CHURCHVIEW COMMONS

PRELIMINARY GEOTECHNICAL ASSESSMENT

PREPARED FOR:

Westmoreland County Housing Authority
167 South Greengate Road
Greensburg, PA 15601

Mount Pleasant Township
Westmoreland County
Pennsylvania

February 2022

PRESENTED BY:

YOUNG & ASSOCIATES | ENGINEERS • SURVEYORS
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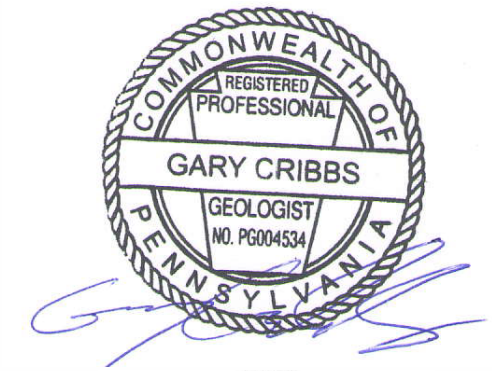
TABLE OF CONTENTS

EXECUTIVE SUMMARY

Geotechnical field investigation at the proposed Churchview Commons (Site) was performed March 8, 2021 – March 10, 2021. The investigation was performed to provide a preliminary rock excavation assessment for the proposed development. Also determined during field testing were: in-situ soil classification and standard penetration test (SPT). These were determined utilizing [9] bore locations in the proposed area of work. The general results are as follows:

- Fill soils were found at depths up to 1.5 feet.
- Top of rock was encountered within each of the borings.
- Drilling encountered static water level at TB-1. Water levels were measured at cessation of drilling.
- The design frost line is 36 inches below final ground elevation.
- Support the structure with a slab-on-grade foundation with a frost wall. Use an allowable soil bearing pressure of 3 ksf for the strip footing of the frost wall.
- Excavation of in-situ soils and placement of engineered structural fill is recommended. This process should be monitored by a field specialist/geotechnical engineer to ensure proper removal and fill procedure has been met.

The investigation utilized an 18-inch split spoon sampler to determine blow counts in the SPT. These tests are commonly used to approximate soil characteristics in the absence of laboratory testing. Test location encountered top of rock (TOR) at a depth shallower than the estimated final grade elevation. In [3] locations NQ2 cores were taken to evaluate the excavatability of the rock. The core samples were collected on 3-foot to 5-foot centers to a minimum depth of 10 feet.



The following professional was responsible for conducting the enclosed geotechnical investigation and preparation of this report.

Gary Cribbs
Professional Geologist

The undersigned certifies that this geotechnical investigation and report was prepared under professional direction and reviewed according to pertinent practices of the profession.

Nathan E. Garlitz, PE
Project Engineer

Churchview Commons
Township of Mount Pleasant
Westmoreland County, Pennsylvania

INTRODUCTION

This report summarizes the result of the subsurface observation made for Churchview Commons (Site), which is located in the Township of Mount Pleasant, Westmoreland County, Pennsylvania. The Site is located west of SR 981 and north of St. Florian Catholic Church. The existing Site is an empty lot which is occasionally cut for hay. The area which was investigated has been previously used as a private residence. The land surrounding the Site to the east and north is predominately agricultural and areas to the south are residential.

The proposed project is a part of a network of housing administered by the Owner. The structures will be single floor wood framed construction. Proposed footings for the structures or design of the structures was not available at the time of this report. Finished floor elevations were listed between 1099.91-1102.00.

This investigation was performed at the request of the Owner for the purpose of providing general geotechnical data and foundation recommendations for the design and construction of a proposed structure in this location. Incorrect data due to design changes or additional findings may invalidate certain recommendation and require additional investigation.

1. CONSIDERATIONS

A. Local Geomorphology: A field walk has been conducted of the Site and the immediate vicinity of the development area. The purpose of this walk was to look for potential sensitive features that could affect the suitability of the site for the proposed development. Potential issues may include items such as surface/groundwater, wasting, sinkholes, subsidence features and disruptions, problematic surface features, and man-made disturbances. The Site has been disturbed by previous residential activities. Local reports indicate that the area is underlain by shallow bedrock. Great effort was needed to excavate adjacent subsurface facilities. The topography of Site's western section slopes to the southwest toward the St. Florian Catholic Church. The topography of the Site's eastern section slopes toward SR 981.

B. Geology: The site is located in the boundary of the Pittsburgh Low Plateau Section of the Appalachian Plateaus Physiographic Province. The local section is characterized by smooth undulating topography with low topographic relief. Geologic structure typically consists of low to moderate amplitude open folds. Drainage in the region is generally dendritic and the surface topography is generally the result of fluvial erosion, periglacial mass wasting and surface mining.

Structurally, the underlying bedrock fold plunges shallowly to the southwest. Regionally this synclinal is known to be the Uniontown-Latrobe Syncline. Stratigraphically, as shown on the Geologic Map of Pennsylvania, the project site is located within the Pennsylvanian-Aged Allegheny Group. This unit typically consists of cyclic sequences of shale, siltstone, sandstone red beds, thin impure limestone and continuous coal seams.

C. Surface Waters: The receiving surface water body for the Site is Welty Run. The distance from the closest edge of construction to the receiving water body is approximately 2,400 feet. It is within the Ohio River watershed:

1. Ohio River
    2. Monongahela River
        3. Youghiogheny River
            4. Sewickley Creek
                5. Welty Run

D. Groundwater: Groundwater was encountered at 3.2 feet BGS in TB-1 as part of this project. In general, the soils were damp to moist with moisture increasing to wet in TB-1 and TB-9. All borings recorded moisture as dry at auger refusal. The gentle grade in association with the silty soils on Site have most likely caused the increased moisture recorded. Each of the test borings was dry at zero-hour time intervals for static water level measurements.

E. Topography: Monongahela Group is part of the Pennsylvania Age. This project falls on the Mammoth Pennsylvania USGS 7.5-minute quadrangle. The current topography is very flat. Historically, the area was part in a series of agricultural fields. Natural land slopes in the area vary from very flat [<2%] to gentle [5%]. Anthropogenic slopes vary from flat [<2%] to moderate [30%]. Regionally 2:1 side slopes are stable in most situations. Surface flow direction is generally parallel groundwater flow direction. No topographic survey was performed for this portion of the project. Relative elevations have been taken from LiDAR produced by NRCS.

F. General Soil Assessment: An online review of the U. S. Department of Agriculture (USDA) Web Soil Survey (WSS) was conducted as part of this investigation. Refer to Appendix F for the USDA Web Soil Survey report. According to the WSS, the soil classification present on the subject property is the Dormont Silt Loam with 3 to 8 percent slopes (DoB). A small triangular portion at the southwest corner of the property is listed as Guernsey Silt Loam with 3 to 8 percent slopes (GyB). According to the WSS, the Dormont Silt Loam soils are fine grained residual soils derived primarily from the in-situ weathering of the underlaying limestone, sandstone, and shales. The Guernsey Silt Loam soils are listed as colluvial weathering from limestones and shales on top of residual soils weathered from the same source lithologies. Residual soils are soils that are generally formed near the top of hillsides or associated terraces where soil transport has been minimal. Colluvial soils are materials that have moved from their original weathering parent rock, often through creep or wasting. Fill soils are materials that have been moved from their original locations through anthropogenic mechanisms.

The Dormont Silt Loam and the Guernsey Silt Loam are described as moderately well drained, with low to moderately high and moderately low to moderately high permeability respectively.

G. Subsurface exploration: Between March 8 – March 10, 2021, representatives were on-site to observe subsurface conditions at the Site. Test bores were used to identify the soil horizons and the approximate strength of the in-situ material. The soil was examined for evidence of a seasonal high groundwater table and top of rock (TOR) within 10 feet of the surface. Each of the borings were sampled continuously from the surface to refusal as possible.

The investigation consisted of the installation of [9] geotechnical borings (TB-1 through TB-9) to assess the soil conditions for the initial foundation assessment. The test borings were installed around the perimeter of the Site. Because the structural loads for the structure is expected to be light, it was determined that bedrock coring and sampling was not necessary for footing analysis. The test bores were arranged in a quasi-grid pattern. Rock coring was specifically requested for this project.

The Owner had been made aware of potential shallow bedrock, and excavation difficulties. As part of the assessment, rock cores provide an indication of effort required for excavation. The test bores were used to identify the soil horizons and ascertain excavatability of any rock in the within the project as well as to provide geotechnical recommendations for the proposed activity. In this location NQ2 cores were taken to evaluate the rock.

The borings were installed utilizing a track-mounted, hollow-stem auger rig. See Appendix C for the Boring Plan, which depicts the boring locations. Copies of the boring logs are attached in Appendix B.

The split-spoon samplers (2-foot long by 2-inch diameter) were advanced using a 140-pound hammer in conjunction with standard penetration tests (ASTM - D1586). Upon retrieval of the split spoon sampler, the sample was observed according to ASTM D2488-09a for color, lithologic classification, density of granular soils or consistency of cohesive soils, the presence of moisture/water, and plasticity (if applicable). A portion of each split spoon sample recovered was also placed in a glass jar with a Teflon-lined lid for subsequent observation and testing, if required. The borings were continuously sampled from the surface grade to bedrock refusal. [6] of the borings were terminated upon split spoon refusal on bedrock. Borings TB-7, TB-8, and TB-9 were cored to assess rock conditions.

The core samples were collected on 3-foot to 5-foot centers to a depth of 11.5 feet. Upon retrieval of the samples, the rock cores were placed in a core box and observed for visual classification including: color, lithology, weathering, relative hardness, thickness of bedding, orientation of bedding and discontinuities (RD), spacing of discontinuities, and rock quality designation (RQD). RQD values were calculated using the equation: RQD = Σ length of rock cores > 4 inches/length of coring x 100 percent. RQD values were calculated for each individual core run and also for each individual lithologic unit encountered.

Boring	Surface Elevation	Bottom of boring (feet)
TB-1	1101.4	5.2
TB-2	1099.2	4.6
TB-3	1099.5	3.9
TB-4	1099.0	3.8
TB-5	1100.6	4.1
TB-6	1101.6	3.9
TB-7	1100.4	5 [cored to 10]
TB-8	1101.2	5 [cored to 10]
TB-9	1100.8	4.3 [cored to 11.5]

H. Subsurface conditions: A total of [9] soil borings were used to characterize the subsurface conditions at the site. The following describes the soil and rock conditions observed during the drilling activities.

Fill: Fill was present in all boring locations (TB-1 through TB-9), with a maximum depth of 1.5 feet below the existing ground surface in TB-1. The fill material observed varied in thickness of 0.5 feet to 1.5 feet and from brown to gray. This fill was variable in composition from silt to silt and clay with variable amounts of clay, sand, gravel, and cobbles. In specific cases the samples had a slight to strong organic odor. The initial layer in some instances were classified as organic silts. The cohesive material showed low plasticity. Consistency recorded by split spoon hammer varied between N-value of 1 to 7. The N-values in the higher range are skewed due to the increased presence of gravel and coal as well as depth below surface. The average consistency excluding oversize skewed material very soft to soft (N-value = 2).

Residual Soil: Residual soil is formed from the chemical and physical weathering of the underlying bedrock. The resulting in situ soils generally have similar characteristic of the original parent rock.

Silt: Immediately below the fill material in each of the [9] borings was a gray to yellow brown silt, though it varied in color to orange-brown in TB-2 were higher percentages of oxidized materials were found. Percentages of clay, gravel, and fine sand varied throughout but remained the minority components. This layer was continually present

below the added fill material to silt/gravel interface. The in-situ silt was the result of the complete weathering of portions of the underlying shale bedrock. The parent materials were mainly light-brown to gray shale. Trace amounts of carbonaceous shale and coal were present but represented less than one percent of the material. This soil had trace to little amounts of clay, fine sand, and gravel; and was generally damp. The upper portions of this layer were medium stiff (N=6) while the lower portions which graded into silt and gravel were stiff (N = 11).

Silt & Gravel: at depths ranging between 2.8-5.2 interval in all borings a tan to gray, dry layer was present. This layer is non-cohesive with a very dense density. As the shales grade into the lower sandstone, the residuum formed this soils layer. It was observed as highly weathered silty and sandy shales.

Bedrock: Bedrock was encountered in each of the borings at auger refusal. [3] borings, TB-7, TB-8, and TB-9 were cored to assess the condition of the rock. This rock is comprised of two district units: light gray sandstone and brown-gray silty shale.

Sandstone: This material was identified at 5.0-5.4 and 7.1-7.9 in TB-7, 5.0-5.4 and 9.0-10.0 in TB-8, and 5.0-6.1 and 10.4-11.5 in TB-9. In each of these instances the rock was thinly bedded, broken with oxidation streaks on bedding planes. Very small non-horizontal fractures are rare but do occur in small zones. These are presumable joints from non-plastic bending. RQD values were 0-10 with most fractures along fluid migration bedding planes. Recovery of the core material was low.

Silty Shale: This material was identified at 5.4-7.1 and 7.9-10.0 in TB-7, 5.4-9.0 in TB-8, and 6.1-10.4 in TB-9. In each instance the shale is highly weathered, broken and soft. Most of this rock was able to be crushed under finger pressure. RQD value for this unit is 0. It also shows strong oxidation from fluid migration. Recovery of the core material was low.

I. **Mining:** Based upon data from online assessment, the property has been undermined in the Pittsburgh Coal Seam. Mining was performed by the HC Frick Coke Company Calumet-United Mine complex. The mine map lists the bottom of coal elevation to be 810-815 msl (datum unknown). A single heading is shown on the available mine map with low percentage extraction. The depth of the mine voids is approximately 300 feet with room and pillar style of mining. Extraction percentages are depicted as less than 50% mining. A portion of the mine map with the project area highlighted is attached as Appendix E. No current mining permits exist in the area.

J. **Karst Cartography:** Although the Monongahela Group contains several known limestone beds, they are generally thin and non-persistent. In addition, areas within Westmoreland County are not prone to karst-related subsidence issues according to information provided by the Geological Survey. The relatively horizontal bedding planes and absence of significant fracturing of the sedimentary rocks of the Pittsburgh Low Plateaus Section are typically not conducive to solution cavities and/or sinkholes.

2. RECOMMENDATIONS

A. Minimum Frost Depth

The design frost line is at 36 inches below final ground elevation according to NAVFAC 7.01 [Soil Mechanics 7.1-42]. Typical strip foundations built shallower than this level may experience frost heave particularly in poorly drained soils which were found on this Site. This will greatly reduce the serviceability of the foundations.

Alternatively, footing frost protection insulation is available for footings with embedment less than the design frost elevation from foundation specialists. At a minimum a layer of well drained stone with positive drainage should be installed under the perimeter of the footing. This circumferential stone should effectively dewater the bearing soils and minimize frost induced expansion.

B. Footing Style

It is recommended that a slab-on-grade footing with a frost wall be used for the construction of the buildings. Each of the buildings should be provided with strip footings with a minimum width of 2 feet to support the exterior walls of the buildings. Over-excavation may be required in areas such as TB-3 and TB-4 to remove the gray silt and install the invert of the footing within the yellow-brown silt and gravel layer. Use an allowable bearing capacity of 3,000 psf to design the wall footings at a depth of +3 feet.

Provide for inspection of the foundation excavations prior to placement of concrete by a field specialist/geotechnical engineer to confirm that proper bearing and adequate construction practices are being used. All soft soils, large cobbles, and unsuitable material (e.g., coal and carbonaceous shale) are to be removed, as directed by the responsible geotechnical personnel, and replaced with an approved compacted material. The removed soils and unsuitable material are to be disposed of outside of the proposed build area.

Prior to placement of subbase, proof roll and remove soft spots, large cobbles, and unsuitable material, as directed by the geotechnical testing field representative. Fill in the soft spot areas with an approved compacted material.

For the slab-on-grade footing, add a minimum 6-inch-thick subbase of compacted AASHTO #57 crushed stone on top of the prepared subgrade. Place a 6-mil, polyethylene sheeting, meeting the requirements of ASTM D-2103 on top of the subbase and lap all joints [sealing preferred] a minimum 6 inches on the sheeting.

C. Groundwater

As indicated in Section 1, no significant groundwater was encountered in any of the soil borings installed as part of this investigation. Wet soils were observed at various depth across the Site. Wet soils may affect foundation performance at elevations found in TB-1. The base of the foundation should be free of any water bearing zone.

It is recommended that the Site be designed to route any precipitation and surface water around and away from the footing zone of influence. Any proposed infiltration zones shall be a minimum of 10 feet away from the closest footing. Additionally, footing drains shall be installed to drain any water to a freely draining downslope location.

D. Subgrade Preparation

The foundation soils should be compacted as outlined in Section 2.D.2 below.

1. General preparation

Organic soils should not be used as fill soils or be placed under footing zones. Removal the organic soils is required for stable filling as well as stable footings. This layer has been recorded up to 6-inches in test borings across the Site.

Structures should not be built on excessive fill or partially in cut and fill. Situation where structures need to be placed within partial cut/fill sections should over excavate the cut/fill interface and into the cut sector a minimum of 12-inches. The material should be prepared as outlined in 2.D.2. below.

2. Footing zone preparation

During the installation of the strip footing, the top 3-4 feet of material should be removed and stockpiled. The material under this layer should be over excavated a minimum of 12-inches and replaced with compacted fill as necessary. All fill material required for Site grading construction within the proposed building area is to be material approved by the field specialist/geotechnical engineer. The soil on site may be used as engineered fill as specified by the field specialist/geotechnical engineer. This fill is to be placed in maximum eight-inch loose lifts and compacted with an impact-type roller (i.e. smooth drum vibratory compactor – granular fill; sheepsfoot roller – cohesive fill), and compacted to 100 percent of maximum dry density as determined by ASTM D-698 (Standard Proctor) ±3% optimum moisture content [or equivalent relative density]. Maximum dry density should be determined prior to construction. The maximum particle size is to be no greater than 2/3 of the loose lift thickness. Provide inspection of all engineered fill as it is placed for proper density by a field specialist/geotechnical engineer.

The floor slab-on-grade should be undercut a minimum of 12 inches below finished floor elevation. A minimum 6-inch thick subbase of compacted AASHTO #57 crushed stone or PennDOT 2A on top of the prepared subgrade. Place a 6-mil, polyethylene sheeting, meeting the requirements of ASTM D-2103 on top of the subbase and lap all joints [sealing preferred] a minimum 6 inches on the sheeting.

All foundations should include a drainage system to ensure proper drainage of the footing area. This system must have positive drainage to a free discharge (no hydraulic tailwater condition). Many footing issues and failures are caused by or closely linked to poor drainage of foundation areas.

3. General fill zone

All fill material required for Site grading construction outside the proposed building area is to be an approved material. Some of the soil on site may be used as engineered fill as specified by the field specialist/geotechnical engineer. This fill is to be placed in maximum eight-inch loose lifts and compacted with an impact-type roller (i.e. smooth drum vibratory compactor – granular fill; sheepsfoot roller – cohesive fill), and compacted to 90 percent of maximum dry density as determined by ASTM D-698 (Standard Proctor) ±3% optimum moisture content [or equivalent relative density]. The maximum particle size is to be no greater than 2/3 of the loose lift thickness. Provide for inspection of all fill as it is placed for proper density by a field specialist/geotechnical engineer.

The existing soils on Site may be used as material for engineered structural fill if the following requirements are met:

- A minimum 3 composite samples must be classified according to ASTM D-2487.
- Soils with classifications **OL**, OH, MH, or CH may not be used.
- Soils within footing zone of influence and frost zone shall be of a granular nature.
- Soils are within 3% optimum moisture content according to ASTM D-698.
- Material which is frozen, soft, highly plastic, organic, expansive, or degradable may not be used.
- Construction waste in the building footprint may not be used.
- Concrete particles may be used in fill if they are sized as outlined above. It is notable that if the percentage of particles is too high, the compaction values listed above will be impossible to achieve.

A qualified person should be on-site to verify the following:

- Verification that the subgrade has been excavated to appropriate depth.
- Proof roll or equivalent of subgrade prior to beginning engineered structural fill.
- Inspection of engineered structural fill as it reaches final subgrade.
- Verification imported fill meets the minimum requirements of applicable structural fill soils.
- Proof roll or equivalent of footing subgrade prior to placing subbase material.
- Verification of bearing capacity prior to installing footings.

E. Seismic Class

The seismic design parameters for the design of the building foundations are:

Site Class = B [rock profile]

S_s = 0.090

S_1 = 0.042

F_a = 0.9

F_v = 0.8

F. Subsidence Potential

Based upon data from online assessment, deep mining has been reported under this Site. No current mining permits exist in the area. The potential for subsidence from deep mining is low.

If, at some point in the future, mining progresses through a coal seam or other marketable unit, mining subsidence potential would increase. Depending on the style of mining and percent extraction, the structure owner may choose to purchase mining insurance. Additionally, the sensitivity of the structures on site should require a minimum safety factor of 2.0 and stability class I mining.

G. Expansion

Trace amounts of carbonaceous shale, slag, and coal (<1%) were observed in the soil samples from several borings. Due to the insignificant quantity of the material, the potential for expansion from the carbonaceous material is minimal. However, an inspection of the footing trench should be conducted by a qualified individual to confirm that there are not residual carbonaceous material present prior to footing preparation.

H. Excavatability

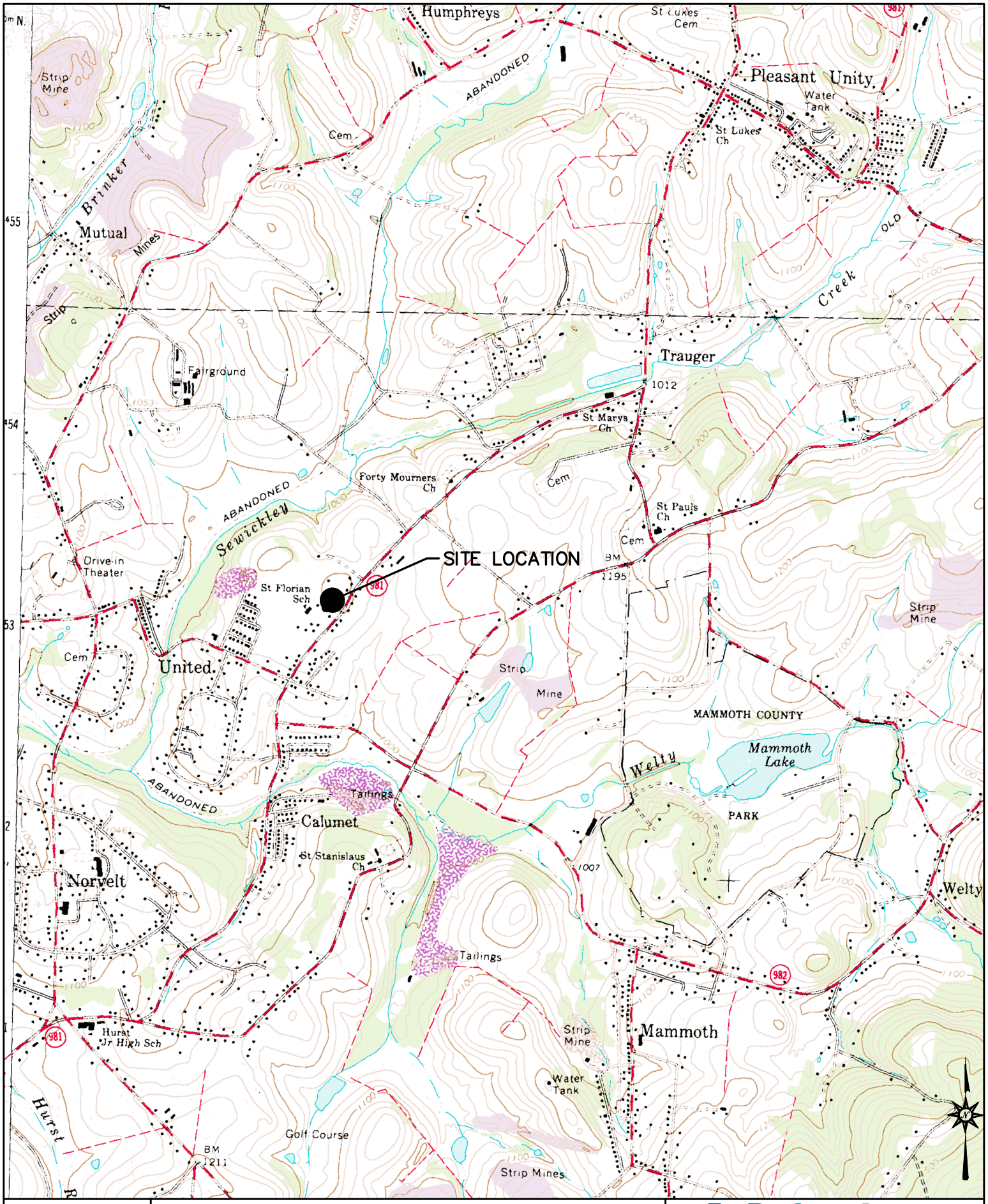
Only incidental rock excavation will be required for installation of footings. The first rock encountered within a top down excavation will be the light gray micaceous sandstone. The RQD value of this unit is 0. However, the intact horizontal bedding of this unit will make excavation difficult with light to medium excavation equipment. When using the classification system developed by Kirsten (1982) excavatability index is 0-100. This is considered easy ripping.

Below the 0.4-1.1 feet of sandstone is a highly weathered unit of shale 1.7-4.3 feet thick. Excavation into this zone will be easy with light to medium excavation equipment.

Excavation into deeper horizons will encounter alternating layers of sandstone and shale with vastly differing excavation efforts. If excavation is required into the sandstone layer, this would best be accomplished by holing through the sandstone in a central location, and continuing excavation into the shale layer. Once the shale is encountered, the sandstone should easily be ruptured through the tension action of lifting up through the sandstone.

APPENDIX A

Location Map



DESIGNED BY:	MKA
REVIEWED BY:	JTJ
DRAWN BY:	NWE
DATE:	2021.01.15
SCALE:	1" = 2000'
PROJ. NO.:	21008

LOCATION MAP
CHURCHVIEW COMMONS
prepared for
WESTMORELAND COUNTY HOUSING AUTHORITY
situated in
MOUNT PLEASANT TOWNSHIP, WESTMORELAND COUNTY, PENNSYLVANIA

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21008_PLAN.dwg

APPENDIX B

Test Borings

CRIBBS & Associates, Inc.

Test Boring TB-1

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1101.4
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53
BOREHOLE: 5" OD
DATE DRILLED: 3/8/2021
GW Level: 3.2' @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
1	S-1	0.9		(0.0'-1.5') Dark brown **Silt**, trace clay, fine sand, gravel, and roots; gravel is gray-brown highly weathered fine grained micaceous sandstone and coal fragments, low plasticity, medium stiff, damp. **(Fill)**	ml	2 3 4	1
2	S-2	0.5		0.2'-0.4' black, gravel is highly weathered coal and carbonaceous shale 0.4'-1.5' gray, gravel is highly weathered gray-brown micaceous sandstone		4 7	2
3			NA	(1.5'-3.8') Gray **Silt**, little clay, trace fine sand, gravel, and light gray streaking; gravel is gray-brown silty shale, moderate plasticity, stiff, damp.	ml	7	3
4	S-3	1.2		**wet at 3.2'** **(Residual)**		7 21	4
5	S-4	0.7		(3.8'-5.2') Tan **Silt** and **Gravel**, trace clay; gravel is highly weathered tan silty shale with trace orange-brown oxidation streaking along former bedding planes, noncohesive, dense to very dense, dry.	gm	27 16 50/0.4'	5
6				gray from 5.0' to 5.2', gravel is red-brown sandy shale at 5.2' ***(TOR)***			6
7				**Bottom Of Boring (5.2' BGS)**			7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-2

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1099.2 DATE DRILLED: 3/8/2021
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53 BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
0	S-1	1.1	NA	(0.0'-0.6') Gray **Silt**, trace clay, fine sand, gravel, and roots; gravel is gray-brown highly weathered silty shale, low plasticity, very soft, damp. **(Fill)**	ol	1 2 4	0
2	S-2	0.6		(0.6'-3.0') Orange-brown **Silt**, trace clay, fine sand, gravel, and light gray streaking; gravel is brown and orange-brown silty shale and orange-brown limonite, low plasticity, medium stiff, dry to damp. **(Residual)**	ml	2 3 5	2 3
4	S-3	0.7		(3.0'-4.6') Tan **Silt** and **Gravel**, trace clay and light gray streaking; gravel is brown and gray silty shale, noncohesive, very dense, dry. **(Residual)**	gm	21 36 50/0.4'	4
5	S-4	0.1		gravel is gray silty shale with trace brown streaking ***(TOR)***		50/0.1'	5
6				**Bottom Of Boring (4.6' BGS)**			6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-3

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1099.5
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53
BOREHOLE: 5" OD
DATE DRILLED: 3/8/2021
GW Level: -- @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
1	S-1	0.4	NA	(0.0'-1.5') Gray **Silt**, trace clay, fine sand, gravel, and roots; gravel is gray-brown highly weathered silty shale, low plasticity, medium stiff, damp. **(Fill)**	ml	2 2 5	1
2 3	S-2	0.9		(1.5'-3.0') Yellow-brown **Silt**, little clay, trace fine sand and gravel; gravel is gray and red-brown highly weathered silty shale, moderate plasticity, stiff, damp. **(Residual)**	ml	4 6 7	2 3
4	S-3 S-4	0.4 0.1		(3.0'-3.9') Gray-brown **Silt** and **Gravel**, trace clay; gravel is gray-brown silty and sandy shale, noncohesive, very dense, dry. **(Residual)** ***(TOR)***	gm	50/0.4 50/0.4'	4
5				**Bottom Of Boring (3.9' BGS)**			5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-4

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1099.0
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53
GW Level: -- @ 0 hrs.
DATE DRILLED: 3/8/2021
BOREHOLE: 5" OD

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
1	S-1	0.9	NA	(0.0'-1.3') Gray **Silt**, trace clay, fine sand, gravel,roots and red-orange streaking; gravel is gray-brown highly weathered silty shale, low plasticity, soft, damp. **(Fill)**	ol/ml	1 1 3	1
2 3	S-2	1.2		(1.3'-3.5') Yellow-brown **Silt**, little clay, trace fine sand, gravel,roots, and gray streaking; gravel is gray and gray-brown silty shale, moderate plasticity, stiff, damp to moist. **(Residual)**	ml	2 3 7	2 3
4	S-3	0.7		(3.5'-3.8') Brown-gray **Silt** and **Gravel;** gravel is gray silty shale with trace brown oxidation streaking along former bedding planes, noncohesive, very dense, dry. ***(TOR)***	gm	7 50/0.3'	4
5				**Bottom Of Boring (3.8' BGS)**			5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-5

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1100.6
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53
BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.
DATE DRILLED: 3/8/2021

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
0							0
1	S-1	0.9		(0.0'-0.5') Gray **Silt**, trace clay, fine sand, gravel, and roots; gravel is gray and red-brown highly weathered silty shale, low plasticity, soft, damp. **(Fill)**	ol/ml	1 2 4	1
2	S-2	1.1	NA	(0.5'-3.8') Yellow-brown **Silt**, little clay, trace fine sand and gravel; gravel is red-brown and gray-brown highly weathered silty shale, trace red-orange and light gray streaking, moderate plasticity, stiff, damp. **(Residual)**	ml	3 3 6	2
3	S-3	0.7				7 25	3
4				(3.8'-4.1') Brown-gray **Silt** and **Gravel**, trace clay; gravel is brown-gray silty shale, noncohesive, very dense, dry. **(Residual)** ***(TOR)***	gm	50/0.1'	4
5				**Bottom Of Boring (4.1' BGS)**			5
6				**Auger Refusal at 4.5' BGS.**			6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-6

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 2-¼" ID Augers
ELEVATION 1101.6
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53
BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.
DATE DRILLED: 3/8/2021

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
1	S-1	0.7	NA	(0.0'-0.6') Gray **Silt**, trace clay, fine sand, gravel, roots, and red-brown streaking; gravel is gray and gray-brown silty shale, low plasticity, soft, damp. **(Fill)**	ol/ml	1 2 4	1
2	S-2	0.7		(0.6'-3.5') Yellow-brown **Silt**, trace clay, fine sand, gravel, roots, and light gray and orange-brown streaking; gravel is gray and gray-brown silty shale, low plasticity, medium stiff to stiff, damp. **(Residual)**	ml	3 5	2
3				red-brown, gravel is gray-brown and red-brown highly weathered silty shale		7	3
4	S-3	0.8		yellow-brown, trace dark brown streaking		7	4
5				(3.5'-3.9') Gray-brown **Silt** and **Gravel;** gravel is brown-gray silty shale with trace dark brown streaking along the former bedding planes, noncohesive, very dense, dry. **(Residual)** ***(TOR)***	gm	50/0.4'	5
6				**Bottom Of Boring (3.9' BGS)**			6
7				**Auger Refusal at 5.0' BGS**			7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

Test Boring TB-7

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn
DRILLING METHOD: 2" SS, 3-¼" ID Augers; NQ2 Wireline Core
ELEVATION 1100.4 DATE DRILLED: 3/9/2021
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53 BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
0							0
1	S-1	0.4	NA	(0.0'-0.5') Brown **Silt**, trace clay, fine sand, gravel, and roots; gravel is highly weathered gray-brown fine micaceous sandstone, low plasticity, soft, damp. **(Fill)**	ol	4 4 3	1
2	S-2	1.0		(0.5'-3.4') Yellow-brown and gray **Silt**, little clay; trace fine sand, gravel, and light gray and orange-brown streaking; gravel is highly weathered brown shale, moderate plasticity, medium stiff to stiff, damp.	ml	3 7 8	2
3							3
4	S-3	0.8		tan, increasing gravel percentage **(Residual)**		11	4
5	Auger			(3.4'-5.0') Tan **Silt** and **Gravel**, trace clay, gravel is highly weathered brown silty shale, noncohesive, very dense, dry. **(Residual)** ***(TOR)***	gm	30 50/0.4'	5
6	R-1	1.8	0	(5.0'-5.4') Light gray fine micaceous **Sandstone;** thinly bedded, broken, medium hard, horizontally bedded with brown and black oxidation streaking along bedding planes, fractured horizontally along bedding planes.	N/A	N/A	6
7				(5.4'-7.1') Brown-gray sandy/silty **Shale;** highly weathered, little silt, trace clay and fine sand, thickly laminated, very broken, soft, horizontally bedded, brown oxidation streaking along exposed edges.			7
8							8
9	R-2	1.8	0	(7.1'-7.9') Light gray fine micaceous **Sandstone;** very thinly to thinly bedded, broken, medium hard, horizontally bedded with brown and black oxidation streaking along bedding planes, fractured horizontally along bedding planes.			9
10				(7.9'-10.0') Brown-gray sandy/silty **Shale;** highly weathered, little silt, trace clay and fine sand, thinly laminated, very broken, soft, horizontally bedded, brown oxidation streaking along exposed edges.			10
11				**Bottom Of Boring (10.0' BGS)**			11
12							12
13				**Auger Refusal at 5.0' BGS**			13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-8

CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn DRILLING METHOD: 2" SS, 3-¼" ID Augers NQ2 Wireline Core

ELEVATION 1101.2 DATE DRILLED: 3/9/2021
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53 BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
0	S-1	1.1	NA	(0.0'-0.5') Brown-gray **Silt**, trace clay, fine sand, gravel, and roots; gravel is highly weathered gray-brown fine micaceous sandstone, low plasticity, soft, damp. **(Fill)**	ol	1 2 4	0
2	S-2	0.8		(0.5'-2.8') Yellow-brown **Silt**, little clay, trace fine sand, gravel, and light gray, black and orange-brown streaking, gravel is highly weathered brown shale, moderate plasticity, medium stiff to stiff, damp. **(Residual)**	ml	2 4 7	2
4	S-3	0.6		(2.8'-5.0') Tan **Silt** and **Gravel**, trace clay; gravel is highly weathered brown-gray silty shale, trace red-brown streaking, noncohesive, very dense, dry. **(Residual)**	gm	21 50/0.3'	4
5	Auger			**(TOR)**	Auger		5
6	R-1	0.9	0	(5.0'-5.4') Light gray fine micaceous **Sandstone;** thinly bedded, broken, medium hard horizontally bedded with brown and black oxidation streaking along bedding planes, fractured horizontally along bedding planes.			6
7				(5.4'-9.0') Brown-gray sandy/silty **Shale;** highly weathered, little silt, trace clay and fine sand, thickly laminated, very broken, soft, horizontally bedded, brown oxidation streaking along exposed edges.	N/A	N/A	7
8	R-2	2.1	0				8
9							9
10				(9.0'-10.0') Light gray fine micaceous **Sandstone;** thinly bedded, broken to blocky, medium hard, horizontally bedded with brown and black oxidation streaking along bedding planes, fractured horizontally along bedding planes with a small vertical fracture at 9.2'			10
11				**Bottom Of Boring (10.0' BGS)**			11
12				**Auger Refusal at 5.0' BGS**			12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

CRIBBS & Associates, Inc.

Test Boring TB-9

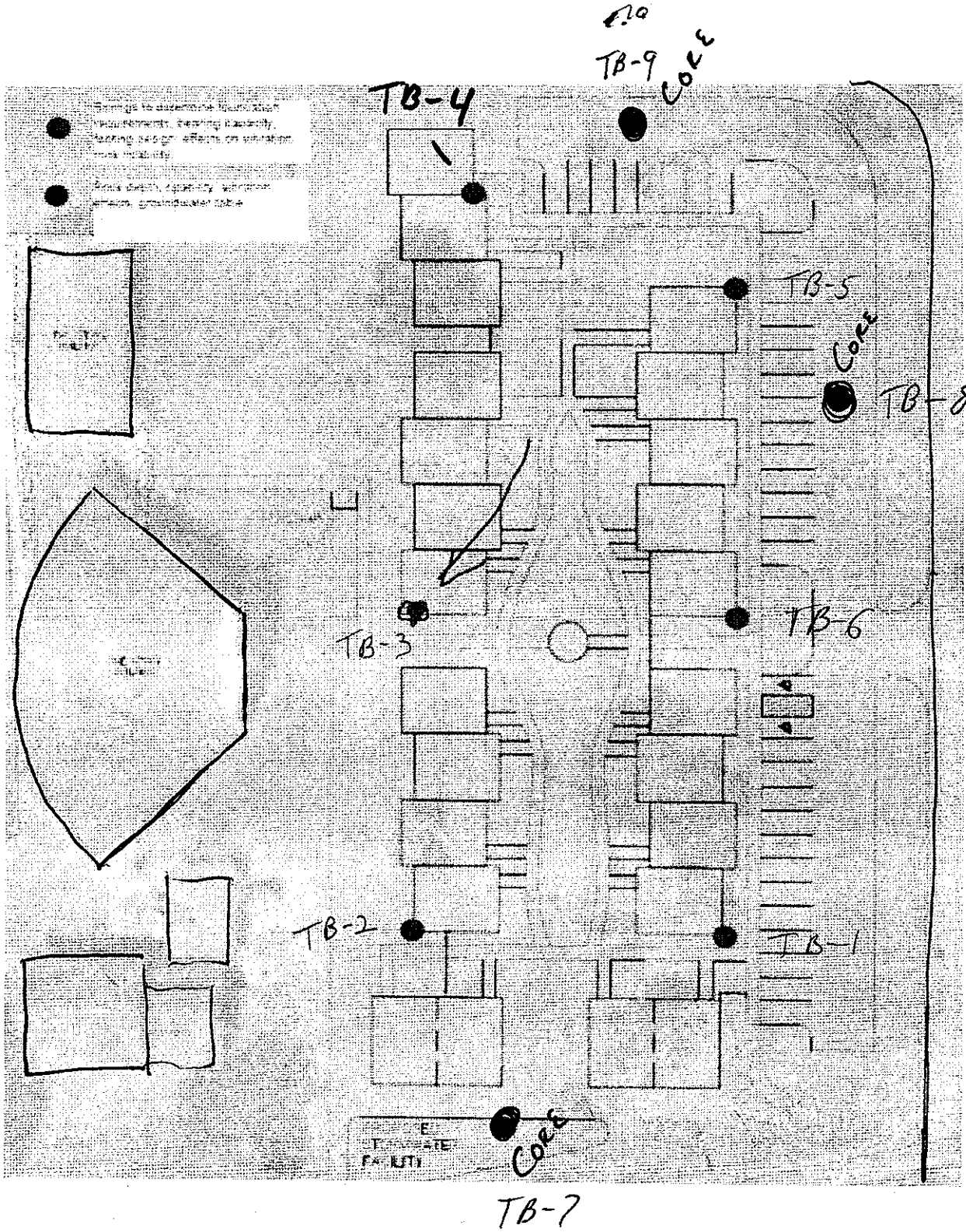
CLIENT: Westmoreland County Housing Authority
PROJECT: Church View
DRILLING COMPANY: Cribbs & Associates, Inc.
LOGGED BY: Jared Thorn DRILLING METHOD: 2" SS, 3-¼" ID Augers NQ2 Wireline Core

ELEVATION 1100.8 DATE DRILLED: 3/10/2021
LOCATION: Calumet, Pennsylvania
RIG: Mobile B-53 BOREHOLE: 5" OD
GW Level: -- @ 0 hrs.

DEPTH (FT.)	SAMPLE ID	RECOVERY (FEET)	RQD (%)	DESCRIPTION	USCS	BLOWCOUNTS	DEPTH (FT.)
0							0
1	S-1	1.2	NA	(0.0'-0.7') Gray **Silt**, trace clay, fine sand, gravel, and roots; gravel is highly weathered gray-brown fine grained micaceous sandstone, low plasticity, soft, **moist to wet.** **(Fill)**	ol	1 1 3	1
2	S-2	1.0		(0.7'-4.0') Yellow-brown **Silt**, trace clay, fine sand, gravel, and light gray streaking; gravel is weathered brown and orange-brown silty shale, low plasticity, soft to stiff, damp.	ml	3 5	2
3						6	3
4	S-3	1.1		increasing gravel percentage with depth. **(Residual)**		8 8	4
5	Auger			(4.0'-4.3') Gray **Silt** and **Gravel**, trace clay and fine sand; gravel is highly weathered brown-gray silty shale, noncohesive, very dense, dry. **(Residual)** ***(TOR)***	gm Auger	50/0.3'	5
6	R-1	2.3	0	(5.0'-6.1') Light gray fine micaceous **Sandstone;** very thinly to thinly bedded, very broken to blocky, medium hard, horizontally bedded, brown oxidation streaking along bedding planes, fractured horizontally along bedding planes with small vertical fractures at 5.1' and 5.8' bgs.			6
7							7
8	R-2	1.5	10	(6.1'-10.4') Brown-gray sandy/silty **Shale**, highly weathered, little silt, trace clay and fine sand, thinly laminated, very broken, soft, horizontally bedded, brown oxidation streaking along exposed edges.	N/A	N/A	8
9							9
10							10
11				(10.4'-11.5') Light gray fine micaceous **Sandstone;** very thinly to medium bedded, very broken to blockey, medium hard, horizontally bedded, low angle concoidal fracture at 11' bgs otherwise fractured along bedding planes, brown oxidation streaking along bedding planes.			11
12				**Bottom Of Boring (11.5' BGS)**			12
13				**Auger Refusal at 5.0' BGS**			13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

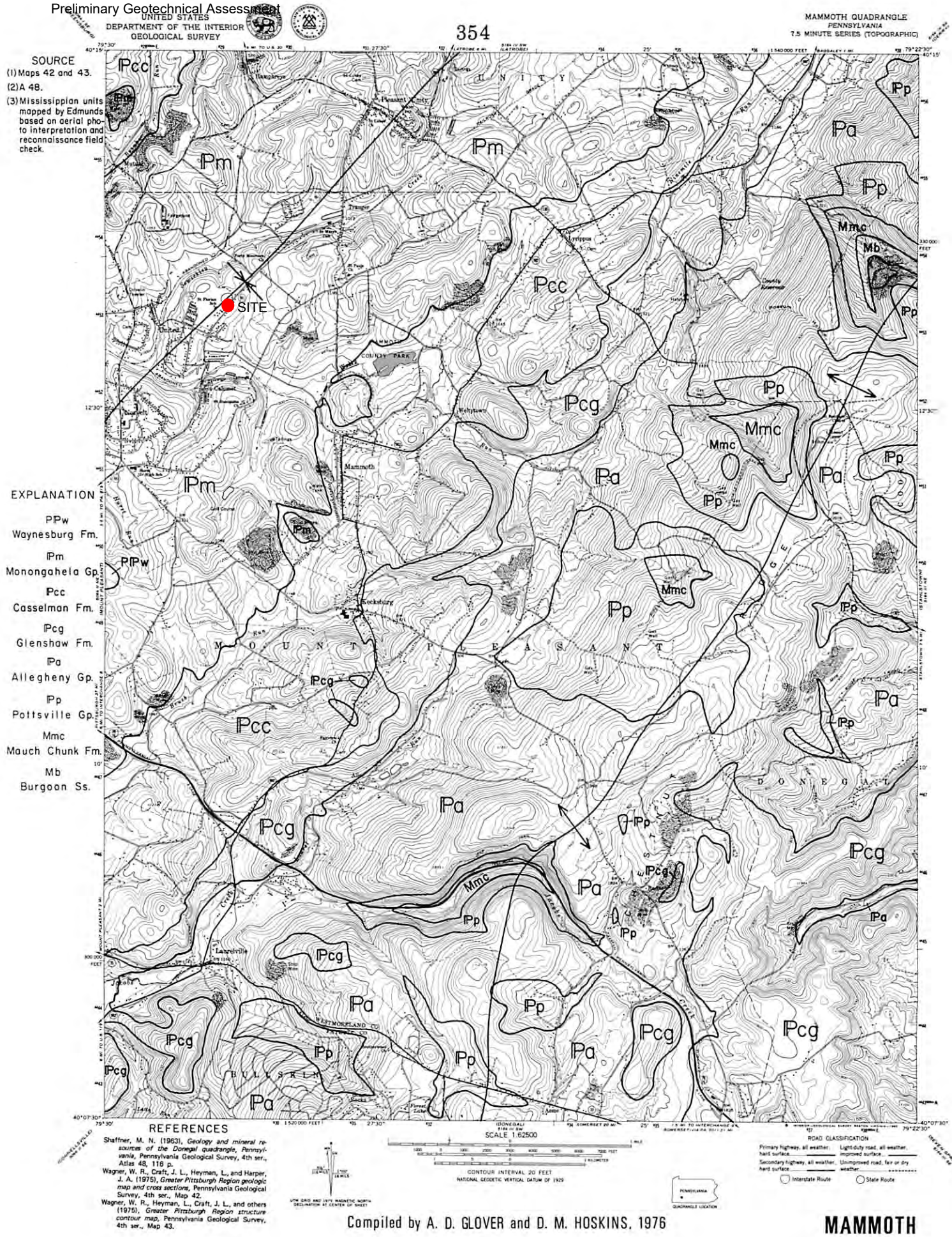
APPENDIX C

Boring Layout


TB-4
TB-9
Core
TB-5
Core
TB-8
TB-3
TB-6
TB-2
TB-1
Core
TB-7

APPENDIX D

Surface Geology Map


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
354
MAMMOTH QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SOURCE
(1) Maps 42 and 43.
(2) A 48.
(3) Mississippian units mapped by Edmunds based on aerial photo interpretation and reconnaissance field check.
SITE
EXPLANATION
PPw Waynesburg Fm.
Pm Monongahela Gp.
Pcc Casselman Fm.
Pcg Glenshaw Fm.
Pa Allegheny Gp.
Pp Pottsville Gp.
Mmc Mauch Chunk Fm.
Mb Burgoon Ss.
REFERENCES
Shaffner, M. N. (1963), Geology and mineral resources of the Donegal quadrangle, Pennsylvania, Pennsylvania Geological Survey, 4th ser., Atlas 48, 116 p.
Wagner, W. R., Craft, J. L., Heyman, L., and Harper, J. A. (1975), Greater Pittsburgh Region geologic map and cross sections, Pennsylvania Geological Survey, 4th ser., Map 42.
Wagner, W. R., Heyman, L., Craft, J. L., and others (1975), Greater Pittsburgh Region structure contour map, Pennsylvania Geological Survey, 4th ser., Map 43.
SCALE 1:62500
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
ROAD CLASSIFICATION
Compiled by A. D. GLOVER and D. M. HOSKINS, 1976
MAMMOTH

APPENDIX E

Mine Map


59
FIT TO 59
48
CALUMET UNITED
49
FIT TO 49
47
38
FIT TO 38
NO. 13&14 BUTTS
NO. 11&12 BUTTS
NO. 7&8 BUTTS
NO. 5&6 BUTTS
NO. 9&10 BUTTS
NO. 3&4 BUTTS
NO. 10&11 BUTTS
NO. 12 BUTTS
NO. 1&2 KILGORE
NO. 8&9 BUTTS
NO. 6&7 BUTTS
NO. 4&5 BUTTS
NO. 2&3 BUTTS
NO. 3 BUTTS
50 COKE OVENS
ASH DUMP
COKE OVENS
UNITED
S. B. FISHER
W. KILGORE AREA 10.580 ACRES
HEADINGS
NO. 1&2 FACE
DANIEL KILGORE HRS.
AREA 120.000 ACS. IN FEE
RES. 95 AREA 4.000 A.
SITE
SLAVISH ROMAN CATHOLIC CHURCH AREA 3.000 ACRES
17.987 ACS. SURFACE TO FRANK SALLAR AND DAUGHTER
13.212 ACS. SURFACE TO MARK SUGARMAN ET UX
3.097 ACS. SURFACE TO MARY LUCAS
HEADING
MAIN DIP
NO. 2&3 FLATS
BARRIER
MAIN DRAIN BARRIER
SCHOOL LOT
830
820
810
800
790

APPENDIX F

Soil Map

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 Westmoreland County, Pennsylvania

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 (https://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.

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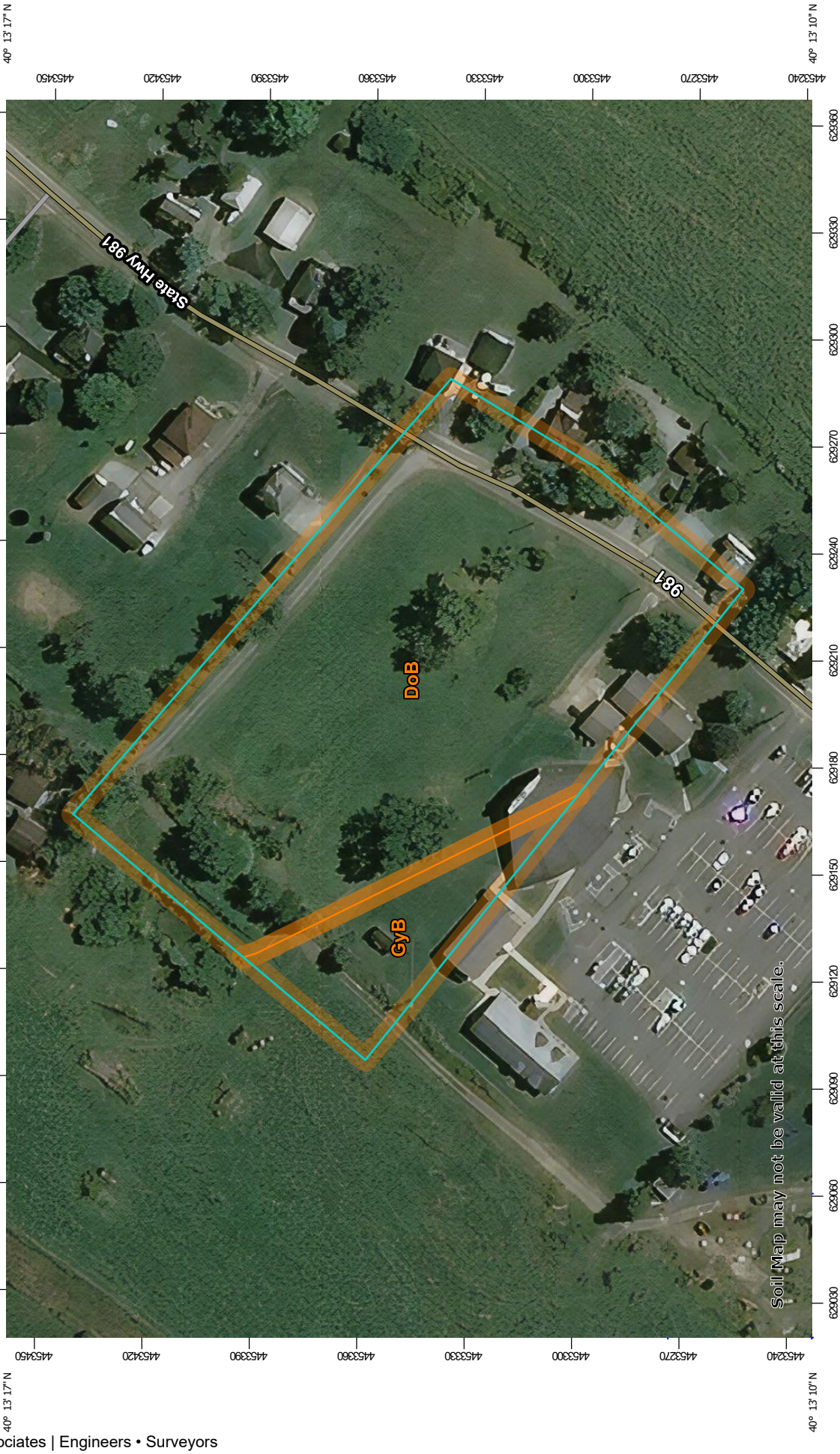
Contents

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



6

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 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
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: Westmoreland County, Pennsylvania
Survey Area Data: Version 17, Jun 5, 2020

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

Date(s) aerial images were photographed: Apr 24, 2019—Sep 15, 2019

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DoB	Dormont silt loam, 3 to 8 percent slopes	3.8	87.9%
GyB	Guernsey silt loam, 3 to 8 percent slopes	0.5	12.1%
Totals for Area of Interest		**4.3**	**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.

Westmoreland County, Pennsylvania

DoB—Dormont silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2s5gj
Elevation: 800 to 1,540 feet
Mean annual precipitation: 37 to 47 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 173 to 197 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dormont and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dormont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 21 inches: silt loam
Bt2 - 21 to 31 inches: silty clay loam
Bt3 - 31 to 46 inches: channery silty clay loam
Bt4 - 46 to 62 inches: channery silty clay loam
BC - 62 to 75 inches: channery silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.66 in/hr)
Depth to water table: About 24 to 44 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lowell

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Culleoka

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Guernsey

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

GyB—Guernsey silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2wdrv
Elevation: 670 to 1,860 feet
Mean annual precipitation: 38 to 43 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 175 to 198 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Guernsey and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guernsey

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope, head slope

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and shale over residuum weathered from limestone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
BE - 8 to 15 inches: silt loam
Bt1 - 15 to 22 inches: silty clay loam
Bt2 - 22 to 37 inches: silty clay
Btg - 37 to 54 inches: silty clay loam
2C - 54 to 60 inches: channery silt loam
2Cr - 60 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 59 to 62 inches to paralithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Culleoka

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Westmoreland

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Dormont

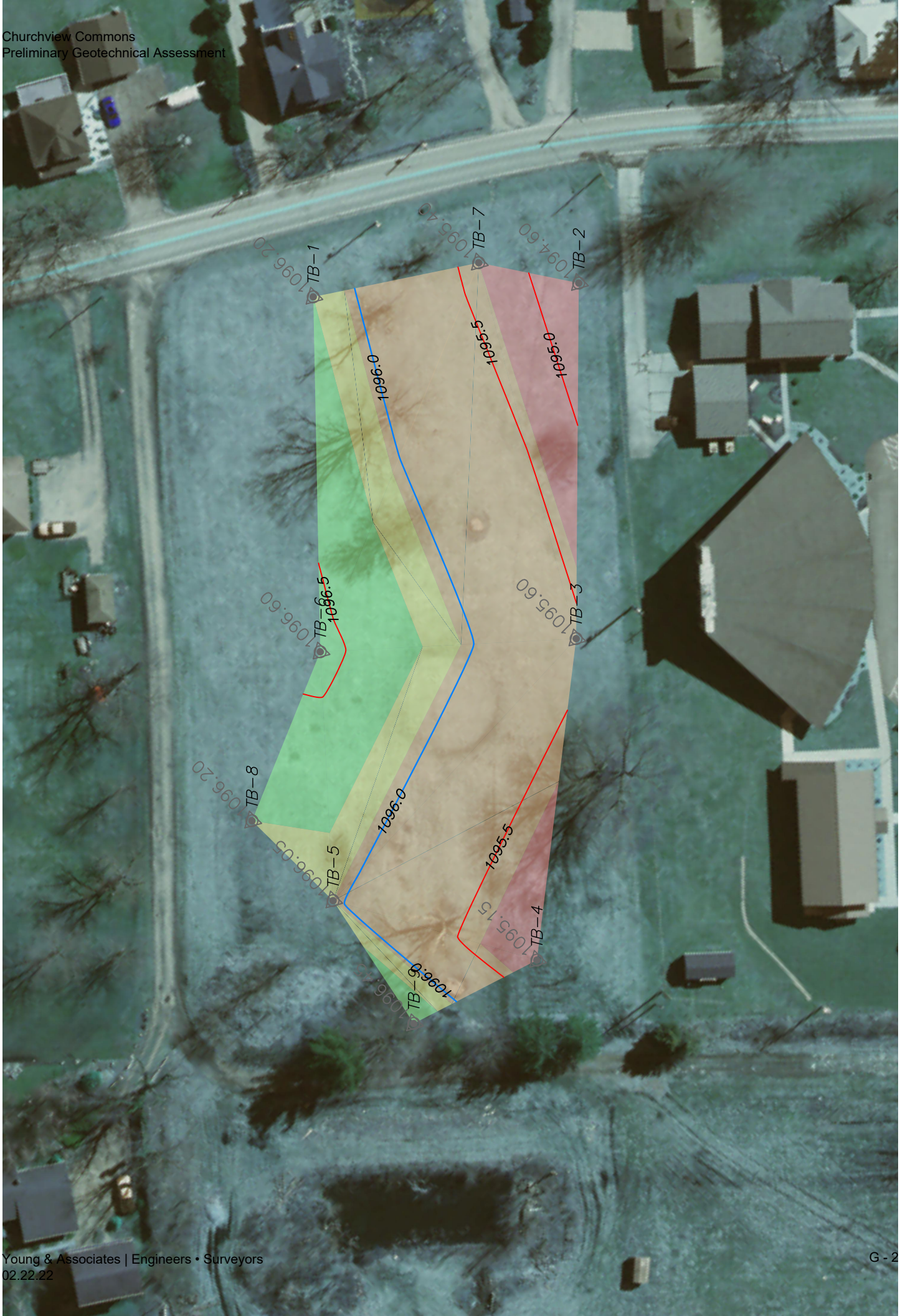
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Linear
Hydric soil rating: No

APPENDIX G

Rock Profile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