **30** in.

Boring Method **HSA** Spoon Sampler OD **2** in.

Driller **S. Gray** Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 495.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % *Dry Unit Weight (pcf)*	Remarks
	Brown Sandy CLAY with Gravel *(FILL)*			1	SS			33		4.5	12.8	
			5	2	SS			16				2 Attempts, No Recovery
				3	SS			15				
486.5		8.5										
485.0	Brown SAND and GRAVEL with Clay *(FILL)*	10.0	10	4	SS			13				
	SAND and GRAVEL *(FILL)*		15	5	SS			9				
475.0		20.0	20	6	SS			4	1.2	0.5	25.8	
474.0	Brown Silty CLAY with Some Sand	21.0										
	End of Boring at 21 feet											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-33**
ALT & WITZIG FILE # **16IN0271**

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DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 495.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
494.9	TOPSOIL	0.1										
	Gray SILT *(FILL)*			1	SS			11		3.0	18.0	
489.5		5.5	5	2	SS			9		3.5	17.3	
487.5	Brown Sandy CLAY with Silt *(FILL)*	7.5		3	SS			37				
	Gray SHALE *(FILL)*											
484.5		10.5	10	4	SS			36		3.5	10.0	
	Gray Sandy CLAY with Silt *(FILL)*											
480.0		15.0	15	5	SS			14				
	Gray SHALE *(FILL)*											
475.0		20.0	20	6	SS			24				
474.0	Gray SHALE with Silty Clay *(FILL)*	21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Pike County Economic Development Corporation**
PROJECT NAME **Pike County EDC 340 Acre Site Certified**
PROJECT LOCATION **Petersburg, Indiana**

BORING # **B-34**
ALT & WITZIG FILE # **16IN0271**

DRILLING and SAMPLING INFORMATION

Date Started **5/18/16**
Date Completed **5/18/16**
Boring Method **HSA**
Driller **S. Gray**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **CME 55 ATV**

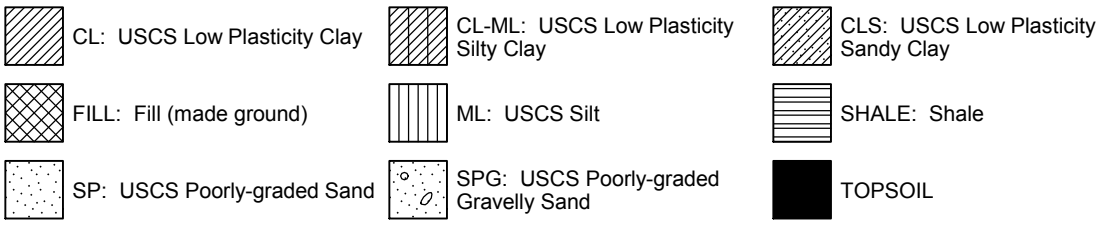
STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 495.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
494.9	TOPSOIL	0.1										
				1	SS			4		3.5	20.8	
	Brown Silty CLAY with Sand *(FILL)*		5	2	SS			16		4.5	14.0	
				3	SS			6				2 Attempts, No Recovery
484.5		10.5	10	4	SS			4		4.5	14.8	
	Brown and Gray Silty Sandy CLAY *(FILL)*		15	5	SS			8		1.0	17.1	
			20	6	SS			10		2.5	15.7	
474.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

MATERIAL GRAPHICS LEGEND



SOIL PROPERTY SYMBOLS

N: *Standard "N" penetration value. Blows per foot of a 140-lb hammer falling 30" on a 2" O.D. split-spoon.*

Qu: *Unconfined Compressive Strength, tsf* PP: *Pocket Penetrometer, tsf*

LL: *Liquid Limit, %* PL: *Plastic Limit, %* PI: *Plasticity Index, %*

DRILLING AND SAMPLING SYMBOLS

GROUNDWATER SYMBOLS

- ○ *Apparent water level noted while drilling.*
- ▽ *Apparent water level noted upon completion.*
- ▼ *Apparent water level noted upon delayed time.*

SAMPLER SYMBOLS

- ⊠ SS: Split Spoon

RELATIVE DENSITY & CONSISTANCY CLASSIFICATION (NON-COHESIVE SOILS)

TERM	*BLOWS PER FOOT*
Very Loose	0 - 5
Loose	6 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	>51

RELATIVE DENSITY & CONSISTANCY CLASSIFICATION (COHESIVE SOILS)

TERM	*BLOWS PER FOOT*
Very Soft	0 - 3
Soft	4 - 5
Medium Stiff	6 - 10
Stiff	11 - 15
Very Stiff	16 - 30
Hard	>31

Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone: 317-875-7000
Fax:

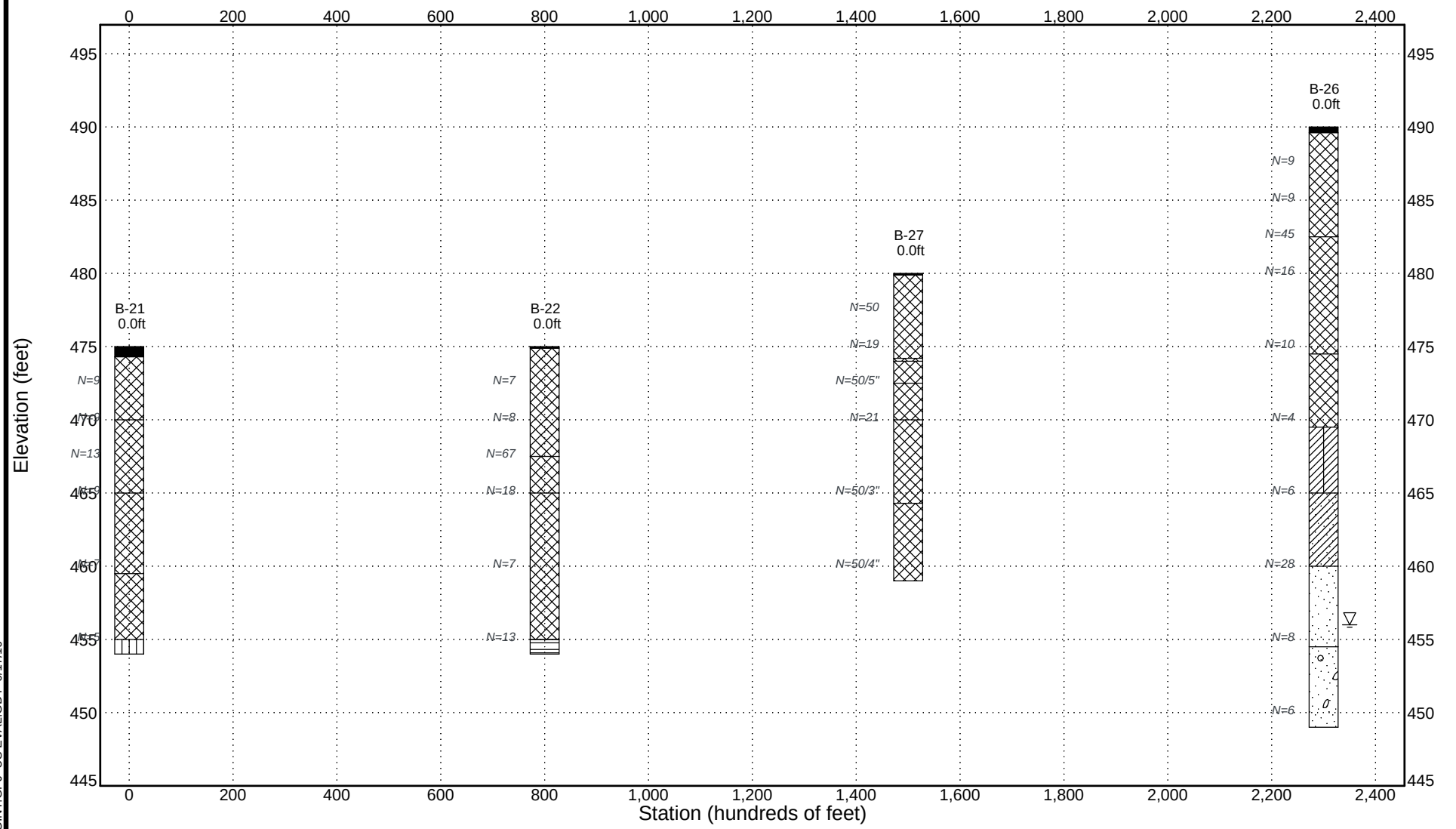
GENERAL NOTES

Project: Pike County EDC 340 Acre Site Certified

Location: Petersburg, Indiana

Number: 16IN0271

B-21 to B-26



Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone:
Fax:

- USCS Low Plasticity Silty Clay
- USCS Low Plasticity Sandy Clay
- Fill (made ground)
- USCS Silt
- Shale
- USCS Poorly-graded Sand
- USCS Poorly-graded Gravelly Sand

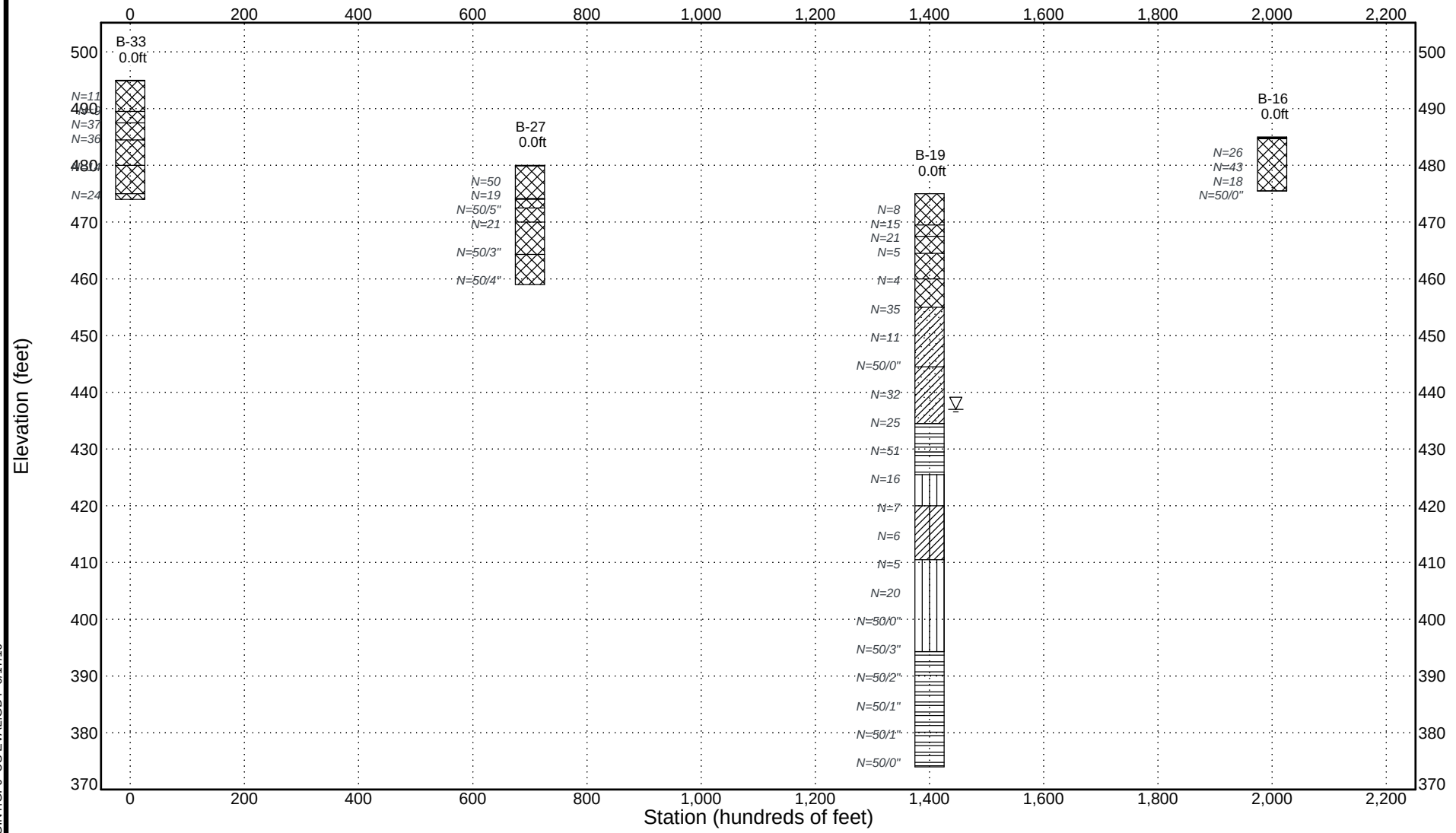
STRATIGRAPHIC PROFILE

Project: Pike County EDC 340 Acre Shovel Ready

Location: Petersburg, Indiana

Number: 16IN0271

B-33 to B-16



Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone:
Fax:

USCS Low Plasticity Silty Clay
USCS Low Plasticity Sandy Clay
Fill (made ground)
USCS Silt
Shale

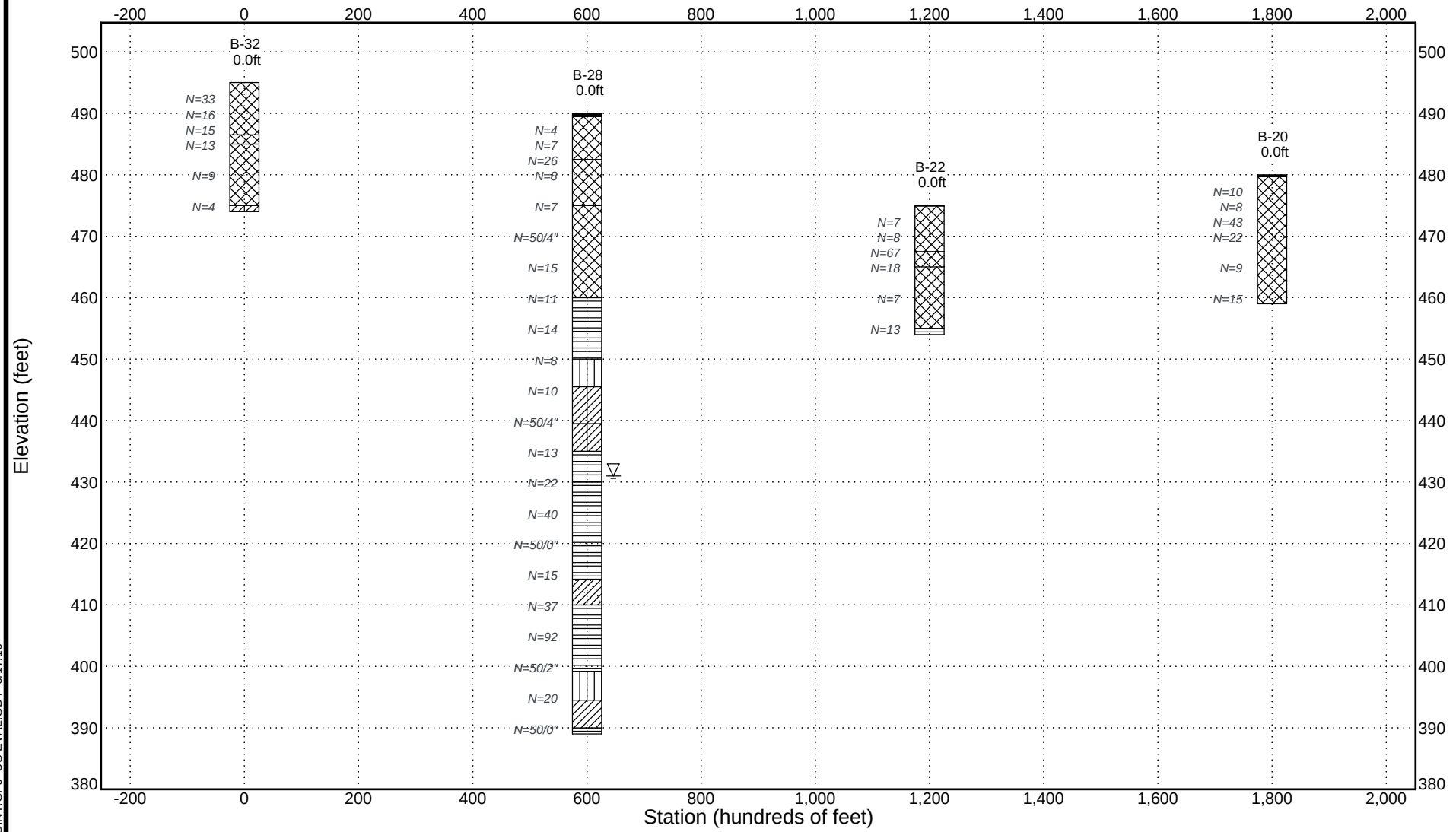
STRATIGRAPHIC PROFILE

Project: Pike County EDC 340 Acre Shovel Ready

Location: Petersburg, Indiana

Number: 16IN0271

B-32 to B-20



Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone:
Fax:

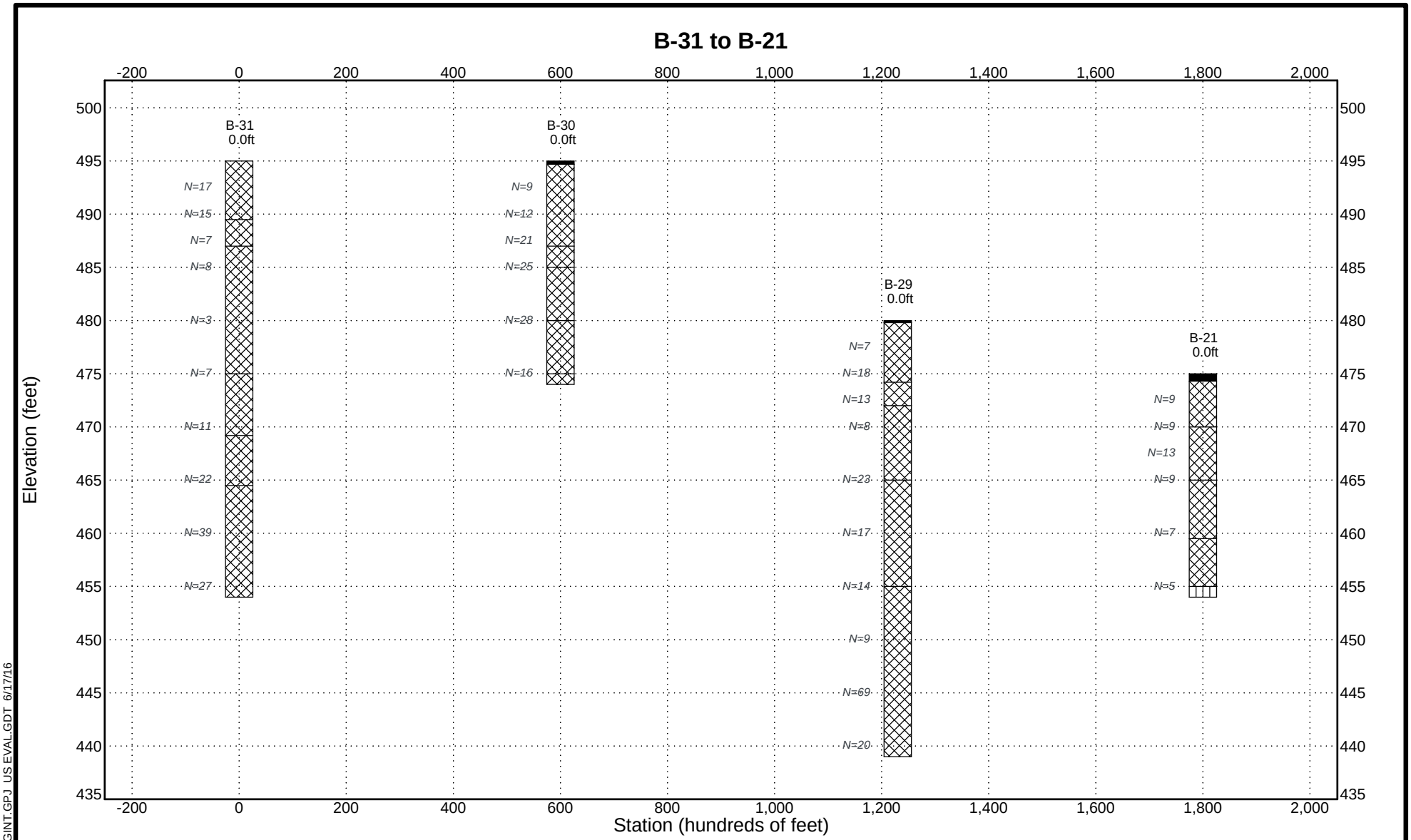
USCS Low Plasticity Clay
USCS Low Plasticity Silty Clay
USCS Low Plasticity Sandy Clay
Fill (made ground)
USCS Silt
Shale

STRATIGRAPHIC PROFILE

Project: Pike County EDC 340 Acre Shovel Ready

Location: Petersburg, Indiana

Number: 16IN0271



Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone:
Fax:

Fill (made ground) USCS Silt

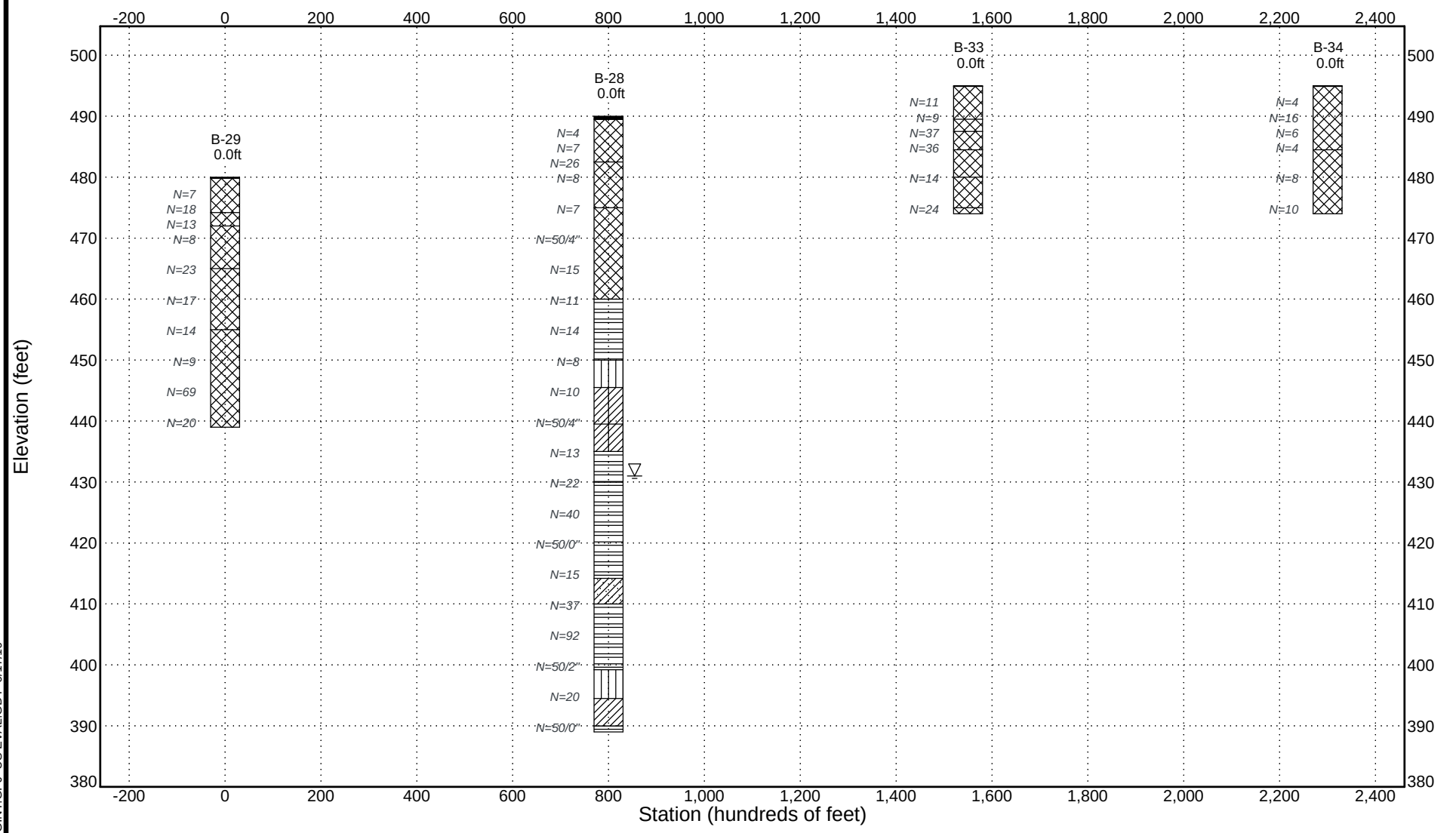
STRATIGRAPHIC PROFILE

Project: Pike County EDC 340 Acre Shovel Ready

Location: Petersburg, Indiana

Number: 16IN0271

B-29 to B-34



Alt & Witzig Engineering, Inc.
4105 West 99th St.
Carmel, IN 46032
Telephone:
Fax:

- USCS Low Plasticity Clay
- USCS Low Plasticity Silty Clay
- USCS Low Plasticity Sandy Clay
- Fill (made ground)
- USCS Silt
- Shale

STRATIGRAPHIC PROFILE

Project: Pike County EDC 340 Acre Shovel Ready

Location: Petersburg, Indiana

Number: 16IN0271

APPENDIX B

Seismic Design Parameters
Indiana GIS Mine Map
Custom Soil Resource of Pike County, Indiana

Design Maps Summary Report

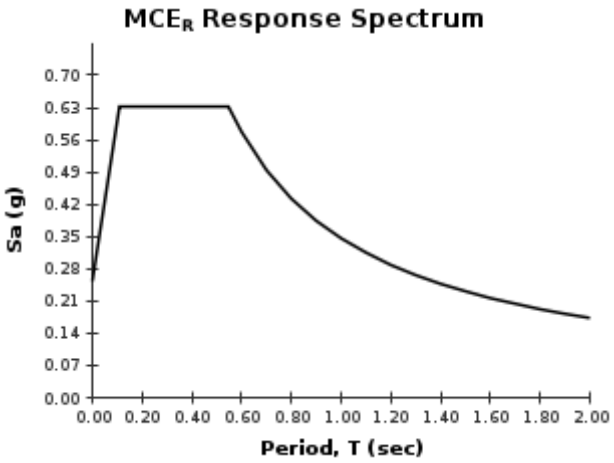
User–Specified Input

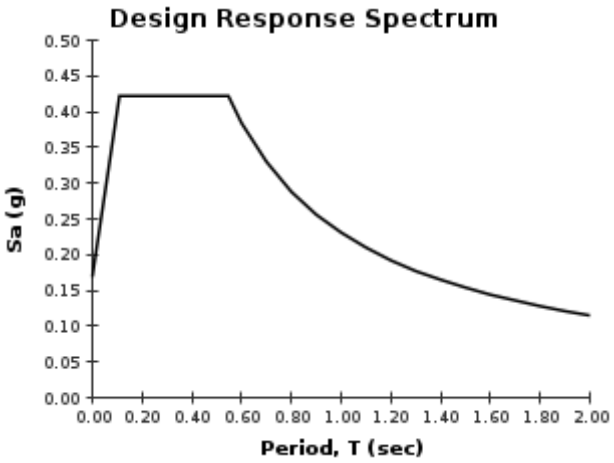
Report Title	16IN0271 Fri June 17, 2016 15:00:33 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	38.45715°N, 87.26964°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

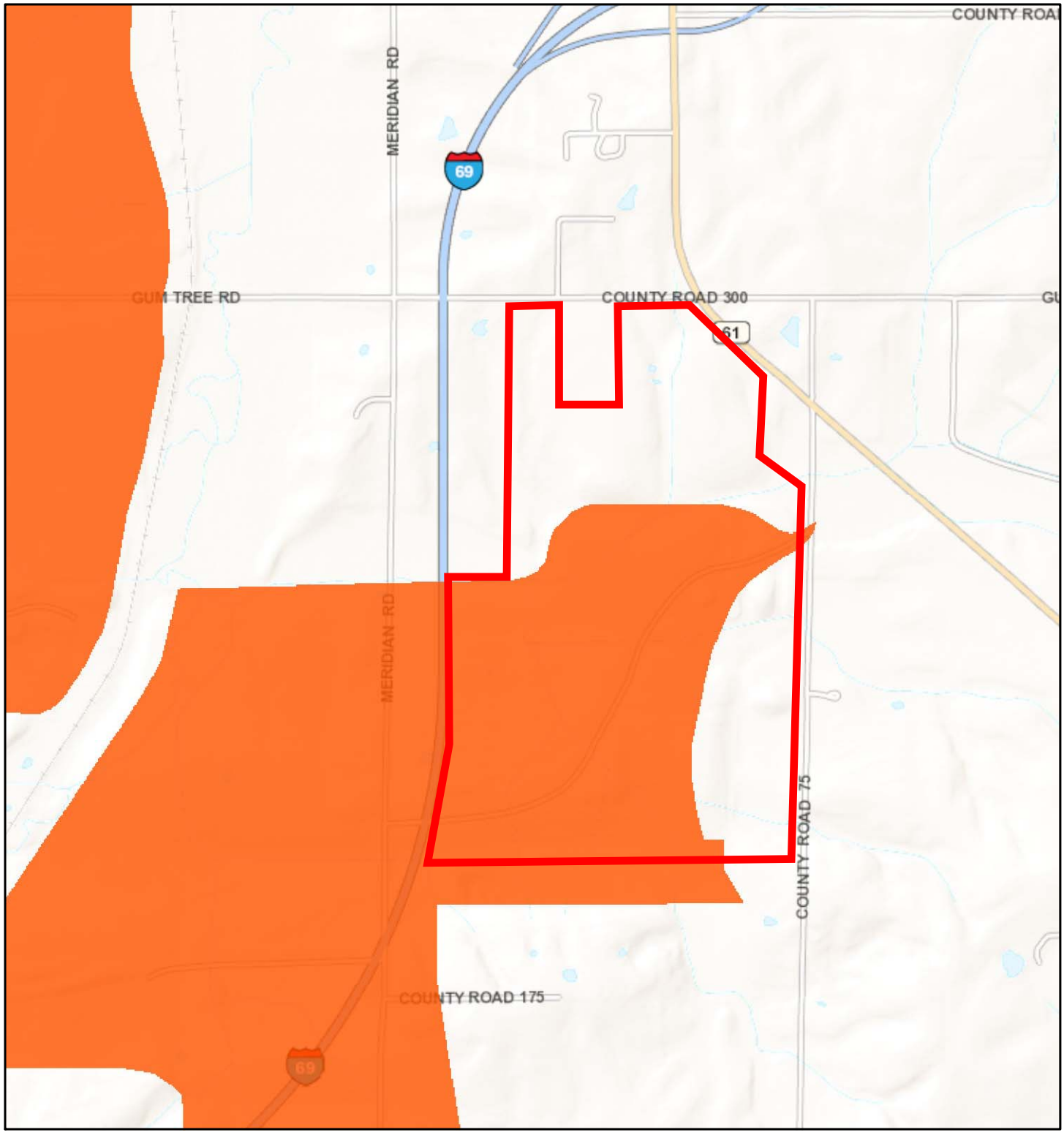
S_S =	0.436 g	S_{MS} =	0.632 g	S_{DS} =	0.422 g
S_1 =	0.160 g	S_{M1} =	0.346 g	S_{D1} =	0.231 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





16IN0271-340 Acre Shovel Ready



June 20, 2016

1:16,000

Mines - Surface

0 0.125 0.25 0.5 mi

0 0.2 0.4 0.8 km

Indiana Department of Natural Resources
Indiana Department of Transportation (INDOT), U.S. Census Bureau (USCB), Indiana Geographic Information Council (IGIC), UITS, Indiana Spatial Data Portal

BAW

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Pike County, Indiana

16IN0271

May 25, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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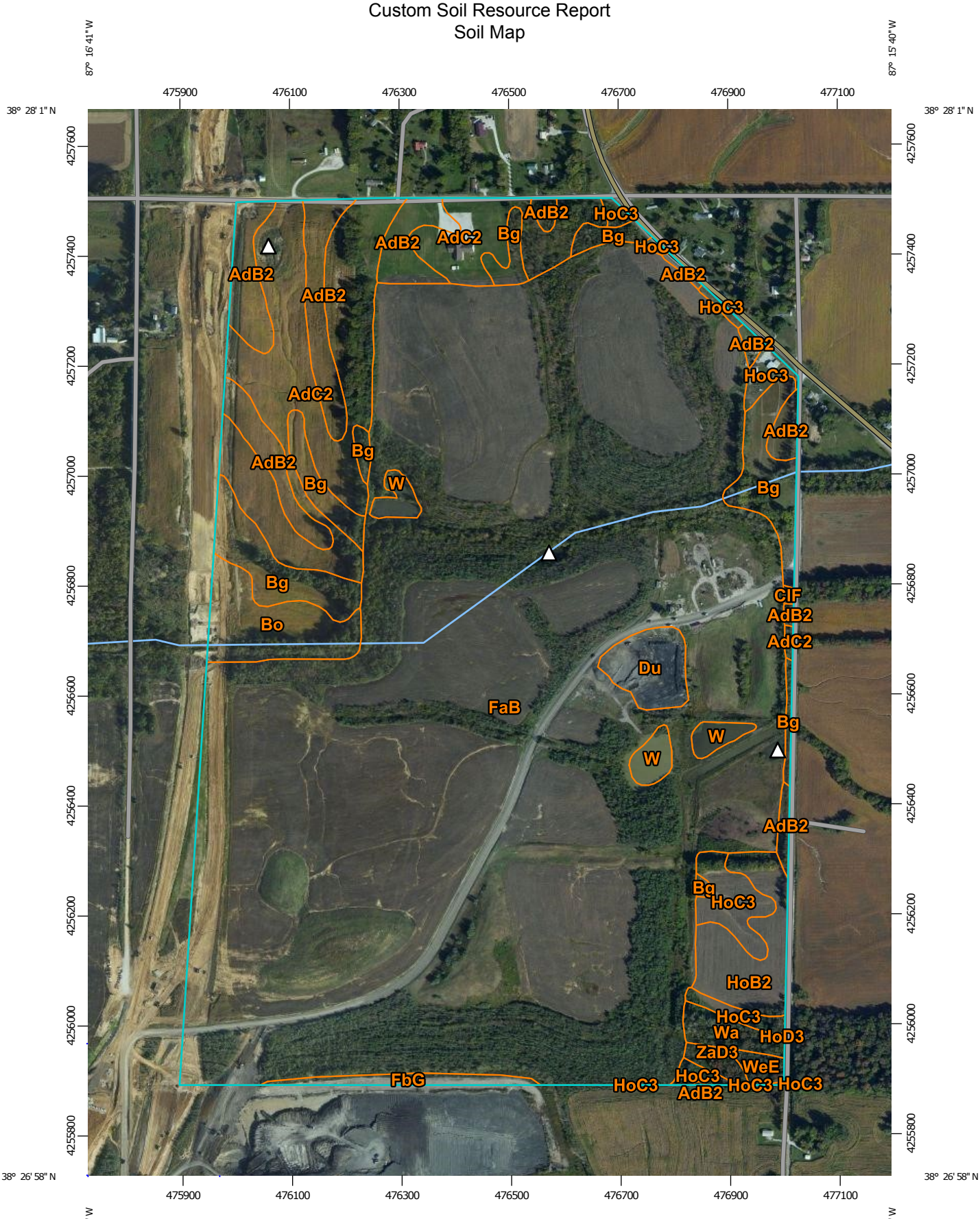
Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:9,460 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pike County, Indiana
Survey Area Data: Version 16, Sep 10, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 27, 2011—Oct 5, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Pike County, Indiana (IN125)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AdB2	Alford silt loam, 2 to 6 percent slopes, eroded	18.5	4.5%
AdC2	Alford silt loam, 6 to 12 percent slopes, eroded	36.4	8.8%
Bg	Belknap silt loam, 0 to 2 percent slopes, frequently flooded	17.9	4.3%
Bo	Bonnie silt loam, 0 to 2 percent slopes, frequently flooded	8.0	1.9%
ClF	Chetwynd silt loam, 25 to 50 percent slopes	0.1	0.0%
Du	Dumps, mine	4.4	1.1%
FaB	Fairpoint silt loam, reclaimed, 1 to 15 percent slopes	301.8	73.0%
FbG	Fairpoint-Bethesda complex, 25 to 70 percent slopes	2.1	0.5%
HoB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	7.6	1.8%
HoC3	Hosmer silt loam, 6 to 12 percent slopes, severely eroded	7.9	1.9%
HoD3	Hosmer silt loam, 12 to 18 percent slopes, severely eroded	0.0	0.0%
W	Water	3.8	0.9%
Wa	Wakeland silt loam, frequently flooded	2.5	0.6%
WeE	Wellston silt loam, 15 to 30 percent slopes	1.1	0.3%
ZaD3	Zanesville silt loam, 12 to 18 percent slopes, severely eroded	1.2	0.3%
Totals for Area of Interest		**413.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability

of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and

relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pike County, Indiana

AdB2—Alford silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2tbsl
Elevation: 330 to 850 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Alford, eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alford, Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over gritty loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 26 inches: silty clay loam
Bt2 - 26 to 73 inches: silt loam
2BC - 73 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Hosmer, eroded

Percent of map unit: 5 percent
Landform: Ridges

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

AdC2—Alford silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5fg2
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Alford and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alford

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 22 inches: silty clay loam
Bt2 - 22 to 72 inches: silt loam
2BC - 72 to 80 inches: silt loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Other vegetative classification: Trees/Timber (Woody Vegetation)

Bg—Belknap silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2tbrv
Elevation: 330 to 490 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 175 to 200 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Belknap, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belknap, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 59 inches: silt loam
Bg - 59 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D

Minor Components

Piopolis, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Bonnie, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Bo—Bonnie silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2tbrr
Elevation: 330 to 490 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 175 to 195 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Bonnie, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonnie, Frequently Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 10 inches: silt loam
Cg1 - 10 to 27 inches: silt loam
Cg2 - 27 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D

Minor Components

Belknap

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

ClF—Chetwynd silt loam, 25 to 50 percent slopes

Map Unit Setting

National map unit symbol: 5fgj
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Chetwynd and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chetwynd

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over loamy outwash

Typical profile

A - 0 to 7 inches: silt loam
Bt1 - 7 to 48 inches: sandy clay loam
Bt2 - 48 to 56 inches: sandy loam
2CB&2Bt - 56 to 80 inches: loamy sand

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Trees/Timber (Woody Vegetation)

Du—Dumps, mine

Map Unit Setting

National map unit symbol: 5fgl
Elevation: 350 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps

Setting

Parent material: Coal extraction mine spoil

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Other vegetative classification: Trees/Timber (Woody Vegetation)

FaB—Fairpoint silt loam, reclaimed, 1 to 15 percent slopes

Map Unit Setting

National map unit symbol: 5fgn
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Fairpoint and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fairpoint

Setting

Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coal extraction mine spoil

Typical profile

Ap - 0 to 2 inches: silt loam
CA - 2 to 5 inches: silt loam
Cd - 5 to 27 inches: silt loam
2C - 27 to 80 inches: very parachannery silt loam

Properties and qualities

Slope: 1 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

FbG—Fairpoint-Bethesda complex, 25 to 70 percent slopes

Map Unit Setting

National map unit symbol: 5fgq
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Fairpoint and similar soils: 60 percent
Bethesda and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fairpoint

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coal extraction mine spoil

Typical profile

A - 0 to 3 inches: very parachannery silty clay loam
C - 3 to 60 inches: very parachannery loam

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Other vegetative classification: Trees/Timber (Woody Vegetation)

Description of Bethesda

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Coal extraction mine spoil

Typical profile

A - 0 to 3 inches: parachannery silt loam
C - 3 to 60 inches: very parachannery loam

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Other vegetative classification: Trees/Timber (Woody Vegetation)

HoB2—Hosmer silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5fh0
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hosmer and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam

Bt - 8 to 23 inches: silt loam
Btx - 23 to 50 inches: silt loam
2Btx - 50 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

HoC3—Hosmer silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 5fh1
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Hosmer, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bt - 5 to 15 inches: silt loam
Btx - 15 to 39 inches: silt loam
2BC - 39 to 80 inches: silt loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 10 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

HoD3—Hosmer silt loam, 12 to 18 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 5fh2
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Hosmer, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bt - 5 to 15 inches: silt loam
Btx - 15 to 39 inches: silt loam
2BC - 39 to 80 inches: silt loam

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: 10 to 26 inches to fragipan
Natural drainage class: Moderately well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups
Land capability classification (irrigated): None specified
Other vegetative classification: Trees/Timber (Woody Vegetation)

Wa—Wakeland silt loam, frequently flooded

Map Unit Setting
National map unit symbol: 5fj1
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Wakeland and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wakeland

Setting
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Cg1 - 7 to 29 inches: silt loam
Cg2 - 29 to 60 inches: stratified silt loam to loam to sandy loam to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Minor Components

Birds

Percent of map unit: 3 percent
Landform: Backswamps on flood plains
Other vegetative classification: Trees/Timber (Woody Vegetation)

WeE—Wellston silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 5fj2
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellston and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston

Setting

Landform: Structural benches, hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over loamy residuum over shale

Typical profile

A - 0 to 8 inches: silt loam
Bt - 8 to 26 inches: silt loam
2Bt - 26 to 41 inches: loam
2BC - 41 to 54 inches: parachannery fine sandy loam
2Cr - 54 to 60 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Trees/Timber (Woody Vegetation)

ZaD3—Zanesville silt loam, 12 to 18 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 5fj6
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Zanesville, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Loess over loamy residuum over shale

Typical profile

Ap - 0 to 4 inches: silt loam
Bt - 4 to 19 inches: silty clay loam
Btx1 - 19 to 28 inches: silty clay loam
2Btx2 - 28 to 42 inches: silt loam
2Bt - 42 to 68 inches: loam
2Cr - 68 to 80 inches: weathered bedrock

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: 12 to 24 inches to fragipan; 60 to 80 inches to paralithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)